Studies in Human Ecology and Adaptation

Katherine Homewood
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Editors

Staying Maasai?

Livelihoods, Conservation and Development in East African Rangelands

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Foreword

The Future of Maasailand: Its People and Wildlife

The area of Maasailand straddling the Kenya–Tanzania border supports the most abundant wildlife populations on earth. It also encompasses 14 of the world's most renowned national parks, including Serengeti, Mara, Ngorongoro, Amboseli, Tarangire, Manyara and Tsavo. Over a million visitors flock to the area each year, generating over $1.5 billion in revenues. Often overlooked is the even greater abundance of livestock and the pastoral peoples who depend on them.

Despite thousands of years of pastoralism in eastern Africa, pastoralists are often blamed for the destruction of the savannas. The blame stems in part from a long-held view that pastoralism is inefficient and destructive. Research over the last three decades has dispelled that view and shown that traditional pastoralism is as productive as well-managed commercial ranches.

The dichotomy scientists and conservationists drew between the natural and human realm also hampered research on pastoralism for decades. Researchers plumbed the ecology and behaviour of virtually every wildlife species in the savannas, yet black-boxed pastoralists and livestock as aberrant and unworthy of study. The focus on wildlife and parks masked the dominant role pastoralists play in savanna ecosystems.

Researchers are finally peering into the black box and studying people, as we shall see in Homewood et al.'s important book on Maasai livelihoods. A look at government policy in the pastoral lands shows just how timely this study of livelihoods is.

Policy among East African governments is still rooted in the view that pastoralism is an inefficient and destructive use of land. Policy does differ between Tanzania and Kenya in terms of state versus individual ownership, but both adhere to the same prescription of curbing migration, settling families and commercializing herd management and production. Land ownership and settlement are seen as prerequisites for improving infrastructure, investment, market access and social services.

This prescription works well in arable areas such as the Machakos district in Kenya, where erosion has fallen sharply since the 1940s, despite a fivefold increase in human population and large jump in crop production. Contrast this with the adjacent Kajiado district where livestock numbers have barely risen since the 1960s, land degradation has increased and poverty has climbed.

The difference reflects differential productivity and malleability of arable and pastoral lands. Whereas the yields of cereal crops in arable lands can be boosted manyfold using modern agroindustrial practices, protein production on pastoral lands already matches the best commercial ranches.

Policy is far better when it comes to wildlife conservation in pastoral lands – at least in Kenya. On the basis of detailed studies in Amboseli, Kenya's 1977 wildlife policy recognized the limitations of parks and the need to conserve entire ecosystems by making wildlife profitable to landowners. From their small beginnings in Kenya Maasailand, community-based conservation policies have spread across Africa and beyond. The underlying assumption of the approach is that wildlife will generate sufficient income to justify its presence on private and communal lands. But does it?

In "Staying Maasai?", Homewood et al. look at how Maasai are adapting to change in the Kenya–Tanzania borderlands, and whether wildlife incomes feature significantly in their livelihoods. The results show the diversity of responses to economic transition among the Maasai, ranging from continued pastoralism to crop farming and employment. The range of responses bucks the view of Maasai as unchanging traditionalists and shows them investing livestock wealth into new opportunities. There are, however, huge disparities in wealth and opportunity. Best off are cattle-rich families whose herds help educate their children and broaden their prospects. Worst off are the cattle-poor families who diversify out of necessity and lose herds in the process.

Off-farm income is sure to grow in Maasailand as the options on the land narrow. Just as ranching families in the American West found it impossible to survive on small allotments when the open range was subdivided, so the Maasai will face a similar conundrum. According to surveys we conducted recently at the African Conservation Centre, Maasai families already see education and off-farm jobs as the best option for coping with population growth and future droughts.

Other observations in this book echo problems of settling the open range. Richer and influential families are already securing the best land in Kenya and buying out poorer families. Fewer families will control large holdings in the course of privatizing the pastoral lands. This may well improve the outlook of the health of land and wildlife, as has happened on Laikipia in Kenya. But one hopes that land consolidation does not reach the point of scuttling the small family rancher as cattle barons did in the American West.

This book takes a hard look at the importance of wildlife incomes at a household level around parks. Contrary to assumptions in Kenya that gross tourism income will trickle down to households, few families are benefiting significantly, except perhaps in Maasai Mara. Even in Amboseli where community-based conservation originated, benefits in the form of bursaries and health care are too diffuse to offset household income losses to wildlife. Unfortunately, some studies in this book fail to capture all sources of wildlife revenues to communities and the extent to which income is skimmed off by corruption. Notwithstanding these shortcomings, household incomes in Amboseli clearly fall far short of projected gross flows and far short of what it will take to offset wildlife losses.

The situation is worse in Tanzania where communities have little control over commercial concessions. Tanzania's policy takes no account of the costs and benefits of wildlife, and marginalizes the very constituency on which the future of wildlife most depends.

The individual household surveys are by far the most important contribution of this book. Finally, we have some rigorous science showing us what the Maasai are doing and why, rather than repeating the presumptions and misassumptions that have shaped land use and conservation policies and practices.

The elemental message of this book is that we must look at Maasailand and its future prospects from the viewpoint of Maasai families. Population growth, land loss and social transition among the Maasai are overwhelming the capacity of their herds to support their families. Environmental vulnerability has risen sharply. Marginalization and poverty are severely constraining Maasai choices. The larger, longer-term concerns of wildlife and habitat conservation take backseat for families scrambling to survive. So, what can be done to improve livelihoods, health and education?

This book rightly makes a case for a better policy framework. Its message comes at a time when the Kenyan government's Office of the President has accepted that the many policy initiatives dating back to colonial times have failed because of misplaced assumptions. A new policy is needed, based on an understanding of pastoralism and semi-arid environments. Such open-mindedness is new and refreshing. But even with such good intentions, new policies take time. And beyond policy formulation lies the challenge of institutional restructuring, culture change and retraining of personnel.

Given the political and economic marginalization of pastoral communities, the ground zero for new policies in the semi-arid environments is an assessment of land ownership and user rights of natural resources. Even Kenya's solution of granting individual land titles to customary owners militates against pastoral communities in a free market economy where wealthier ethnic groups can secure loans to buy land from the poorer ones. The resulting immigration of richer farming communities into poorer pastoral ones and displacement of pastoralists has created ethnic clashes in Kenya.

This book concludes that the lack of wildlife user rights for pastoral communities in Tanzania will hasten its demise. More rights and greater flexibility will bring bigger returns to Maasai communities and encourage wildlife use, as in Mara. But is a *laissez faire* policy the answer, given the size of the tourism industry in Kenya Maasailand already and its weak reflection in household incomes?

Clearly, there is more to policy than a national strategy and enabling legislation. Above all, there is the political structure that favours agricultural communities over pastoral and elite cabals over the poor and serves to dilute and subvert policy. There is also the drawback of the diffuse governance structure of pastoral societies. These work slowly and surely in traditional disputes, but hamper the Maasai when it comes to establishing landowner associations, producer cooperatives and the political advocacy needed to counter their marginalized position. Add the self-interest of leaders among many pastoral communities in keeping

communities weak for their own gains, and the difficulty of translating policy into practice is apparent.

Without greater individual liberty and strong local institutions, national policy, however good, is not enough. The devolution of decisions and the strengthening of grassroot institutions will do more to elicit development than policy ever can, and will be far harder to reverse or subvert.

This is borne out by evidence that the most innovative wildlife conservation programs are emerging in the pastoral areas of Kenya far removed from parks, rather than those adjacent to them. In the absence of a park, wildlife conservation is a matter of choice, not obligation, and it must pay its way. Where they have more latitude to do so, communities are inviting in tourists and tourism businesses, setting up their own wildlife sanctuaries and employing their own scouts to protect them. And, unlike a national park, these new community wildlife sanctuaries do not exclude livestock use. Many, like those of Shompole and Olkiramatian in the Lake Magadi region of Kenya Maasailand, serve as grass banks for livestock during dry seasons and droughts.

To succeed, policy must create the conditions for self-starting, self-developing and self-sustaining communities. “Staying Maasai?” shows that the Maasai are adapting and diversifying as far and as fast as the economic, ecological and political environment will allow. Such research has a major role to play in bringing knowledge of what is happening among the Maasai to the attention of governments, donors, NGOs and conservationists, just as it has in bringing outside knowledge to the attention of the Maasai.

Nairobi David Western
3 May 2008

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Chapter 1
Changing Land Use, Livelihoods and Wildlife Conservation in Maasailand

Katherine Homewood, Patti Kristjanson, and Pippa Chenevix Trench

1.1 Introduction

At the outset of the twenty-first century, Masaailand[1] comprises some 150,000 km^2 of arid and semi-arid rangeland straddling the Kenya/Tanzania border. It is internationally famous for both its spectacular large mammal wildlife and its iconic pastoralist populations. But Maasailand is undergoing rapid change. The events unrolling there are of central importance on the one hand to development trajectories for many people struggling against poverty, and on the other to environmental sustainability and the conservation of dwindling wildlife populations. The priorities of wildlife conservation not only show some synergies with the imperatives of community development but also present strongly competing demands. There is a pressing need to understand people's changing land use and livelihoods better to foster positive outcomes for conservation and for development in Maasailand.

Historically, populations in and around Maasailand have depended on livestock keeping, cultivation, and to some extent hunting and gathering (c.f. Galaty, 1982). Individuals, households and whole communities have for centuries shifted between different mixes of herding, farming and gathering/hunting. However, specialized pastoralism, traditionally at the core of Maasai cultural identity, has declined throughout the twentieth century (Waller, 1999; Spear and Waller, 1993). Although the population of Maasailand is still primarily rural and strongly livestock-dependent, with some communities and households remaining almost entirely livestock-oriented, the majority is increasingly diversifying, either towards agro-pastoralism or away from natural resources-based livelihoods to non-farm activities.

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[1] 'Maasailand' denotes a loosely bounded area of East Africa (Fig. 1.1) whose rural population is dominated by Maa-speaking communities which, despite their diversity, self-attribute to Maasai ethnicity. It is not a formal term and does not denote an administratively recognized region.

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The growing importance of diversification away from livestock production is taking place alongside drastic changes in tenure, with rapidly diminishing access due to land privatization, subdivision and conservation set-aside. The subdivision of formerly communal rangelands into private holdings, their conversion to commercial cultivation or their designation as conservation estate, have had radical implications for the people of Maasailand. The most significant consequences of subdivision include the loss of access to key resources by people and livestock and increasing constraints on movement between, and competition for, those key resources that remain (Rutten, 1992; Turner, 1999). Privatization and fencing of formerly communal land also excludes wildlife from access to critical resources and can block vital corridors between wet and dry season areas.

Many conservation and development agencies have advocated integrated conservation and development projects (ICDP), conservation with development (CWD) and most recently community-based natural resource management (CBNRM), including community-based conservation (CBC), as the way to achieve poverty reduction alongside environmentally sustainable livelihoods (Hulme and Murphree, 2001). However, policy goals are increasingly polarized between poverty reduction on the one hand, and wildlife conservation priorities on the other (Adams and Hulme, 2001; Adams et al., 2004; Adams and Hutton, 2007). Where evidence exists, the performance of ICDP, CWD and CBNRM initiatives has been disappointing for both conservation and development outcomes in sub-Saharan savannas and woodlands as elsewhere (Blaikie, 2006; Ribot, 2002; Menzies, 2004). Some see this as the inevitable outcome of an increasing imbalance between population and resources. Others see problems arising more as a result of changing rules of access and exclusion, irrespective of the absolute availability of resources (Gausset et al., 2005). Whatever the relative importance of the different factors, climate change is likely to exacerbate matters, not only by precipitating crises in biophysical conditions but also by triggering political and economic responses that further impact access (Wisner et al., 2004). There is real need for a more careful and robust understanding of environment and development processes and outcomes in household and individual decision-making, and the ways these affect livelihoods and land use change under different site-specific circumstances.

This volume on changing land use and livelihoods and the implications for wildlife in Maasailand combines a wide range of qualitative and quantitative approaches to develop an understanding of Maasai households' perceptions, aspirations and actions on the one hand, and the more external driving forces, processes and linkages on the other. A series of case studies from across Maasailand in Kenya and Tanzania, together with reviews of formal and *de facto* policy, incorporate questions of scale and extent of change, from national to household levels. In doing so, they start to identify the factors driving change in land use and livelihoods, to investigate the implications for people, environment and wildlife and to clarify lessons learned (Homewood et al., 2001; Thompson et al., 2002).

This chapter first outlines the biophysical setting and the social, institutional, and policy history of the area, particularly as concerns tenure. This is taken as the

background to develop ideas on Maasai land use and livelihoods in general and diversification in particular, with a focus on conservation and development issues. This chapter goes on to develop a conceptual framework, outlining the detailed theoretical underpinnings on which we have drawn and setting out our approach for addressing the complex trajectories of land use and livelihoods change in Maasailand. The final section describes the structure and contents of the rest of the volume.

1.2 The setting

Maasailand sits across the Tanzania/Kenya border, and is centred on a broad cross section of the Great African Rift Valley (Fig. 1.1). The area is largely made up of arid or semi-arid lands where production is limited by lack of plant-available water (Pratt and Gwynne, 1977). These grazing lands are interspersed with cropland mosaic and Acacia-dominated woodlands, all representing habitat for wild and domesticated herbivores. The Rift Valley is associated with fertile volcanic soils across much of Maasailand, and with topography encompassing key highland and montane drought refuge areas characterized by cooler climates and better water availability. Along with low-lying swamps and drainage lines, these represent key resources which are hotspots of potential for dry season forage production, and have long been contested between different forms of land use (pastoralism, farming and wildlife-based). Sited just on and below the equator, Maasailand has low, variable, unpredictable, but broadly bimodal rainfall. Both pastoralist and wildlife populations have for millennia moved around this landscape seasonally to make the most of changing quality and quantity of grazing and to avoid disease. Sites covered in this volume vary from very arid (Longido, Chap. 6) to semi-arid (Mara, Chap. 3), to the 'wetlands in drylands' of Amboseli (Chap. 5). Each site combines wet season dispersal areas with dry season refuges retaining permanent water (whether swamp as in Amboseli or higher land). As well as pastoralism, areas with high fertility soils and good soil–water relations have often been long associated with farming, and forests, where they persist, are still regularly used for products such as honey, poles, charcoal and medicinal plants. More recently, permanent water has increasingly been captured for irrigated crops (all sites). Wildlife conservation and tourism have added new opportunities and constraints, as has the growth of urban centres, especially Nairobi (Kitengela, Chap. 4). In Tarangire (Chap. 7) and to a lesser extent elsewhere, gemstones and other mined or quarried products have become sought after resources.

The history of the Maasai has been set out in detail by other authors (Spear and Waller, 1993; Waller, 1976, 1979, 1985, 1988, 1990, 1993, 1999; Waller and Sobania, 1994; Anderson, 2002). The emergence of Maa-speaking people as specialized pastoralists, and their shifting access to and use of land are summarized in Table 1.1.

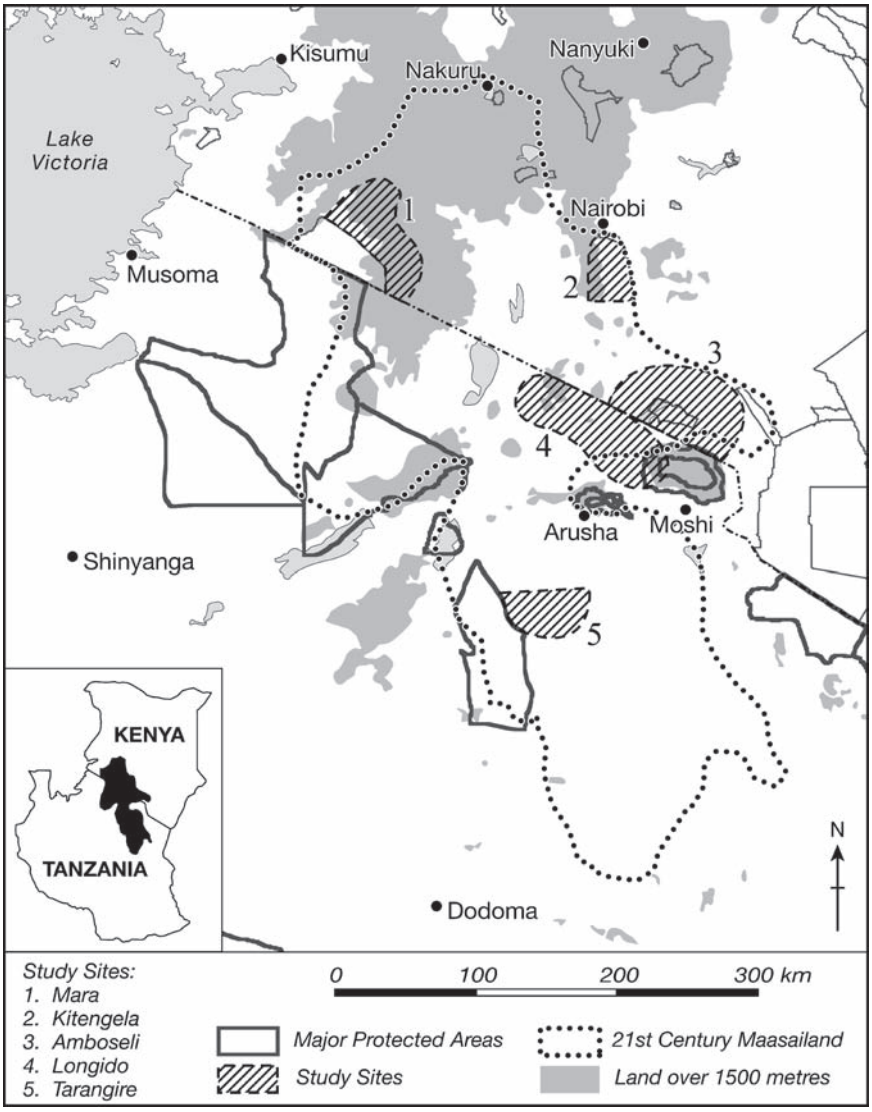

Fig. 1.1 Map of Maasailand at the start of the twenty-first century, and study sites

Table 1.1 Summary of Maasailand historical timelines

1000–0 BC	Cushitic-speaking farming and herding groups spread as far as Southern Rift. Nilotic groups differentiating into Plains and Highland Nilotic language groups (Ehret, 1974)
0–1500 AD	Livestock herding groups across East Africa interact with incoming Bantu and adopt iron. Maasaians differentiate within ancestral Plains Nilotes. Emergence of specialized pastoralism versus mixed farming/herding economy (Marshall, 1990,1994, 2000). Maasaians spread southwards through Kenya 1000–1500 AD.

(continued)

Table 1.1 (continued)

Ca. 1700s	Maasai expansion	Maa-speaking groups extend from Lake Turkana (N. Kenya) throughout Rift Valley and present day Maasai steppe (East–Central Tanzania). Maasai displace Barabaig/Oltatwa from Ngorongoro (Borgerhoff Mulder et al., 1989)	
Ca. 1800s	Iloikop wars	Central Maasailand dominated by central sections especially Kisongo and Loita; Laikipia Plateau Maasai destroyed and dispersed; Ndorobo remain as pastoroforagers. Outlying Maa-speaking groups (Il Parakuyo, Il Chamus, Ndorobo) combine farming, fishing, foraging, trade and other activities with pastoralism (Spear and Waller, 1993)	
1890s	Emutai	Rinderpest pandemic/epidemics/livestock losses/social disruption. Massive livestock and human losses. Loss of pastoralist political and military dominance (Waller, 1988)	
		Kenya	Tanzania
1900–1910	Advent of colonial rule	British colony 1903. Some rebuilding of herds through service as mercenary forces supporting British punitive raids (Waller, 1976)	German colony. Conflict with Germans further undermines Maasai. British territory 1918-independence
	Maasai moves	Maasai relocated to Narok/Kajiado Southern Reserve; History of Trans-mara (Waller, 1990); Uas Ngishu/Il Chamus (Anderson, 2002) Laikipia settled by white ranchers	Some areas designated for settlement and Maasai initially removed, for example, from Mkomazi area (Brockington, 2001)
1940s–1960	Protected areas in Maasai land	Mara National reserve; Amboseli reserve/NP; Rift Valley protected areas (Lake Nakuru, Lake Bogoria, etc.)	1959 Serengeti National Park/Ngorongoro Conservation area; Manyara NP; Tarangire National Park; Mkomazi Game reserve
1960s–1980s	Independence	Maasai Reserve lands held in Trust: some areas allocated to private ownership. Remainder first redesignated as group ranches and later progressively privatized (Rutten 1992; Galaty 1999)	Nyerere: all Tanzanian citizens have the right to live anywhere in Tanzania: extinguishes customary rights (Shivji, 1998). Mid-1980s: economic liberalization: communal lands can be sold by central agencies with minimal consultation of users (Igoe and Brockington, 1999; Igoe, 2007)
2000	Land issues	Mara group ranches fully privatized (Chap. 3); Kajiado group ranches debating privatization. Proximity to Nairobi drives Kitengela land market (Chap. 4)	Wildlife management areas legislation threatens land tenure and village/household revenues from wildlife-based enterprises (Chaps. 6, 7, 8)

1.2.1 Policy and Institutional Context of Land Use and Livelihood Change

1.2.1.1 Land Tenure

Land tenure underpins resource access, land use and livelihoods. The contrasting land tenure policies which have evolved in Kenya and Tanzania since pre-colonial times have led to very different contexts of land use and management in the two countries, with major implications that our cross-border analyses look at in detail. The summary here draws on a fuller review elsewhere (Homewood et al., 2004).

During the pre-colonial period, Maasai-dominated lands were largely managed as common property, with access primarily governed through social networks of section, location, clan, kin and peer group friendships. Key resources of water and grazing were continuously contested, periodic violent conflicts alternated with negotiated settlements, and raiding was an institutionalized way of accumulating livestock (cf. Kurimoto and Simonse, 1998). Mechanisms of negotiation allowed for flexible, often reciprocal social and spatial patterns of access, and potentially included intermarriage with and/or adoption of outsiders into the social group governing a given resource (Galaty, 1980).

With the advent of the colonial period, large areas of Maasailand in both Kenya and Tanzania were alienated for settlers and for protected areas. Both Trust land (Kenya) and Crown land (Tanzania) came under the control of the colonial Governor or his equivalent. In Kenya, a series of land expropriations and resettlement moves culminated in Maasai being concentrated in the Maasai reserve (Hughes, 2006). The southern Maasai reserve was designated as Trust land, with access on the basis of the criterion of Maasai ethnicity, but soon became subject to intense pressures for access by, and in-migration of, non-Maasai (Waller, 1993). In the run-up to independence and its aftermath, intense pressure to privatize led to the formation of individual, company and group ranches in Kenya (Galaty 1980). Privatization of land eventually culminated in major land use transitions to large-scale mechanized cultivation, among other outcomes. People in positions of power within group ranches not uncommonly leased out or sold land for personal profit, to the detriment of other members (Homewood et al., 2004; Mwangi, 2007a, b, c). Faced with such insecurity of tenure, many Maasai group ranch members preferred to subdivide and get individual title rather than lose out altogether (Galaty, 1999). The pressure to subdivide and processes of subdivision continue today (Mwangi, 2007a, b, c). Those failing to be included on the register before subdivision are effectively dispossessed. They may become squatters, or be absorbed into patron households, or gravitate to rural trading centres or towns seeking work.

In colonial Tanzania, Maasai held ‘deemed’ rights of occupancy on Crown land, which initially provided some protection to customary users. However, following World War II the status of ‘deemed rights’ of occupancy was progressively eroded in favour of rights of occupancy granted to outsiders by the central government or its agents (Shivji, 1998). At independence, the state owned all

land, including what was initially Maasai District. Early attempts to form ranching associations, and give them tenure, collapsed under the political pressure for *ujamaa* collective villages, and Nyerere's assertion of the right of any Tanzanian citizen to apply to live anywhere (Moris, 1981). The state granted rights of occupancy to *ujamaa* villages and parastatals, overriding customary 'deemed' rights (Shivji, 1998). From the mid-1980s, economic liberalization intensified this trend, with rights increasingly granted to expatriate entrepreneurs and often NGO-driven conservation initiatives (Igoe and Brockington, 1999; Igoe, 2007). With well-placed outsiders (including the state) increasingly able to secure exclusive title to formerly communal land, the trajectories of access to, and use of, land seem in some ways to be converging with those seen in Kenya (Borner, 1985; Goldman, 2003; Igoe and Brockington, 1999; Kallonga et al., 2003). The radical 1992 Presidential Land Commission Report questioning land tenure policies made devolutionary and democratic recommendations, many of which were disregarded. However, others were in due course adopted in the 1995 Land Policy followed by the Village Land Act and Land Act of 1999. The positive aspects of the Village Land Act 1999 are traced to the commission's work and subsequent national advocacy efforts. In Tanzanian Maasailand, the Village Land Law came into force in 2001 and has in many ways helped pastoralist land rights. However, there is a key contradiction between village and general land law over the definition of village land. This contradiction could result in land alienations, particularly in pastoralist villages, since general land law defines pastoralist rangelands as empty and therefore open to reallocation by the government. A second contradiction involves the control of hunting licenses and game viewing operations in wildlife management areas (WMAs). WMAs were conceived and established in the spirit of devolving both management decisions and benefits to local communities as part of Tanzania's National Strategy for Growth and Reduction in Poverty ('Mkukuta': URT, 2005). In a move that runs counter to community conservation ideology and rhetoric, the state has now formalized central control of all licenses for game viewing as well as hunting enterprises in WMAs (TNRF, 2007). Different dimensions of this rapidly evolving situation are explored in more detail in Chaps. 6, 7 and 8.

Contrasting land tenure policies and trajectories have thus culminated in some similarities in the two parts of Maasailand, to the extent that many rural poor find themselves with few or no rights to the land they live on, paradoxically at the same time as laws are being passed that are supposed to increase security of tenure of rural communities. As a result, many Maasai are increasingly excluded from resources central to livelihoods, in ways that impact on land use and well-being (Chaps. 8, 9).

1.2.1.2 Agriculture and Livestock

In addition to land tenure, other agriculture and livestock policies, as well as the broader political framework dictating trade and economic development, have been of considerable importance in determining the context of land use and livelihoods

change. There are considerable macroeconomic policy differences between the two countries (Chaps. 8, 9). Kenya's capitalist trajectory stimulated market opportunities for maize and other crop production (including, most recently, high-value export vegetables and flower production). In Tanzania, such opportunities have been strictly controlled by the state, and often allocated to outsiders through centrally negotiated leases. Despite contrasts in macroeconomic policies, there are clear parallels between the agricultural and also the livestock policies in the two parts of Maasailand. Agricultural policies have tended to favour farming over livestock production in both countries. Livestock policies have consistently supported 'western' style commercial ranching operations over indigenous production systems (Raikes, 1981; URT, 1997; Mattee and Shem, 2005). In both Kenya and Tanzania, livestock development policies have over the decades progressively withdrawn animal health provision in rural areas (e.g. Homewood et al., 2006). Quarantine policies have repeatedly undermined local producers in favour of the protected and relatively small export market producers (Raikes, 1981; Waller and Homewood, 1997; McPeak and Little, 2006; Scoones and Wolmer, 2006).

1.2.1.3 Wildlife and Conservation Policy

In both Kenya and Tanzania, wildlife belongs to the state, but wildlife and conservation policies present major cross-border differences. The Draft Wildlife Bill (MTW, 2007) lists around 8% of Kenya's surface area as protected conservation estate (not counting marine parks and reserves), including 23 national parks, 28 national and primate reserves, including the Maasai Mara National Reserve, and 4 national sanctuaries (Chap. 9). This does not include the increasing amount of land set aside as privately protected areas, where land use is regulated under local agreements or voluntarily. In Tanzania, 12 national parks together with the Ngorongoro Conservation Area constitute category I and II protected areas, giving strict protection to wildlife and 'natural' ecosystems. These comprise around 25% of the land surface area (Earthtrends/WRI, 2003). However, residence and local people's consumptive activities are excluded from a considerably greater area, including 28 game reserves and 540 forest reserves. There are also 38 game-controlled areas (GCAs), but these, in theory at least, pose no restrictions on land use, and grant the state no powers over wildlife that it does not have everywhere else (e.g. on village lands which are not GCAs), while the protected area categories of National Park, Game or Forest Reserve exclude human residence and many or all local land use activities.

Wildlife policies differ considerably in the two countries. Kenya bans hunting, emphasizes game viewing and allows private landowners to benefit, albeit less than they would if consumptive uses of wildlife were allowed (Norton Griffiths, 2007). The Tanzanian State promotes and controls hunting, and has manoeuvred to establish tighter central control over game viewing despite official policies which purport to be pro-poor and devolutionary (Chaps. 6, 7, 8; Mkukuta: URT, 2005; TNRF, 2007).

In 1977, Kenya banned hunting of wildlife other than game bird species, in part as a last ditch measure to control corrupt practice around the explosion of ivory poaching then threatening the survival of East African elephants. In 1989, a high-profile campaign that included publicly burning stockpiled and seized ivory re-energized an international ivory sales ban. Alongside shoot-to-kill policies, ivory poaching in Kenya was brought under control but at considerable human, economic and perhaps ultimately conservation cost. As a result of the ban on hunting, revenue from wildlife in Kenya focuses on income from tourist viewing and photography. This is considerable: tourism is regularly in the top three contributors to GDP and among the top three earners of foreign exchange in Kenya, and currently earns nearly $1 billion a year (65.4 billion KShs in 2007: Ministry of Tourism and Wildlife, 2006, 2008). Although half of this is attributable to coastal tourism, Maasailand and other pastoral areas further north are among the fastest growing destinations nationally, with a 33% growth in hotel bed nights seen in Maasailand in 2004–2005 (Ministry of Tourism and Wildlife, 2006).

Private land tenure rights extend to rights over access for viewing wildlife. Kenya policy led the way in allowing local landowners to benefit directly from wildlife on their own land, as well as developing benefit sharing for reserve-adjacent dwellers (Western, 1994; see also Chap. 9). The wildlife viewing tourism market is open to an increasingly wide array of individuals, companies, NGOs and cooperatives. However, potential income from wildlife must compete with the opportunity costs of foregoing other forms of development, particularly cultivation that is incompatible with wildlife. Across a range of sites with varying agro-ecological potential, economic analyses of opportunity costs suggest returns from game viewing do not match those potentially available from conversion to commercial cultivation (Norton-Griffiths, 2007). Wildlife enterprises on community land also tend to require multi-household or even multi-community land use agreements and cooperation. This commonly has taken the form of wildlife associations (WAs) that are responsible for representing members in developing contracts with tour operators around popular game viewing areas. WAs receive income from tented camps as well as game viewing vehicles using the area, and after taking a percentage to cover running costs, such as administration and policing the area, they may distribute the rest in the form of bursaries for health or education purposes and/or dividends to all their members. As well as the considerable social capital required to establish a WA, they may lack immediacy for the poorest households who cannot afford to wait for unpredictable dividends to feed their families day to day. Their governance presents perennial issues, and the presence of wildlife can bring considerable costs and dangers as well as benefits.

On a macroeconomic level, this argument explains the phenomenon of conversion to agriculture, but it tells us little about the processes and implications at the household level. This volume focuses on individuals as decision makers. The household level analyses allow us to look at the range of returns to cropping activities and compare them across our sites and to those of other studies (e.g. Norton Griffiths, 2007). It also looks at the distribution of returns to households through community and other conservation channels. Few Maasai households are primarily

commercial cultivators, and it is necessary to go beyond the macroeconomics to understand the full range of factors and the real trade-offs driving pastoralists to plough up the land on which their livestock depend.

Nonetheless, many reserve-adjacent households and communities ostensibly in a position to benefit from wildlife revenues have commonly opted to cultivate, albeit at a much smaller scale than the commercial agribusinesses often run by absentee landowners or lessees. Loss of habitat to cultivation has driven a drastic decline in Kenya wildlife species over a 20- to 25-year period (Norton Griffiths, 2007). Long-term aerial census data series (Ottichilo et al., 2000; Homewood et al., 2001) show the Mara ecosystem has experienced a 50–80% decline in all species (apart from elephant, impala and ostrich). Similar patterns have emerged more generally nationwide (Western et al., 2006; Norton Griffiths, 2007). Disaggregated analyses show National Parks and their environs have shared in this decline, leaving National Parks holding only 10% of Kenya's wildlife, with Maasai Mara National Reserve accounting for a further 25%. By contrast, private sanctuaries now hold 40% Kenya's remaining wildlife (Western et al., 2006). Some observers estimate hunting revenues could readily match or exceed returns from cultivation, and see a return to consumptive uses of wildlife, alongside support for private sanctuaries, as the only route to sustaining wildlife conservation in Kenya (Norton-Griffiths, 2007; Parker, 2006).

Tanzania, in contrast to Kenya, has maintained a considerable wildlife hunting enterprise since independence, with the national government's Division of Wildlife leasing hunting blocks within GCAs (which comprise around 10% of Tanzania's surface area) as well as in game reserves and on general or village lands, including the new category of WMAs (originally conceived as community conservation areas). Hunting is a major earner of foreign currency revenues across Tanzania, generating income from areas that have no tradition of wildlife viewing tourism, as well as from areas adjacent to reserves with game viewing facilities (Leader-Williams, 1999). Taken together, hunting and game viewing are extremely lucrative sources of revenue, estimated as bringing total annual incomes nationally of $30 million and $800 million, respectively (Baldus and Cauldwell, 2004). These revenues could potentially underpin sustainable development in Tanzania's rangelands (cf. Pearce and Moran, 1994), but they are the subject of intense contestation. For example, ecotourism enterprises with low-volume, low-impact tented camps in remote places have become increasingly popular with tourists over the past decade (in contrast to earlier 'lodge tourism' models). Initially, Tanzanian villages were able in a number of cases to establish relatively beneficial local deals with game viewing tour operators. However, neither hunting companies nor the Tanzanian State benefited from such direct deals, and hunting companies backed by the state mounted legal challenges to the game viewing companies' right to such concessions. Recently, such court cases led to the banning of wildlife viewing deals at village level in a number of parts of Tanzanian Maasailand.

The Tanzanian State and international NGOs such as the African Wildlife Foundation recently pioneered new 'Wildlife Management Areas' (WMAs), intended to develop a pro-poor form of community-based conservation (URT, 2005;

see also Chap. 8). However, a September 2007 ministerial decree asserted central control over all hunting and game viewing licenses and revenues (TNRF, 2007), counter to the regulations governing WMAs approved in 2005 and the Village Land Act of 1999. Under this decree, villages lose any direct revenue from game viewing enterprises. Hunting and game viewing entrepreneurs can operate there under license, but the state now captures all wildlife viewing as well as hunting revenues, and controls any onward flow of those revenues. The Director of Wildlife controls the proportion of tourism earnings from WMAs that is returned to the District. The district government in turn controls any onward flow to the multi-village WMA committee, who then manage any disbursements ultimately reaching local households. Experience suggests that problems of accountability and distribution mean little is likely to trickle down to local level, and nothing in practice to the individual households. This outcome runs directly counter to current donor-encouraged community-based conservation orthodoxy, creating a major gap between rhetoric and reality (Kallonga et al., 2003; Nelson, 2004, 2007; Homewood et al., 2005) and driving key villages to withdraw from such WMA schemes (Chaps. 6, 7, 8).

1.2.1.4 Institutional Context of Maasai Diversification and Land Use Change

The institutional environments of Kenya and Tanzania Maasailand present further parallels and contrasts. In both countries, traditional Maasai institutions persist, involving councils of elders, liaison with warrior age groups through *laigwenan* spokesmen, and recourse to ritual experts (*laibon*) for strategic advice. However, these interact in rather different ways in the two countries, with respect to both individual herd owners and national political processes.

Kenya has nominally moved some way towards multiparty democracy, despite the strongly contested result of the 2007 presidential election leading to serious civil disturbance at the time of writing. In Tanzania, the *Chama cha Mapinduzi* (CCM) party remains central to politics. In Kenyan Maasailand, there has been a marked shift from a situation where the group ranch committees (generally congruent with earlier leadership structures) exercised considerable control, to the current position whereby private land tenure has given individual landowners significant autonomy, while creating considerable difficulties in organizing collective action (Thornton et al., 2006; Boone et al., 2006). Following privatization, there is now a sharp trend of dismantling the original WAs congruent with former group ranches, and reconstituting smaller, more exclusive WAs, whose members do not necessarily form a spatially continuous unit but are rather constituted along political and entrepreneurial fault lines (see Chap. 3: Mara). This co-opting of Kenyan WAs into electoral politics has potentially sinister overtones, with the manipulation of ethnic tensions for political purposes in Maasailand in the run-up to multiparty elections (Klopp, 2001), and comparable tensions in the aftermath of the 2007 presidential election.

In Tanzania, land use is in theory controlled by the village government and moderated by interplay with representatives of district, regional and national government. However, central agencies can override or strongly influence local decisions and priorities, and the ambiguity of the 1999 Land Act's inclusion of rangeland within the category of 'general land', erasing customary user rights, leaves pastoral areas highly vulnerable to state-controlled reallocation (Nelson, 2007). This is apparent in the leasing or sale of large areas of land to outside investors (including conservation organizations) without consultation and to the detriment of local residents (Nelson, 2004; Homewood et al., 2005; Homewood, 2008; Igoe, 2007). Globalization means that, increasingly, major international financial interests weigh in against local natural resource-based livelihoods. A recent example is the highly conflictual purchase of the Grumeti hunting block lease by a US-based entrepreneur through a series of deals negotiated centrally with, and to the benefit of, Tanzanian State agencies, with the proposed re-location of Rubondo village and the cross-Serengeti transport links (e.g. Igoe, 2007). Around Tarangire, a rather different manifestation of similarly questionable governance has seen numerous private individuals securing tenure title (of doubtful legal validity) and asserting their claim through land clearance and large-scale cultivation, with major implications for wildlife and livestock movements (Goldman, 2003; Igoe, 2003; Sachedina, 2008; Chap. 7, Tarangire).

1.2.2 Changing Land Use and Livelihoods in Maasailand

Maasailand is changing. The area is increasingly home to non-Maasai, land use and land tenure systems are in constant flux and individuals and households are responding in a myriad ways. While overall strongly centred on livestock, the poorest are having to cope with change to survive; the wealthiest are looking for new opportunities to optimize their portfolio and increase their individual or household wealth and security (Little et al., 2001). Major players far away in national capitals or international locations increasingly determine (or deny) access to and use of land in rural areas.

Customary patterns of pastoralism are characterized by a central focus on livestock, by mobility, and by a land tenure system based on common property resources. Different Maa-speaking groups have commonly complemented pastoralism with farming (Il Parakuyo), fishing (Il Chamus), gathering and hunting (Ndorobo). More recently though, population growth, loss of access to key resources of land, water and grazing, loss of mobility and the emergence of alternative opportunities with urban and international linkages, all challenge our understanding of diversity and change in pastoralist societies.

As cash needs have increased, for health, education, livestock or crop inputs, and to purchase sugar, maize and tea, so has the need for households to access a source of steady cash income. The range of income or livelihood options has changed for

Maasai communities as government policies and the general economic environment have changed. Many pastoralists have adopted cultivation, not so much as a shift out of pastoralism, but so as to protect against having to sell livestock and to be able to continue as pastoralists (O'Malley, 2003).

Maasai households, and the growing numbers of non-Maasai residents around protected areas and throughout Maasailand, increasingly have multi-stranded livelihoods drawing on wage employment, remittance income, investment incomes (e.g. from rental properties) and entrepreneurial activities (Kristjanson et al., 2002; Campbell, 1993; Coast, 2001, 2002; Thompson, 2002; Homewood et al., 2004; Thompson and Homewood, 2002). Having an educated family member with a steady job in the city, in local or regional government, or teaching at a nearby school, has become an increasingly important means of livelihood diversification. Growing population densities in and around rural trading centres means increased demand for services and materials (Bryceson and Jamal, 1997). Poor households sell casual labour, resort to collecting, processing and sale of natural resources through charcoal burning or honey hunting, and take up other poverty strategies including petty vending (Talle, 1999; Chaps. 6 and 10) .

The implications of the various development trajectories of agro-pastoralist Maasai populations for the environment and for poverty reduction are complex. Some observers of change in pastoralist groups have focused on the failures and the tragedies that have resulted. Galaty (2005) sees mobile pastoralism as collapsing under the twin pressures of loss of mobility (as boundaries harden–Homewood 1995) and of an increase in competition for resources, conflict and violence (particularly among pastoralist groups of northern Kenya and Uganda – cf. Hendrickson et al., 1998; McCabe, 2004). Marginalization and/or exclusion from the privatization of East African rangelands has been a particularly strong element in the dispossession of many pastoralist communities and households (Galaty, 1999; Igoe and Brockington, 1999). Caloric terms of trade for pastoral products in one sense favour the producers, given that milk and meat almost always command a greater caloric value of cereal or other agricultural products in exchange (Zaal and Dietz, 1999; Dietz et al., 2001). However, the relative terms of trade for livestock and meat have declined over the last decades, not least through the dumping of subsidized meat and milk powder from Europe and elsewhere on African markets (Sandford, 2006). There is much evidence to support the view of 'Failing Africa' in Maasailand (Mortimore, 2005; Homewood et al., 2004). At the same time, macroeconomic analyses suggest spiraling economic growth driven by domestic and export markets, which is creating considerable wealth (Norton-Griffiths and Said, in press). This volume shows a mixed and nuanced analysis of development and change can be seen in pastoralist diversification for Maasai areas and communities. What this volume suggests is not so much either a collapse or a success story, but an increasing differentiation between rich and poor, and growing diversification by both, which moves away from traditional pastoralism while retaining livestock as central to most livelihoods and as a strong correlate of economic success.

1.2.3 Wildlife Conservation as a Dimension of Pastoralist Development

The presence of high-earning wildlife resources should create special opportunities for Maasai, which would be at once outside pastoralism, yet also consistent with a landscape that retains natural habitat with or without domestic grazers. Such revenues can have an impact at the household level (through jobs, wages or dividends) and/or can flow to the community level into investments in health, education and infrastructure). In this volume, we look at the extent to which Maasai are finding employment in tourism enterprises in areas dominated by wildlife interests and tourism opportunities. Wildlife dividends, though widespread in the Mara site, are not currently a major source of income for most Maasai. Around the Mara, a few elite households, controlling special resources, are able to engage most profitably with WAs (Thompson and Homewood, 2002; Thompson, 2005; Homewood and Thompson, in press). A far greater proportion of households around the Mara are able to benefit from tourism-related enterprises (as disaggregated from other forms of employment, petty trade, etc.: see Chap. 3). Income derived from wildlife is very much more important for Mara Maasai, and perhaps for other households located close to major protected areas, than is the case elsewhere in Maasailand. Even within major tourist destination ecosystems like Amboseli, households located in the outer, drier parts of the system receive minimal tourism returns (Chap. 5).

The case studies raise both conservation-compatible development possibilities and conversely also concerns over outcomes both for environment and for the welfare of vulnerable people. Maasailand includes some of the most important tourist destinations in Africa. Wildlife conservation interests command major funding streams and are powerful players shaping policy and practice. Some households living around protected areas earn revenues from wildlife tourism, with socially and spatially well-placed individuals receiving considerable sums (Thompson and Homewood, 2002; Thompson, 2002; Kallonga et al., 2003; Nelson, 2004). More commonly, a far greater number of rural households are restricted from using areas with tourist potential (DeLuca, 2004; Wildlife Management Areas: Chap. 8; Brockington, 2002; Homewood et al., 2005, Homewood and Thompson, in press). Current definitions of displacement recognize restrictions on use, as well as eviction (West et al., 2006; Cernea, 2000). In Tanzania's Ngorongoro Conservation Area, one of the most prominent tourist destinations in Africa, where management objectives have supposedly focused on conservation with development over a 50-year period (Homewood and Rodgers 1991), only a very small proportion of resident Maasai rely on tourism for their main source of income (Homewood and Rogers, 1991; DeLuca, 2004; Homewood et al., 2005). Elsewhere in Tanzania, households in areas where villages have made deals with local tour operators were observed to earn a maximum of $35 per year, with a majority receiving no income from tourism at all (Chaps. 6, 8). Tourism-related income may be poorly distributed among those who remain in reserve-adjacent areas, with revenue progressively

concentrated in fewer hands (Thompson and Homewood 2002, Chap. 3). Further from protected areas, few Maasai have access to tourist-related income while across the region as a whole, incomes commonly comprise well under the international poverty datum line of a dollar per person per day. As conservation estate and privatization or allocation to state enterprises have increasingly removed land from pastoralist production, poverty reduction and wildlife conservation priorities become more strongly polarized.

1.3 A conceptual framework

> 'It is by trying to understand how poor people manage their livelihoods and their natural resources in conditions of great difficulty that science can learn to make itself more useful to them, rather than by promoting transformations based on imported models' (Mortimore, 2005: 47).

Summarizing theories of development and change in African rural areas, Mortimore (2005) points out that widespread perceptions of deteriorating productivity across the African continent should be seen in the context of food prices having in many cases dropped in real terms over several decades. For example, in West Africa where rural populations have doubled, and rainfall decreased by 25–30% over three decades:

> It is a paradox that …poor rural Africans in many areas continue to demonstrate a capacity to produce more food, to supply urban labour, to educate themselves, to endure oppression and deprivation, and to reconstruct broken economic or social systems. (Mortimore, 2005:47)

Mortimore's 'complex Africa' view recognizes a patchwork of socially and historically specific situations in which many people and communities not only get by but also show immense vigour and resilience with some very positive outcomes. Conversely, it also acknowledges many other cases where asymmetries of power and rights alongside political and environmental instability generate gross inequalities, oppression and violence (c.f. Schatzberg, 1988; Fairhead, 2005). Under these circumstances many people do not get by; at the worst, vulnerabilities escalate (Wisner et al., 2004) into devastating tragedies with conflict, violence, mass deaths or even genocide (e.g. Kenya: Klopp, 2001; Hendrickson et al., 1998; Democratic Republic of Congo: Fairhead, 2005; Sudan: Johnson, 2003; and numerous works on Rwanda).

Development and change trajectories across Maasailand show just such a mixed patchwork, from success stories of vigorous livestock production and trade (McPeak and Little 2006) or production of export vegetables and flowers (Garside et al., 2007), and claims of successful pro-poor tourism enterprises (e.g. http://www.Lewa.org), to cases of land loss, dispossession and destitution (Galaty, 1999; Talle, 1988; Brockington, 2002) and violent, politically manipulated inter-ethnic conflict (Klopp, 2001).

1.3.1 The Approach

Although Maasailand is characterized by extreme variability, the underlying continuities are so strong that comparative approaches and generalizations can add to, rather than obscure, site-specific understanding. Ecological, ethnic/cultural, and micro-economic continuities and age set timeframes make for clear common frames of reference, as do major defining events (1890s rinderpest; 1960s independence; 1997 El Nino) and unfolding trends (loss of common land to conservation and commercial agriculture; excision of key resources; privatization of land; changing aspirations for health and education). This volume uses the continuities in a comparative analysis, not just of the qualitative nature of site-specific processes but of the scale and relative importance of different factors, and of their different possible interactions spanning the great range of variability encountered across Maasailand as a whole.

In analyzing the interplay of conservation and development in Maasailand, this volume focuses on the following questions:

1. What is the range of livelihood strategies found in Maasailand? How are these impacted by conservation, privatization and other dimensions of development and change?
2. What are the patterns, scale and extent of diversification? How dependent are people on natural resources-based livelihoods?
3. What are the main determinants shaping livelihoods and triggering change? To what extent do external factors such as biophysical and ecoclimatic/agro-ecological factors on the one hand, and infrastructure and policy on the other, shape livelihood choices? To what extent are livelihoods determined by socio-demographic characteristics of the household?
4. What trends do these patterns indicate in terms of land use change, poverty trajectories and wildlife conservation?
5. Have any win/win solutions for environment and development emerged, and if so, where, how and why? What are the main policy lessons for managing conservation and development in Maasailand and more generally across African rangelands?

This volume centres on detailed case studies of five different areas illustrating the range and diversity of conditions in Maasailand today. Each study was carried out intensively over a period of several years. The central case studies are all based on household surveys, semi-structured interviews, and participant observation, further complemented by policy, institutional and/or oral history/archival analyses and discourse analysis, and where possible, combined with the results from spatially explicit analyses of aerial photographs, satellite imagery, aerial and ground census or large-scale surveys. This volume includes findings from several other in-depth studies that have drawn on different and complementary methodologies and investigated parallel and contrasting sites in other parts of Maasailand. Combined, these studies draw together ethnographic, economic, political and to a lesser extent historical approaches and findings from different researchers so as to explore the major factors underlying observed changes across Kenya and Tanzania Maasailand. They bring a wide range of qualitative and quantitative approaches

together within a standardized framework. This makes it possible to develop an understanding of scale and extent of livelihoods activities, and to some extent of livelihoods change, particularly of perceptions and aspirations on the one hand, and driving factors, processes and linkages on the other, and of their relative importance in influencing outcomes.

1.3.1.1 Modeling Land Use Decisions in Maasailand

Past research in Maasailand has led to the development of a relatively simple conceptual model to help analyze the critical pressure points and thresholds in changing land use and wildlife populations that integrates a number of different theoretical approaches (Homewood et al., 2001). This model was formalized by Eric Lambin and Suzy Serneels of the University of Louvain, building on the vast inherited fund of knowledge on the natural ecosystem dynamics of the Serengeti-Mara system (e.g. Sinclair and Arcese, 1995; Sinclair et al., in press), and on the well-documented main driving factors (rainfall, fire, herbivore grazing, browsing and trampling) powering transitions between woodland and grassland in this region (e.g. Dublin, 1995). Onto this understanding of wildlife and vegetation change in the absence of human impacts, the conceptual model incorporated the effects of people and their land use, as a means to understand implications for changing livelihoods and wildlife populations. As a summary aid to grasping the interplay of people's land use decisions with rangeland vegetation, livestock and wildlife populations, it complements, but does not attempt to emulate, the systems modeling and simulation work encompassed by the SAVANNA model and its linked rule-based household cash and calorie flow model Pastoral Household Economic Welfare Simulator (PHEWS) (Boone et al., 2006; Thornton et al., 2006).

Our conceptual model begins by recognizing increasing competition between alternative land uses. That competition over land availability operates at two levels (Fig. 1.2a): competition between different land uses for land area, and competition specifically within the grasslands, between wildlife and livestock competing for net primary production (NPP), which multiplied by area of grassland gives the total biomass of forage available.

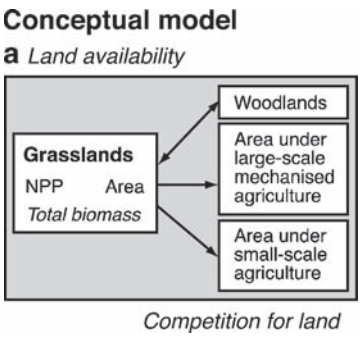

Fig. 1.2 **a–e** Developing the conceptual model. (After Serneels and Lambin see text)

Cash crop prices and policies, particularly for cereals such as maize, wheat and barley, but also for irrigated horticultural export crops (peppers, green beans, flowers), drive the profitability of large-scale commercial farms and thus their extent and ecological impacts (Gereta et al., 2003). The spread or retreat of small-scale farming is driven by population growth, migration and education – all factors affecting aspirations and economic alternatives, cultural change, and economic trade-offs between alternative livelihoods (Fig. 1.2b).

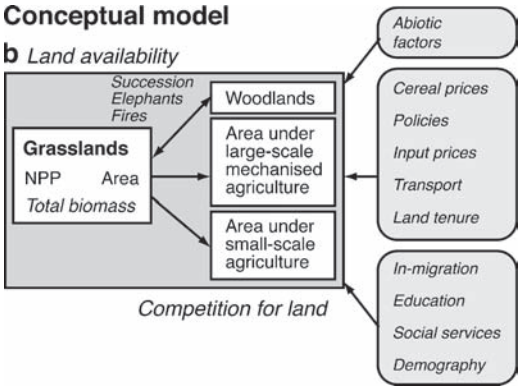

Fig. 1.2 (continued)

Biophysical factors (rainfall, fire, ground water, grazing and browsing populations) influence the proportional extent of woodland and grassland (Fig. 1.2c).

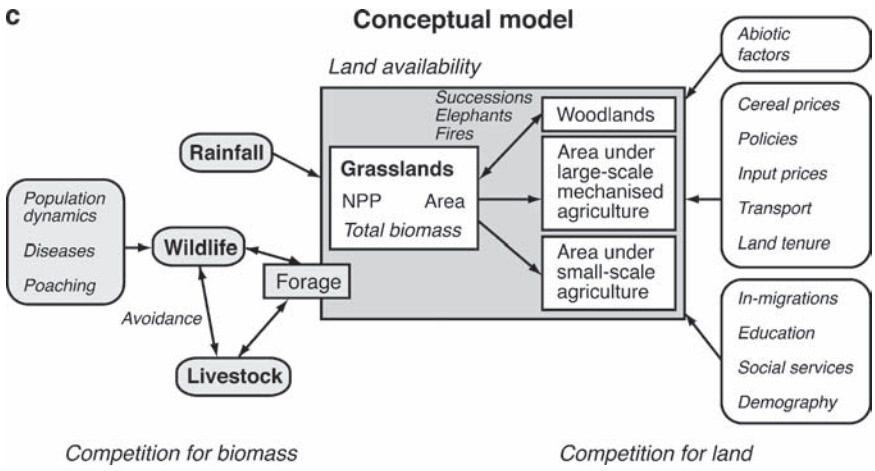

Fig. 1.2 (continued)

These processes do not just come into direct conflict. They lead to active trade-offs and operational decisions being made by individual Maasai deciding whether to herd, to farm and/or to run wildlife-related enterprises (Fig. 1.2d).

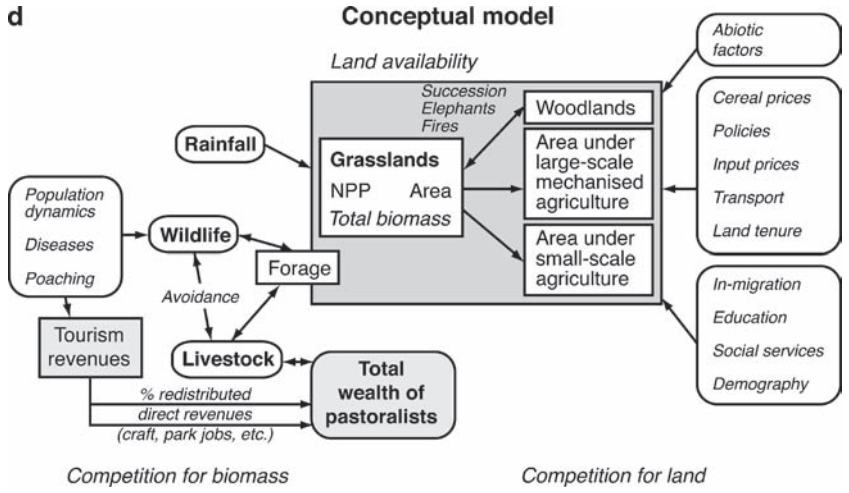

Fig. 1.2 (continued)

In many cases, these trade-offs around land use and labour investment decisions are being calculated at the level of the individual household, strongly influenced by social hierarchies and institutions structuring distribution of resource access and of different types of revenues (Fig. 1.2e).

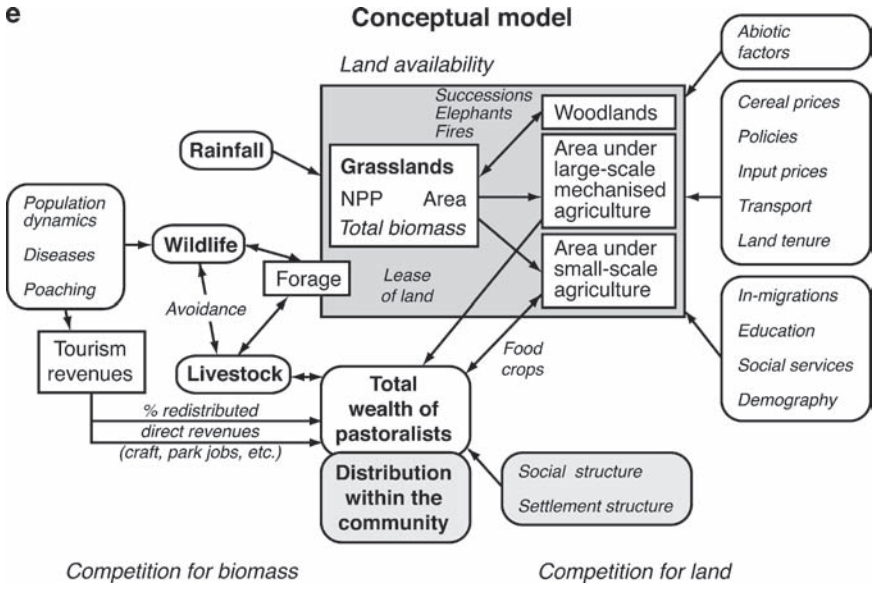

Fig. 1.2 (continued)

We postulate that household-level decisions driving major changes in the study region are made on the basis of a number of factors. These include regular or periodic revenue from different enterprises (herding, farming, wildlife, tourism) and its distribution among households, as well as asset management in the absence of banking and other financial options and infrastructure. They also include less economically obvious cultural and social values. For example, there may be significant intangible values attached to livestock-related activities rather than other occupations. Among the Maasai, owning livestock and successfully managing a herd carries 'social capital', in the sense of winning approval and ultimately support (and entitlements) from the wider social group; similar values permeate the society, reflected, for example, in attitudes to milk and meat (Talle, 1990). As elsewhere, agro-pastoralists make choices among alternative livelihood strategies and land uses as much or more on the basis of cultural preferences than on economic pay-off alone (Buhl and Homewood, 2000; Buhl 2000; Hampshire, 1998). Those choices safeguard their standing within the social group and hence their ability to call on that group in possible future times of need. Another possible determinant is that, quite irrespective of yields, farming may make it possible to stake a tenure claim to land in a way herding does not, and so land use decisions represent a tenure strategy (Grandin, 1986; Homewood et al., 2004; Mwangi, 2007a, b, c).

While in this complex system there are major drivers like rainfall determining net primary production, the underlying conceptual model suggests that it is mainly the decisions made at household level, where all the driving forces are integrated, that speed up or slow down the rate of land conversion from rangeland to cultivation. That process of land conversion is a major determinant of wild and domestic animal populations. In different parts of Maasailand, the trade-offs are different, making revealing contrasts between the Kenyan and the Tanzanian components, and between individual study sites.

Household decisions are thus in part a response to policy, but policies have different outcomes in different environments. The tenure differences between Kenya and Tanzania, the differences in returns to wildlife, farming and herding, and the differences in distribution of those returns, produce divergent outcomes in contrasting parts of the system. The central approach of this volume is to focus particularly at the level of the household to understand those trade-offs and decisions. Chapters 3–7 centre on detailed household-level data, analyzed within the context of site-specific opportunities and constraints. At the same time, policy decisions enabling or constraining land uses affecting large areas are often taken at a level remote from the individual household, very obviously in more centrally controlled post-socialist Tanzania but also in the Kenya rangelands. Chapters 8 and 9 broaden the focus to institutional and policy analyses at the national level.

This volume seeks to develop a better understanding of those relations to help make clear the conditions under which desired outcomes for people, environment and wildlife are most likely to emerge.

1.3.2 Theoretical Background

Society–environment relations are notoriously hard to analyze: ultimately, one is trying to study everything (De Sherbinin et al., 2007). The task is made harder still in a semi-arid pastoralist rangeland system, subject to biophysical and socio-political conditions which are highly variable through space and time (Homewood, 2008). In order to establish a research approach that can capture and analyze the complexities of land use and livelihoods in systems primarily characterized by unpredictability, this volume draws on and integrates a range of theoretical frameworks. The main areas of theory we have brought to bear in designing this work deal with development, livelihoods and diversification, political ecology, livelihoods, tenure and governance (particularly collective action and community-based governance).

1.3.2.1 Development

A number of frameworks are commonly applied to understanding development (Ellis, 2000). Development orthodoxy holds that external interventions in the form of new technologies increase production, and therefore wealth, allowing improvements in the standard, security and potentially the sustainability of livelihoods. New technologies do offer considerable possibilities. However, many social scientists see technical fixes as failing to address the root causes of vulnerability and poverty and as often perpetuating the very problems which development interventions purport to tackle (Escobar, 1995; Wisner et al., 2004). The indigenous solutions models suggest that local people are those best placed not only to define and prioritize their own problems but also to identify, generate and implement effective and sustainable solutions to those problems (e.g. Goldman, 2003; DeLuca, 2004). Outside interventions are then best used to support and facilitate essentially local initiatives.

These perspectives are by no means mutually exclusive; in practice, the trajectories of many changes in Maasailand may be best understood by combining elements of each. For example, there is no doubt that some veterinary inputs represent technical interventions which have had a major impact on livestock health issues central to pastoral welfare, and these have been swiftly adopted by local producers (e.g. rinderpest vaccine; East Coast Fever (ECF) vaccine: Homewood et al., 2006). At the same time, it is equally clear that such positive technical solutions are neither equally nor easily available to all. Long-established, locally evolved indigenous solutions, for example, in maintaining long-distance mobility in times of drought or disease, have continued to be important alternatives, despite changes in tenure and access which make such movements increasingly difficult (Chap. 5). Similarly, improved breeds have proved a real benefit in some circumstances, particularly in pockets of higher-potential agro-ecological conditions where intensification is more easily achieved, but more generally the indigenous solution of maintaining a significant proportion of the herd as local livestock breeds, resistant to drought and

disease, remains a central strategy, particularly in the drier parts of arid and semi-arid Maasailand (Boone et al., 2006).

Political economy has been extensively used to analyze development approaches and impacts, highlighting the role of power within the context of any development. The approach holds that change always entails winners and losers, and that those who are well placed tend to capture the benefits and improve their own position further at the expense of the marginalized. The relevance of a political economy perspective is made clear in the analyses of the privatization and subdivision of Kenya's former group ranches, and of ongoing alienation of Tanzania's rangelands (Galaty, 1999; Mwangi, 2007a, b, c; Igoe, 2007). In both countries, these processes have demonstrably concentrated formerly communal resources into the hands of elites (local, national or international) and/or the state, as political economy would predict. Similarly, the rhetoric of decentralization, devolution, participation and community-based natural resource management only masks the realities of dispossession of the rural poor (Blaikie, 2006; Menzies, 2004). While the approach has been essential to highlight the pitfalls of many development interventions, the political economy model is seen by many as failing to deal with cultural and historical particularities, or with the ability of even structurally weaker players to shape development outcomes.

In our approach to analyzing development and change in Maasailand, we keep in mind the site-specific social and historical contexts which frame each of our study areas and the region overall. We are careful to examine critically dominant narratives of decline, while remaining aware of the very real vulnerability of many of the communities and households with whom we have worked. These different strands come together in the political ecology approach.

1.3.2.2 Political Ecology

> access to and control over natural resources depends on interacting and overlapping sets of rules, formal and informal, embedded in the social and political life of the area. (DeLuca, 2004: 47–48)

Political ecology explores the ways political, economic, and social factors affect environmental issues and their social correlates (Blaikie and Brookfield, 1987; Stott and Sullivan, 2000), and has become an important analytical framework for understanding development and change in the context of natural resources-dependent livelihoods. It has clear links to political economy, and provides a framework that can integrate technical fix and indigenous solutions models.

Development orthodoxy, predicated on the idea of the technical fix, assumes that (primarily Western) outside intervention can solve local problems (whether environmental, technical or social). This perspective tacitly assumes that Western knowledge and understanding are superior to local knowledge and understanding, and that Western models of, say, ecosystem dynamics, and consequently of the impacts of local use on natural resources, are unquestionably superior to local understandings of such processes.

These assumptions feed through in a number of ways into development practice. First, they are expressed in the dominance of Western scientific models and their use as justification for regulating, restricting or excluding local land users on the grounds that these are damaging ecosystems, environments, biodiversity or productivity. Western science and technology clearly have much to offer. However, it has become increasingly apparent that in a number of well-documented cases, classical ecological models developed in Western temperate ecosystems are not necessarily good predictors of dynamics in tropical contexts (e.g. Homewood et al., 2001; Homewood, 2005; Sullivan, 1999; Behnke and Scoones, 1993; Leach and Mearns, 1996; Laris, 2002, 2003), and that there is often a strong ecological rationality to local resource use practices. Despite the accumulated evidence of the inadequacy of imported Western models in tropical arid and semi-arid land situations, they continue to dominate official perceptions of these ecosystems, and continue to be used as the basis for regulating or excluding local users.

At the same time, for all its potential, Western scientific thought is not necessarily a good starting point for understanding the priorities, aspirations and values of other societies with other ways of thinking. Different groups have different world views, different understandings of local processes and causalities, and divergent political and economic interests, which gives rise to a complex discourse around environment and resource use issues. Within that discourse, models which come to dominate policy are inevitably those associated with wealth, power and influence – the knowledge of people who count – as opposed to the understandings held by the marginalized, which are unlikely to be heard, irrespective of their objective validity. Without romanticizing local users and their impacts, it is important to be aware of the power relations underlying apparently straightforward formulations of research issues and questions, and shaping supposedly objective evaluations and value judgments.

Such a discourse has developed over pastoralist land use and environmental degradation in East African savannas. Commonly, degradation narratives portray local land use (be it pastoralist grazing, use of fire in managing vegetation, soil fertility management practices, etc.) as bringing about long-term decline in productive capacity and/or biodiversity. These views have tremendous staying power irrespective of evidence to the contrary (e.g. Homewood et al., 2001; Laris 2002, 2003; Sullivan 1999; Turner 1998a, b). Such narratives are used by different interest groups to contest control over valuable natural resources, and the dominant narratives used by state and conservation agencies have commonly been instrumental in displacing, evicting and excluding former users.

Political ecology thus involves the political use of ecological concepts, including their (mis-)use by the well-placed seeking to capture control of valuable resources from the less well-placed, whose own views are less likely to be heard or given credence. Political ecology clearly links to the playing out of political economy in principle and to the operation of entitlements in practice.

The political ecology perspective has a particular role in formulating relevant ecological economic questions, and in analyzing community conservation cost and benefit outcomes. At the same time it is important to give due weight to cultural understandings and the local agency of even the poorest players (potentially neglected by political ecology and economy: DeLuca, 2004).

1.3.2.3 Ecological Economics and Community Conservation

It is increasingly acknowledged that the application of ecological economics to African conservation needs to take account of the opportunity costs, as well as the potential revenues, of conservation and other natural resources management initiatives (Emerton, 2001; Hulme and Murphree, 2001). The studies in this volume make considerable use of microeconomic methodologies (encompassing distributional issues) to study livelihoods, and the role of livestock, farming, and wildlife land uses and revenues (as well as non-farm income streams) within those livelihoods.

Simple opportunity cost analyses drawing wholly on microeconomic data risk overlooking important socio-cultural and economic dimensions such as control over food security, stability of supply over the short (seasonal) and longer terms and cultural importance of livelihood choices (DeLuca, 2004). They also risk overlooking the ways funds flowing to conservation or development initiatives may destabilize and disrupt local grassroots institutions that function as channels of representation available to the poor and marginalized (Igoe, 2003; Ribot, 2006). The overview and case studies of Maasai livelihoods in this volume use a broad methodology that combines ecological and household microeconomics with a political ecology framework. This approach is used to establish a better understanding of Maasai livelihoods and land use choices, and also to explore the extent to which wildlife conservation revenues in Maasailand have resulted in green development. Given the conviction on the part of policymakers that the millennium goals for poverty reduction are to be achieved through conservation with development (e.g. URT, 2005), this volume asks whether and to what extent wildlife tourism in Maasailand is leading to environmentally sustainable use of natural resources, underpinning more secure livelihoods and successful community development?

In addition to consideration of the absolute (though often hidden) costs of conservation and other initiatives, an increasing awareness of distributional issues has emerged, both concerning the general attribution of costs and benefits to local, state and international groups (Bell, 1987) and more recently, differentiated analyses of the ability of different individuals within and outside local communities to capture profits from natural resource commodity chains (Ribot, 1998; Ribot and Peluso, 2003) including conservation initiatives (Thompson and Homewood, 2002; Chap. 3, Mara). Communities are bundles of divergent interests: their boundaries can be spatially and socially fuzzy, and their members unlikely to share a single clear set of priorities. ‘Community-based’ conservation initiatives tend to be driven by outsiders with interests and priorities that are rarely widely shared by local residents (Mavhunga, 2007). Local leaders have all too frequently sold off communal resources for personal gain, or been pressured by powerful interests into ceding communal resources for which they are the stewards (Mwangi, 2007a, b, c; Igoe, 2007). Supposedly participatory processes are readily co-opted by the more powerful, often in ways not understood by rapid appraisal teams. Numerous case studies and overviews demonstrate that when operating in the context of hierarchical societies with little transparency or

accountability, the political structures determining distribution rapidly transform supposedly broadly inclusive community-based processes and revenue flows into an exercise in prising control from the wider group for the benefit of local, national or trans-national elite, or indeed the state (Menzies, 2004; Blaikie, 2006; Goldman, 2003; Igoe, 2007).

Wildlife tourism-related enterprises are often portrayed as a sustainable use of natural resources, generating income that can underpin sustainable or 'green' development (e.g. Pearce and Moran, 1994). This view remains dominant among policy-makers and in conservation rhetoric (Castree, 2003, 2008a, b). Critics suggest that rather than underpinning sustainable development and poverty reduction, the conversion of former commons into privatized and commercially marketable forms of ecological wealth or natural capital merely accelerates the process of capital accumulation by the well-off (Castree, 2003, 2008a, b). National and international entrepreneurs and corporations can more readily penetrate the furthest reaches of remote rural commons, securing control of valuable natural resources at the expense of the poorest (Igoe and Brockington, ms under review; Castree, 2003, 2008a, b; Homewood et al., 2005). The sequence of commoditization, privatization, de-regulation, and re-regulation has been seen as making for an unholy alliance of global-level environmental and commercial interests, despite these two sets of interests being, in the public perception, opposed to each other (Chapin, 2004; Adams and Hutton, 2007).

1.3.2.4 Livelihoods and Diversification

Analyzing Livelihoods

The sustainable livelihoods framework (SLF) has become the main current development paradigm for many governments and development agencies and institutions across the world (Carney, 1998). It encompasses five dimensions of assets important to defining livelihoods: physical (spatial/infrastructural): natural (agro-ecological, environment and biodiversity); financial (capital in various forms, including livestock as wealth store); human (people, defined by age, sex, education and skills, and as economically active or dependant individuals) and social (social networks including, for example, family support; leadership positions). The framework places these assets within an environmental and social context, including vulnerability to shocks such as drought, social and institutional processes and policy (see Ellis, 2000; De Sherbinin et al., 2007 for more discussion).

The SLF constitutes a tool with heuristic and analytical value, but it has its limitations. Among other problems the concept of social capital is perhaps less sound and less useful than that of entitlements (Sen, 1981), and the SLF is not really able to deal well with the dynamics of livelihoods (Chap. 2). Earlier formulations analyzed household economy in terms of land, labour and capital, a framework in which, alongside Sen's theory of entitlements, the more recent, disaggregated, but essentially compatible SLF is rooted. The earlier conceptual

framework of land, labour and capital invites us to focus particularly on two dimensions of special importance in analyzing change in Maasailand, dimensions that emphasize significant linkages with political economy and political ecology. Land, and specifically land tenure, is a central theme in this volume, made all the more important because of the parallels and contrasts between systems of tenure and access in Kenya and Tanzania.

Land Tenure

The range of systems of tenure and access, and their trajectories of change, are outlined briefly here. Different pastoralist groups show a great variety of indigenous systems of tenure and access (Potkanski, 1994; Lane, 1996a, b, 1998; Homewood, 2008). These indigenous African pastoralist systems of tenure and access to grazing land, water or other natural resources have generally worked as common pool and common property resource management systems regulated by different user groups. Key resources have also been perennially subject to contestation and sometimes violent conflict by competing groups (cf. Iloikop wars in nineteenth century Maasailand – Waller, 1979). However, continual open-ended negotiation has allowed long periods of flexible use, with continuously re-evaluated access to point-centred key resources of water, grazing and minerals (Turner, 1999). The boundaries around those key resources have in the past commonly been fuzzy both in terms of the spatial extent of biophysical resources they encompass and also in terms of the social composition and membership of the user group able to access them. Point-centred control, particularly control of access to water points, has enabled *de facto* control over grazing rates in the surrounding pastures without the need for monitoring vast areas of rangeland. Rights have depended on birth, kinship, investment of labour and social contracts. Overlapping groups of users and customary channels of negotiation have allowed adaptive flexibility in response to seasonal, annual and long-term changes in many sub-Saharan African pastoralist systems (Turner, 1999; Niamir-Fuller, 1999).

European colonial administrations tended to interpret the absence of clear, cut-and-dried individual property rights as an absence of a legal framework, rather than as a manifestation of well-adapted, alternative systems of resource tenure, evolved in the context of an unpredictable and variable environment. These administrations imposed their own legal frameworks, derived directly from the colonizing nations' property law. Specific areas were designated as homelands for specific ethnic groups. Leaving aside here the colonial creation of 'traditional' groups and chiefly hierarchies, colonial legal frameworks tended to take previously communally owned land to Crown or state, opening the way for European and other settlers' purchase of land and acquisition of legal title. In some parts, this led to massively inequitable land distribution (Toulmin and Quan, 2000). Overall, especially post-independence, it tended to replace functioning common property resource management with effectively open access systems that the state, having extinguished customary systems of regulation, was often unable to control (Bromley and Cernea,

1989; Berkes, 1989). Customary systems often continue to operate alongside formal national legal frameworks (cf. Wardell and Lund, 2006).

Post-independence administrations were mostly influenced by economic theories developed in very different social, political, and economic contexts. These led in some cases to privatization of land on the basis of economic theories postulating private tenure as essential to investment, and to economically and environmentally sustainable development (e.g. Hardin, 1968; Toulmin and Quan, 2000; World Bank, 1975). In other cases, they resulted in state ownership on the basis of socialist ideology. Over the last decade, with economic liberalization and globalization, such state lands have increasingly been made available for private purchase. Both paths have been open to manipulation by elites, who have in many cases used their privileged access to money, information and power, and their better mastery of the complexities of new national land law and its foreign language expression, to secure large areas for personal gain. Poor people have typically been unable to purchase title; holders of secondary rights have become increasingly vulnerable, particularly women, whom the colonial system generally excluded from land ownership (Talle, 1988; Hodgson, 2000).

The upshot is that now, at the outset of the twenty-first century, there are across African rangelands plural legal systems which provide alternative authorities and channels for negotiating access and securing tenure. In the conflicts that result, the well-placed tend to benefit at the expense of the more vulnerable (McAuslan, 2000). Throughout East Africa, mobile pastoralists and pastoralism as a land use system are frequently marginalized in the process (Lane, 1998; Galaty, 1994; IIED: pastoral land tenure program). Settled people have an advantage in claiming tenure over mobile groups, and are better represented both in official administrations and in processes of consultation (Hesse and Trench, 2000). Pastoralists in arid and semi-arid lands are among the most mobile of African peoples. They are often sporadic or seasonal, rather than continuous, users of most resources. Both their social groups and their spatial movements are of necessity flexible and fluid. However, across Africa, mobile pastoralism is being progressively squeezed out of an intensified agricultural landscape (Bourn and Wint, 1994; Maina, cited in Toulmin and Quan, 2000).

The crucial determinant of pastoralist ecology has for millennia been the extent to which pastoral peoples can maintain entitlements of flexible access to seasonal resources, and mobility to exploit them (Niamir-Fuller, 1999; Turner, 1999; Behnke and Scoones, 1993). Where access and mobility are extremely constrained (e.g. communal areas of South Africa), the ecological rationale for mobile pastoralism may become increasingly strained (Baker and Hoffman, 2006). Some integrated agro-pastoralist systems have emerged, but in arid and semi-arid areas these two forms of land use may compete as much as they complement one another. East Africa at the time of writing retains large areas of open rangeland potentially accessible to pastoralists, but privatization, conversion to cultivation and conservation set-aside are bringing about rapid change (Norton-Griffiths, 2007; Igoe, 2007). In Kenya Maasailand, former group ranches have largely been privatized and subdivided:

> In Narok District… the original 33 group or communal landholdings around the Maasai Mara National Reserve, which were on average some 38,000 hectares in size, have been converted to about 33,000 privately-owned land parcels of, on average, 30 hectares in size. (Norton-Griffiths, 2007:47)

In Tanzania, some agro-pastoral villages have taken to subdividing communal land, with the intention of making it harder for outside investors, conservation agencies or the state to take their land (Sachedina, 2008; see also Chap. 8). This volume explores the strategies of pastoralist and agro-pastoralist households under a range of different tenure regimes, but where certain common conditions apply: access to grazing land is increasingly constrained, mobility is becoming progressively more difficult to maintain, access to productive farmland is highly contested and crop yields are low, unreliable and vulnerable to wildlife damage.

Labour

Alongside land tenure, labour is a major defining dimension of livelihood and household strategies. Labour requirements work very differently in different forms of production system. Livestock can be managed with rather low levels of labour for much of the time. Child herders as young as 5 or 6 years old are common, as are ratios of several score or even hundreds of animals per herder. Difficult and dangerous herding tasks need more numerous and/or more experienced herders, often young men at the peak of physical fitness, to carry out long-distance movement to dry season grazing; watering competing herds at hard-to-access water points in the dry season; moving animals to market through areas potentially vulnerable to raiding or crop damage. Women commonly manage building and maintenance of temporary houses, milking, fuel and water provision, cooking and care of dependents; they play an important role in monitoring animal health and nutritional status through their close contact with lactating cows. Older men manage political negotiations over grazing, shared herding labour, animal sales and ceremonies including weddings, initiations and burials. In a more farming-oriented society, these labour commitments change drastically, with increasing need for physically strong adults to clear and plough the land, sow, weed and harvest the crop. At the same time, a more settled existence makes possible greater involvement of children in schooling, and the growing importance of off-farm work, often requiring literacy, makes such involvement increasingly desirable for most families, though poorer ones may simply not have the option of relinquishing economically active children to education. There are as many individual solutions to the labour equation as there are households. Our approach takes note of household demography and dependency ratios, levels of educational attainment aspired to and achieved, and the primary and subsidiary economic activities of each household member. This makes it possible to analyze linkages between human resources, and the patterns of livelihoods strategies, sources and levels of income found in different households.

Capital

Capital is a concept most commonly thought of in financial terms, but the word derives from the French *cheptel* (livestock), as historically does the concept of accumulated wealth held in store and yielding a return. In a society for which livestock have so long been central, it is important to establish the extent to which this remains the case for present day livelihoods. Banks are few in Maasailand, and few rural households have easy access to them; nor would they necessarily consider banks the most reliable and convenient way to store and invest wealth (Chap. 5). The case studies in this volume explore the assets controlled by different households, focusing particularly on livestock holdings but also on extent of land cultivated or controlled by the family under different systems of tenure, and the nature of that land (high or lowland, irrigated or rainfed), which determines its agricultural potential. Some households also own urban property or businesses as a further dimension of capital, as they diversify away from pastoralism.

1.3.2.5 Diversification and Intensification

Literature dealing with diversification and development among formerly mobile pastoralists emerged initially as primarily empirical and ethnographic accounts (Berntsen, 1976; Galaty, 1982; Talle, 1988; O'Malley, 2003; May, 2002; May and Ole Ikayo, 2007). Some recent papers use quantitative and statistical approaches to seek patterns and trajectories of change within an immensely diverse array of communities, households and strategies (Coast, 2002; Little et al., 2001; Fratkin and Roth, 2005). The strong body of theory structuring our understanding of diversification in rural populations of sub-Saharan Africa has tended to focus on farmers rather than pastoralists (Bryceson and Jamal, 1997; Ellis, 2000; Iliya and Swindell, 1997; Mortimore, 2005). This volume sets East African pastoralist diversification and intensification within a qualitative understanding of the broader context of rural diversification, as a background to developing detailed quantitative studies of the ways different driving forces have played out in different parts of Maasailand.

Overall the pattern of livelihoods change for Maasai pastoralists suggests close parallels with the broader process of rural livelihoods diversification taking place across sub-Saharan Africa. Rural people undergoing diversification alter their activities, their primary source of income, their location and eventually their social identity and aspirations (Bryceson and Jamal, 1997). These separate and intertwined processes do not necessarily take place in any particular sequence and may overlap to a greater or lesser extent. The great majority of households in our study sites are living mainly from herding and, to some extent, farming. However, there is a wide range of other activities, from wildlife-based livelihoods, through property and land leasing, to businesses displaying a variety of types and scales, to waged work for government, parastatals, NGOs, churches and other concerns. This suggests a degree

of diversification not widely recognized in the popular view of the Maasai pastoralist. Also, there is a major flow of poor or destitute to urban destinations with at best risky economic activities (night watchman; commercial sex worker: May, 2002; Coast, 2006; May and Ole Ikayo, 2007). Apart from the defining shift in occupation, sources and patterns of income change as do spatial location and residence (Bryceson, 1999; Bryceson and Jamal, 1997; May, 2002). In these pastoralist populations, changing social identity and aspirations have involved changing attitudes to Western education (Bishop, 2006, 2007) and changing perceptions of women's roles (Hodgson, 1999, 2000).

For pastoralists, one common dimension of changing activities, changing primary source of income and changing livelihoods is commonly loss of mobility (Niamir Fuller, 1999) and with this a loss of spatial scale and an associated intensification of land use (Chap. 5, Amboseli; Fratkin and Roth, 2005). Sedentarization per se is not necessarily either positive or negative from the point of view of people's health and welfare (Fratkin and Roth, 2005). It is driven both by push factors (exclusion from increasingly privatized or conservation-controlled key resources of land, water and grazing; need to assert tenure rights) and pull factors (access to education, trade, employment and health facilities). However, to the extent that sedentarization is in many pastoralist cases driven by loss (of access to key resources, or of livestock due to drought, disease or raiding), it is also commonly associated with poverty, and loss both of opportunities and of the means to pursue them (Fratkin and Roth, 2005).

Intensification involves increasing inputs: land clearance, fencing, soil management, tree planting/protection, terracing, irrigation system construction and maintenance; storage structures and livestock housing; poultry and other small livestock (Mortimore, 2005). Alongside inputs, intensification may involve increasingly complex cropping (seed selection/storage, irrigation, complex plantings, thinning, multiple weedings, sequential harvesting; carting, drying, bundling, threshing). It also involves a shift to low-mobility, higher input livestock management (with changes in the supervision of grazing herds; maintaining corrals; cutting/collection/purchase of fodder and of supplements; water fetching, storage, well digging; milking/marketing; inputs to animal health and breeding). Intensification is seen as the way for food production to keep pace with population in East Africa, but it is not clear that current policies take full account of the limitations on intensification in arid and semi-arid rangelands, nor of the impacts that current levels of intensification are having on key resources for environment and livelihoods across the broader landscape.

Alongside natural resource-based livelihoods, as populations grow and systems intensify, so the opportunities for off-farm activities and non-farm services increase – not merely unskilled labour, but experienced irrigation system maintenance; construction workers; water sellers; food vendors; craftsmen; traders; transporters; healers and midwives. Incomes diversify and households come to depend more on craft specialization, trade, and short-term migration. These detach individuals and whole households from primarily livestock-oriented or other natural resource-based livelihoods, as analyses of other rural populations predict (Bryceson, 1999;

Bryceson and Jamal, 1997). On the basis of his analysis of West African peasant farmers, Mortimore (2005) puts forward a stepwise sequence of diversification and intensification in pastoralist groups. Eventually, some migrate out permanently, 'ending the natural resources base to livelihoods' (Mortimore, 2005). Recent studies in Maasailand (Coast, 2006; May, 2002; May and Ole Ikayo, 2007) find considerable out-migration, especially of young men, but with mixed success, particularly in terms of returning remittances. Maasai labour migrant strategies are often couched in terms of hopes for purchasing livestock with the proceeds and of re-establishing self and/or family in the pastoral system, consistent with Mortimore (2005) who postulated 'strong circularities [which] bind these back to the resource base'. Many Maasai who work outside the pastoral system say they do so to remain pastoralists in the longer term (O'Malley, 2003; May, 2002), as shown by young male urban labour migrants who dress to emphasize their cultural identity (May and Ole Ikayo, 2007).

1.3.2.6 Triggers and Drivers of Change

A final body of theory deals with the changes observed through time. These include remotely sensed land cover change data. The underlying forces driving the changes may be less visible and highly complex (Guyer et al., 2007). Trigger events are critical, whether socio-political in origin (e.g. *Ujamaa* villagization in Tanzania– Ndagala, 1982; privatization policies and programs in Kenya – Toulmin and Quan, 2000), economic (e.g. introduction of new technologies such as the ECF vaccine – Homewood, et al., 2006), or biophysical (e.g. 1960s drought; 1997 El Nino). Such changes put in place many years ago play themselves out over time (e.g. subdivision of group ranches around the Maasai Mara– Chap. 3; Thompson and Homewood, 2002; and fencing and fragmentation of Kitengela as the final stage of land privatization – Chap. 4). Once triggered, they may unroll according to pathways largely predicted by established models (such as the van Thunen, and Lillieholme families of models, predicting development along roads and habitat conversion within a certain radius of settlement and demand for natural resources with increasing urbanization: see Guyer et al., 2007). They interact with fluctuating processes of migration (Coast 2001, 2002; Homewood et al., 2004), and of fertility, mortality and population growth (Coast, 2002), resulting in changing access and land use practices.

In order to understand more about such change through time, we have to move beyond the primarily economic methods central to the studies in this volume. We need to draw as well from the rich array of historical work (especially by researchers such as Waller, Spear, Hodgson and Anderson), and use timelines derived from individual histories, family portraits and site-specific information to help capture the aspirations driving decisions underlying those changes, as individuals, age sets and generations move through life stages (Spencer, 1988). Site- and nation-specific histories of institutional change are used to explore the ways successive generations have moved through changing socio-cultural, political and economic contexts

(Waller, 1988; Hodgson, 2001) and continue to do so (Chaps. 8 and 9, this volume). In this volume, family history narratives illustrate those timelines and give a feel both for the opportunities and constraints and also for the decisions, strategies and livelihoods that result. The ramifications of gender constructs, set up during initial contacts in the colonial period, have also contributed to progressive shifts in access, control and decision-making for women as opposed to men (Hodgson, 1999; Talle, 1988). These are embodied within our studies of household economies.

This volume shows that while some sites have so far had limited opportunities for diversification beyond largely dryland agro-pastoralism (e.g. Longido, Chap. 6), other sites show many features of rapid intensification. Intensification may be poorly compatible with conservation goals, and may at the same time be so constrained by agro-ecological and socio-economic circumstances as to offer limited scope for development and improved standards of living (Boone et al., 2006). Kitengela shows some aspects of intensification, particularly through breed improvement but also in generally higher use of purchased animal health-related inputs than seen in the other sites. Its proximity to a major city with good livestock market opportunities and high land values creates special conditions (Chaps. 4, 9). In prime tourist destination areas, such as the inner group ranches bordering on the Maasai Mara National reserve, wildlife revenues represent a significant economic possibility, albeit one that is vulnerable to elite capture and also to fluctuations in international perceptions of security and of destination fashions (Mara: Chap. 3). Amboseli wildlife may have comparable economic potential, but the returns do not penetrate to households of the outer, drier group ranches, studied in Chap. 5. In Amboseli/Kajiado, swamps fed by run-off and underground seepage from Mount Kilimanjaro offer key resources for intensive irrigation farming (Chaps. 5, 9). Tourism revenues may constitute a very significant part of desperately low and insecure incomes, such as those seen in Laikipia (Mizutani, 2005), or may make a sizeable contribution to better-off households (Mara: Chap. 3), but in most case study sites they fail to deliver significant alternatives to livestock (and crops) despite their apparent potential. This volume explores the main determinants of these different trajectories, and the implications for trade-offs between wildlife conservation, development and poverty reduction, in qualitative and quantitative detail.

1.4 Structure and Sequence of this Volume

Following this first introductory chapter, Chap. 2 sets out the overall approach including the common survey and analytical methods used by the five central case studies in this volume, the family portraits, and the institutional analyses of political and macroeconomic context. Chapter 2 establishes the framework for cross-border and cross-site qualitative and quantitative comparative analysis.

Chapters 3–8 each set out a site-specific case study, covering Kitengela, Mara and Amboseli in Kenya, and Longido and Tarangire in Tanzania (Fig. 1.1). All the case study chapters follow a broadly common template, so these chapters allow for

basic comparative reading though each has its own very different story to tell. In each case, site history, key actors, management policies, spatial organization/scale and ecosystems dynamics are outlined as context for understanding community, household and individual responses. The main data in each case explore livelihoods strategies (who does what); economic returns to different activities (how well they do at each); the driving factors affecting livelihoods choices (what influences what people do) and outcomes (what factors influence how well they do). Each of the case study chapters is built around a site-specific story substantiated by detailed analysis of broadly comparable qualitative and quantitative datasets, centering on cluster and regression analysis of household survey data, put in context through review of historical, institutional, biophysical and other information. Analysis of the household survey data gives quantitative detail and statistical associations with specific social, economic, demographic, ecological, and other determinants. Case study chapters are preceded by sets of short family portraits, giving a feel for people's experience of the everyday and of the changes they have witnessed through time.

Chapter 3 analyzes 1998 baseline and 2004 follow-up data for households around the Maasai Mara, Kenya's highest-earning game viewing attraction. Around Mara, land subdivision has been largely finalized, and those households that have been able to secure land title represent a relatively prosperous pastoral population, earning significant additional income from wildlife tourism. Reserve-adjacent households get significant returns from the National Reserve (channeled through the district and through cooperative WAs), and there are also potentially high tourism returns to individual landowners from campsite shares. However, the economic analysis shows a progressive concentration of wildlife revenues in fewer hands post-privatization, and dwindling involvement of locally resident households in commercial cultivation (whether large-scale cereal farming, or localized but high-impact irrigation cultivation of export vegetables drawing water from the Mara river). Around the Mara, wildlife income is considerable, and potentially better distributed than in other study sites. However, it remains very much less than livestock returns, and vulnerable to major swings in the decisions by elites and outside investors to cultivate commercially, as well as to fluctuations in tourism (as happened in 1997, and is happening at the time of writing with Kenya's post-election disturbances in 2007–2008).

Chapter 4 looks at the special circumstances of Kitengela, which is close to Nairobi and borders the small, isolated Nairobi National Park. In Kitengela, land has been privatized for some time, and urban property values are driving rapid subdivision, increasing fragmentation and fencing of these formerly communal rangelands. Households are finding trade-offs between the economic and other opportunities offered by proximity to a major cosmopolitan city, and conservation-driven leaseback incentives.

Chapter 5 examines the case of households around Amboseli, where aridity has always favoured pastoralism, but the excision of key swamp resources for conservation (Amboseli National Park, recently reclassified controversially as a Reserve) and cultivation (Kimani and Namelok swamps), has removed key resources from

the pastoral equation. This major change has come about alongside pressures to begin subdividing formerly communal land, further impacting on pastoral households' management of their livestock. Chapter 5 looks at the interplay of intensification, diversification and loss of spatial scale among pastoral households of the drier, outlying group ranches around Amboseli, and the emergence of intensive cultivation in the wetlands-in-drylands represented by outlying Amboseli swamps. These processes impact on wildlife too, but many of the resulting effects are felt across the border in Tanzania.

Chapter 6 deals with livelihoods and diversification of Maasai households in Longido District in northern Tanzania, across the border from Amboseli. Here, mean and median livestock holdings and annual incomes are a fraction of those in Mara. Poverty limits the ability of many Longido households to live from pastoralism, and while two-thirds of households attempt to cultivate, only half of these harvest anything, given the agro-ecological constraints. Opportunities to diversify are equally constrained, but many young men from Longido households are driven by necessity to take up low-return jobs, for example, as watchmen, while most women engage in petty trade to make ends meet. Changing wildlife migration patterns, in part driven by Amboseli's elephant population growth and by land use change in Kenya pushing wildlife to move through Longido rather than Amboseli (AWF, 2005), have introduced additional issues into Longido's already marginal situation. Although few Longido households earn wildlife income, and any such earnings are minimal, game viewing deals have in the past brought some benefits at community level. The current policy over WMAs and the lack of clarity over how revenues to WMAs can be channelled back to community and household level, mean significant numbers of Longido villages are effectively losing access to natural resources on which they depend for grazing and farming, without any clear possibility of wildlife revenues to compensate for that loss.

Chapter 7 deals with the final Tanzanian case study, Tarangire/Simanjiro. In contrast to Longido, the agro-ecological as well as socio-political context have encouraged the spread of cultivation around Tarangire National Park, with scramble competition for tenure of cultivable land impacting on wildlife migration. The explosion of Tanzanite gemstone mining in the area has further raised the stakes around the politics of land tenure in general and WMAs in particular.

Following these case studies, Chap. 8 presents a review and analysis of changing wildlife policy trends in Tanzania, including different case studies of the workings of community conservation initiatives, especially the WMA system and its likely implications for conservation and development change. Chapter 9 pulls together an overview of formal and *de facto* policies in Kenya and relates these to changing economic and development trajectories on the one hand, and trends in wildlife numbers and distribution on the other.

The brief concluding Chap. 10 draws together the findings in a cross-site comparative overview of the relative role of different factors in shaping Maasai land use and livelihoods change. It explores the range of outcomes in different sites and circumstances for livelihoods and poverty reduction on the one hand, and wildlife conservation on the other. It discusses the particular contribution of livelihoods studies to the evaluation of conservation, development and poverty outcomes of interventions.

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Chapter 2
Methods in the Analysis of Maasai Livelihoods

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2.1 Introduction

Chapter 1 set out the rationale for our focus on Maasai households, taken in political and economic context, as the unit and level of analysis critical to understanding changing land use and livelihoods in Maasailand. It also set out the rationale for focusing on household economy, again taken within social and cultural context, as central to understanding the decisions which people make over how to use their land, labour, and capital, and which drive the interplay of conservation and development. Economic indicators alone cannot capture the complexity, fluidity, and historical contingency of change, but they provide a powerful tool central to our approach, and one allowing for integration of additional perspectives.

The present chapter outlines the common methods of data collection and analysis used by different researchers operating in the five different major case study sites, as well as the methods used in the broader analyses of national level political and institutional contexts. The collaborative work on which this book is based arose from a research programme funded by the Belgian government (Directorate-General for International Cooperation, DGIC), coordinated by the International Livestock Research Institute (ILRI, Nairobi). Field data collection had in several cases begun prior to the emergence of the collaboration. The collaboration drew together independent studies already underway in different parts of Kenyan and Tanzanian Maasailand and provided the forum in which those studies could become more than the sum of their parts. With the establishing of the collaboration, data collection methods in each site were extended and harmonized to allow, as far as possible, for a common core data set. This makes in-depth cross-site comparisons possible, while also continuing with more site- and issue-specific data collection in each case study. Common methods of analysis were developed both during and subsequent to the data collection in the field.

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This chapter is structured around the overarching research questions tackled within each of the site studies and put into perspective in the broader national context chapters. Despite methodological hurdles, the ethnic, micro-economic, and ecological continuities across Maasailand make it possible to integrate the different case studies through a cross-border comparative structure, where parallel disturbances or interventions (e.g. impacts of conservation, mechanized agriculture, or urban markets) are played out under contrasting national, regional, and local political and economic circumstances. Considerable time and thought went into developing an appropriate framework for comparative analysis. While each study site calls for its own dedicated analysis of factors of site-specific importance, the collaboration ensured a core set of household economic, social, demographic, and spatial data was available for each site. This allowed for comparative analysis and a synthesis showing how the relative importance of different livelihood strategies varied within and between sites (and where possible through time), the openings for diversification into new land use possibilities and market opportunities, and how these in turn translate into land cover changes, with far reaching implications for vulnerable people and dwindling wildlife.

The main research questions were addressed in each of the study sites using a set of common quantitative survey data collection and statistical analytical techniques combined with more qualitative and descriptive approaches (Table 2.1). This common approach did not preclude each study developing a rather different focus depending on context, salient issues, and site-specific research interests. In all cases, household-level interviews were conducted in Maa by Maasai male and female enumerators, often, but not always, accompanied by the principal researcher.

2.2 Design and Implementation of Field Surveys

The five different study sites in part represent the enormous variation found across Maasailand today (Table 2.2). They range from arid to moderately favourable agro-ecological conditions; from top-rated wildlife tourism destinations to sites with little tourist appeal; from remote rural to peri-urban; from areas limited to agropastoralism to those with high value natural resources like gemstones; from fully subdivided, surveyed, and privately titled plots to communal land; and from Kenyan to Tanzanian sites. This array gives us the opportunity to explore the many dimensions of pastoralist diversification and development, and their complex interplay with the social, geographical, and political environment. Livelihoods change among pastoralist communities is a difficult process to analyze, not least because of the complexities of establishing a representative sample in areas where there is no realistic sample frame, where households are scattered, remote, and hard to access, where agropastoralist households may alternately be defined by occupation or by ethnicity, and where there is immense variability within and between households, and within and between years in terms of their composition, activities and strategies. Furthermore, superficially discrete households may in practice be tied

Table 2.1 Main research questions, methods of data collection, and methods of analysis

Research question	Methods of data collection	Methods of analysis
What is the range of livelihood strategies found in Maasailand? How do livelihood strategies differ in the different sites (pattern, scale, and extent of diversification)?	Household surveys on stratified random samples	Non-parametric cluster analysis
How dependent are people on natural resources-based livelihoods?	Household surveys on stratified random samples	Non-parametric and parametric comparisons of household data based on cluster and other categorizations
What are the main determinants shaping livelihoods and triggering change? To what extent do external factors such as biophysical and eco-climatic/agro-ecological factors on the one hand, and infrastructure and policy on the other, shape livelihood choices? To what extent are livelihoods determined by socio-demographic characteristics of the household?	Household surveys, formal and informal interviews Family portraits Literature survey and background field research plus in-depth key informant interviews, semi-structured interviews, panel/focus groups, participant observation	General linear models Mixed models Qualitative comparison and cross-referencing
How are livelihood strategies impacted by conservation, privatization, and other dimensions of development and change?	Review policy, legal and financial documents; observe decision making and conflict resolution processes; field research plus key informant interviews	Policy analysis, institutional analysis. Comparative analysis of outcomes of similar policies in contrasting contexts and vice versa
Have any win/win solutions for environment and development emerged, and if so, where, how and why? What are the main policy lessons for managing conservation and development in Maasailand, and more generally across African rangelands?	Household survey data on economic activities and returns; remotely sensed data on agro-ecological variables; data on biophysical, social, economic/demographic variables	Discussion and synthesis from case studies

Table 2.2 Five in-depth study areas across Maasailand

Site	Area (km^2)	Rain (mm/pa)	Defining conditions	Protected areas; Conservation/eco-tourism projects
Mara (Kenya)	6,500	400–1,200	Private land: wildlife tourism/commercial crops: Maasai Mara National Reserve (MMNR) is Kenya's highest-earning PA (gate fees ~$20 million pa). Further from the MMNR, large scale cereal cultivation and irrigation for export crops along the Mara river have had far reaching ecosystem impacts	MMNR Numerous wildlife associations/ tourism operations etc.
Kitengela (Kenya)	390	<600	Peri-urban: close proximity of Nairobi (population 3 million); urban markets and land values transform the local economy	Nairobi National Park; Kitengela Landowners Association (KILA) operates lease back scheme
Amboseli (Kenya)	8,400	350–600	Subdividing land: wildlife/agropastoralism: pastoralism and wildlife in arid Amboseli depend on wetlands fed by Kilimanjaro precipitation. These key resources are being converted to cropping. Subdivision further threatens mobility and access	Amboseli National Park/Reserve; Numerous small tourism operations
Longido (Tanzania)	9,220	300–600	Communal land: agropastoralism squeezed by set-aside. Arid area, limited cultivable land and dry season grazing; increasing importance as wildlife migration corridor attracting conservation NGO investment	Ringed by PAs (Ngorongoro, Manyara, Arusha, Kilimanjaro, Amboseli); site of new Enduimet Wildlife Management Area
Tarangire (Tanzania)	22,200	650	Privatizing land; gemstone mining. Agroecological and spatial factors encourage commercial cereal cultivation. Tanzanite and other gemstone finds have fuelled a mining rush which interacts with cultivation, livestock, and wildlife land use choices	Tarangire NP; Manyara NP; Emboreet Community Based Conservation Scheme; Manyara Ranch etc.

into a wider multi-local array of more or less closely related and involved homesteads in pastoral, cultivating or urban areas, creating further challenges in defining sampling units. In this section, we lay out the commonalities and differences in the sampling frame for each case study and some important definitions.

2.2.1 Household Sampling Strategies

2.2.1.1 Definition of 'Household'

In all case studies, the 'household' refers to the Maasai entity of an *olmarei* (pl. *Ilmareita*) within the homestead (Maa *enkang* Pl. *Inkang'itie*), that is, one household head with his or her dependents, which may include, in the case of male-headed households, more than one wife and her children and grandchildren, parents and dependent siblings, as well as non-related individuals who reside with the family and depend on them for food in return for assistance with household chores (most commonly herding). Customarily each wife builds a small house (*aji*) for herself, her children, and the occasional presence of her husband. The positioning and occupancy of such houses have been described elsewhere (Spencer, 1988; Homewood and Rodgers, 1991; Coast, 2002), but broadly speaking the *enkang* comprises a number of these *enkaji* (Pl. *inkajijik*) built around one or more linked livestock corrals. Men traditionally have lived in their wife's house or moved between several wives' houses. Increasingly, men invest if they can in a house of their own, built to a 'modern', non-traditional design (rectangular plan, mud and wattle walls, if possible with plaster, cement floor and corrugated iron roof). Such houses may be built at the rural homestead (and often used as a store and site of more formal meetings). In some cases men invest in modern houses located in trading centres or urban sites as a property investment, and/or generating a multi-local household. The present set of studies tried to establish as far as possible the extent to which the homestead that formed part of the sample represented a component of a multi-local household as one of two or more related bases. Where this occurred they might often be in complementary locations (pastoral; upland or swamp-based farm; urban settlement); only the one initially sampled could be visited.

2.2.1.2 Villages and Group Ranches

Beyond the household level, the unit of study for each area described in this book differs due to local variation in social structures, land tenure and mobility of, and within, households. Thus in Tanzania, historical processes and policy placed individual households within government-defined administrative units called villages (often comprising several sub-villages, particularly with the dispersed nature of Maasai homesteads; Chaps. 6 and 7). In Kenya, the units of study may be group ranches, sub-locations or trading centres (akin to village centres), according to

whether or not land is held in Trust, as a Group Ranch or has been subdivided and is therefore under private property. The extent of the area covered may vary according to the mobility of households and their relationship to a particular geographical area (Chaps. 3–5).

2.2.1.3 Sample Selection

For each of the studies in this volume, the first challenge was to decide upon the area to cover, how to choose the sample of households to interview, and how many households to cover in order to ensure the results are representative and support statistical analyses. In all sites, a range of study sub-sites was chosen to represent variation in access to all-weather roads, markets and other services, as well as in distance to, and impacts of, protected areas and wildlife conservation across the region.

In the Mara, 219 household interviews were conducted in six villages across three group ranches. 85 of these households had been previously sampled in 1998 (Thompson, 2002). The selection of the same households per location for both periods permitted an analysis of changes in livelihood activities and income over the 5-year period for that sub-sample. This comparison also allowed some evaluation of the impacts of group ranch subdivision on household activities as it included a subdivided group ranch (Lemek), a group ranch that underwent subdivision between the two surveys (Koyiaki) and a group ranch that has not yet been subdivided (Siana).

In Kitengela, a random sample of 150 households was drawn in proportion to the overall population distribution across the area. An additional 27 households that had been surveyed in 2000 from an area adjacent to Nairobi National Park, were also included in order to be able to look at changes in the last 5 years for this smaller sub-sample. The survey focused on Maasai households that have been in this area since the group ranch subdivision, and did not include in-migrants who have purchased small parcels of land around the urban centres. As elsewhere, the Kitengela household was defined as the *Olmarei*. Because of the typical land tenure conditions in the area (already privately owned by all households for at least the last 21 years, with all subdivision of the group ranches complete here by 1985–1986), most households are becoming smaller. Increasingly, nuclear households choose to be located on their own land holding, which has meant a trend away from the customarily large *enkang,* that traditionally would have included married sons of the *olmarei* head (Grandin, 1986; Homewood, 1992). Kitengela households are, as a result, smaller compared to those in other case study areas. The houses in Kitengela are now predominantly made of corrugated metal sheeting, and women play a lesser role in physically building the houses (though they contribute or pay to buy materials).

In Amboseli, 184 households were chosen using a proportional stratified random sampling strategy based on wealth rank and location. A wealth ranking exercise (Grandin, 1988) was carried out in each of six study sub-sites, distributed across four group ranches selected on the basis of land tenure conditions, land uses and

degree of access to resources. Community informants from each study area were asked to categorize all the households from each study area based on locally relevant wealth indicators. The criteria cited most often that identified wealthy versus poor households in this exercise were (in order of importance) (1) number of animals, (2) family size, and (3) access to 'new' sources of wealth (e.g. salaries, a vehicle or agriculture). Male heads of households were interviewed except in one case where the head of the household was female. Two survey strategies were pursued with households: a small sub-sample of households (n = 38), evenly spread across the six study areas, was interviewed twice (once in the dry season and once in the wet season); a larger sample of 146 households was interviewed once.

In Longido, following initial work in one site in 2000–2001 (Mairowa village; Homewood et al., 2006) a wealth ranking exercise was carried out in each of six study sites so as to select a stratified random sample of households representing the range of socio-economic circumstances in each study site. Working with the local village chairman, study site households were listed and representatives of the local community then allocated each household to one of three or four categories ranging from poorest to wealthiest (Grandin, 1988). A proportional random sample from each category was chosen for interview. A total of 229 households were surveyed.

In Tarangire, households from all seven sub-villages within Emboreet village were listed based on sub-village census data and these lists were then updated by each sub-village chairman. A wealth ranking exercise was initially carried out by the Village Executive Officer and two Community Animal Health Workers. The revised list was cross-checked by focal groups in each sub-village to further corroborate the list and wealth ranking and finally, the list was verified at each *enkang*. Out of a total of 437 households, 226 were selected on a stratified random basis for each sub-village for a broad scale survey. A sub-sample of 37 households from three sub-villages was selected for a more in-depth, 15-month, multi-round, repeat survey, of which 27 were also interviewed in the broad scale survey.

Studies in this book could not capture the very wealthiest households, who are frequently absentee landowners and whose decisions can have a massive influence on land use and land cover change, but who are not available to survey. Also, the very poorest people are often socially invisible in household surveys, existing as dependents in other households, as landless and homeless people on the periphery of rural trading centres, and missing from any local government lists of independent households. The poorest individuals and families – those without social networks of support – may leave the area altogether as urban migrants, leaving little or no trace of their past presence. The studies in this book represent independent households resident in the rural landscape, but cannot represent those who through extremes of wealth or poverty no longer form part of that category of local resident.

Household level studies may also identify households resident in the area while failing to capture the crucial links between superficially distinct but essentially mutually dependent, complementary farming and herding and/or urban and rural households. We made every effort to capture the full range of wealth and poverty, and to identify multi-local households where these occurred.

2.2.2 *Characterizing the Biophysical and Socio-Demographic Environment*

2.2.2.1 Spatial Variables

Spatial factors such as market access, population increase, service provision, and urbanization among others, are known drivers of change (see Chap. 1, also Kristjanson et al., 2002; Herrero et al., 2003). Therefore, in all of the studies, several spatially referenced variables were used to characterize the locations of households in relation to availability and use of resources and services. The variables characterizing the biophysical environment were assembled using geographical information systems (GIS), making it possible to extract the information for each of the homestead locations in our database. Distances to the nearest road, nearest permanent water source, nearest town centre and distance to the national parks were calculated per kilometre. Normalized Differentiated Vegetation Index (NDVI) or NDVI-CV (the coefficient of variation for monthly NDVI) was used as a proxy measure of agro-ecological/eco-climatic potential (c.f. Pratt and Gwynne, 1977). NDVI and NDVI-CV values were calculated as the average monthly NDVI over a 10-year period for the nearest 5 × 5 km pixel to the homestead (Kitengela, Mara), and for the surrounding 10 km^2 in Amboseli and for Longido. Table 2.3 summarizes the main spatial variables used in the study.

In each study site, proportion of pasture available in the area around the homestead was calculated as:

$$\% \text{ pasture available} = 100 \times \frac{\text{total area} - \text{cultivated land} - \text{urban area} - \text{national park}}{\text{total area}}$$

The area used to calculate percentage of rangeland pasture differed slightly for the different sites. For the Mara site, this was calculated as the percentage of grassland, savanna and bushland available in a radius of 5 km around the homestead, derived from the Africover classification. In Amboseli, proportion of pasture within 10 km^2 was used, and in arid Longido, figures were based on a 10 km radius. Wildlife

Table 2.3 Spatial variables used for characterizing the biophysical locations of *enkangs* in relation to access to resources and livelihoods options[a]

Variable	Kitengela	Mara	Longido	Amboseli
NDVI average	*	*	*	*
NDVI coefficient of variation	*	*	*	*
Distance to nearest road (km)	*	*	*	*
Distance to nearest major town	*	*	*	*
Distance to nearest primary school/services (km)	*		*	*
Distance to permanent water (km)	*	*	*	*
Distance to protected area (km)	*	*	*	*
Distance to livestock market (km)	*	*	*	*
Proportion of land area available as pasture	*	*	*	*
Wildlife density (kg/5 km^2)	*	*		*

[a]No equivalent regression analysis was undertaken for Tarangire site data

densities were available for all sites except for Longido. In the Kenya study sites, average wildlife and livestock densities[1] were available, calculated based on three aerial surveys conducted by Department of Resource Surveys and Remote Sensing (DRSRS) at a scale of 5×5 km for the years 1997, 2000, and 2002. In Kitengela, cattle densities and permanently fenced areas were also geo-referenced.

2.2.2.2 Household-Level Variables

In all the study areas (Mara, Kitengela, Amboseli, Longido, and Tarangire), the studies combined household surveys using questionnaires as well as formal and informal semi-structured interviews with household members and community groups. The questionnaires were used to gather information on household structure and education levels, crop production (cultivars and acreages grown, yields and production techniques used), livestock production (herd size and structure, milking patterns, off-take rates, and marketing arrangements), and household income characteristics (other economic activities and predicted future production choices) (Table 2.4). Detailed interviews were conducted with household heads. In Longido and Kitengela, additional questionnaires were developed asking women of the household about their activities and income sources.

Studies quantifying the returns to livestock production (i.e. live animals, meat, milk, hides and skins, and manure) versus other livelihood and land use options, such as cropping, quarrying, running a campsite for tourists, or producing and selling honey, face considerable methodological challenges. To measure the benefits versus the costs of livestock production, models are required that take into account herd composition, movement and life cycles, multiple outputs, and feed inputs coming from outside the ranch or landowners acreage. Figuring out how to account for and/or integrate the value of Maasai livestock as an asset/bank account or stock on the one hand, or as an income flow on the other, provides yet another challenge. Several recent case studies have addressed this issue, and compare returns to different land use options, for Kitengela (Kristjanson et al., 2002), Amboseli (BurnSilver, 2007), and Maasai Mara (Thompson, 2002). In the absence of details on herd dynamics for each study site, the analyses in this book focus on livestock productivity as measured by transfers to cash or for consumption for the household, that is, livestock sales, livestock slaughtered and consumed by the household, and sales of livestock products such as hides and, where available, milk.

In most cases, as with livestock production, analyzing the value of different income streams to individual households required aggregating different variables. This was a crucial part of the collaboration to ensure that like could be compared with like across the different case studies. For example, off-farm income was divided into four or five categories: wage or salary income, petty trade income, business income, income from wildlife and conservation related activities, and income from remittances. Considerable

[1] Livestock densities are expressed in Livestock equivalents (LE) or Tropical livestock units (TLU) per unit area. Exact definitions vary. In the context of these studies, one LE or TLU = 250 kg weight. Adult Maasai cow = 0.71; adult sheep/goat = 0.17 TLU or LE. See, for example,. ILCA (1981) and Sellen (2003).

Table 2.4 Variables characterizing household socio-demographic conditions and household economy

Category	Variable
Household assets	Area under rainfed cultivation[a] (ha)
	Area under irrigated cultivation (ha)
	Livestock owned (TLU)
Household socio-demography	Total AU (see section 2.4 for definition)
	Sex of household head
	Age household head
	Dependency ratio
	Education of household head (years educated)
	Education, all children (proportion of children 6–15 in school)
	Years resident
Household economy	Gross annual revenues from milk sold ($)
	Gross annual revenues from livestock sales (include skins and hides)($)
	Gross annual value of livestock consumed and gifted out ($)
	Value of annual purchases of livestock ($)
	Gross annual value of crop consumed ($)
	Gross annual value of crop sold ($)
	Annual income from petty trade activities ($)
	Annual income from business activities ($)
	Annual income from salary/wage activities ($)
	Annual income from conservation/wildlife related activities (including land leasing, beads and crafts, tourist guide, ranger etc.) ($)
	Land rental income (cropping, etc.) ($)
	Total number of off-land activities
Household connections	Influence/no influence on allocation of resources (based on range of factors – networks, political influence, leadership, gate-keeper position to opportunities)

[a]The idea of dividing this into high potential and low potential rainfed area was eventually rejected on the basis that the information that it represented would come from the NDVI regression variable and the value of the crop

effort was put into agreeing these categories and what to include within them. Because of the way multi-local households operate, and the circular migration increasingly common in Maasai households (Coast, 2002; May, 2002), remittances were an important element of household income in many sites, but with a nature different to other income streams and therefore placed in a category of their own. Wildlife related income was differentiated from other activities on the basis that conservation and wildlife-related activities are specific to Maasailand in a way that the other activities described are not. In some areas, highly specific income streams of significant value were also differentiated from these categories. In Tarangire, for example, mining income was separated from other business income streams due to the focus of the study on the role of mining and the particular value that the Tanzanite mining trade has within the Maasai communities in the area. In the Mara, land leasing for wheat cultivation was similarly differentiated from other income streams as one that had a significant impact on land use in the area. Table 2.5 summarizes how values were calculated for agricultural production, livestock production and off-farm income streams.

Table 2.5 Definitions/calculations for aggregated income streams and production values

Aggregated variable	Component variables	Comments
Gross livestock income/ production value	Value of livestock sold; Value of hides/skins sold; Value of milk sold; Value of livestock slaughtered; Value of livestock received as gifts Value of milk consumed where available; Income from manure sale; Revenue from traction	Value of milk consumed not available for Longido or Mara; Value of hides traded as part of a regular business would be included in business income
Gross agricultural income/ production value	Value of crops sold; Value of crops consumed	
Gross wildlife income	Value of income from tourism related activities (bead/other craft work, guiding, etc.); Value of income from land-leasing scheme Value of land from rents off tourism related ventures	Includes activities that would otherwise come under business or salary, but would not be available as opportunities without the wildlife
Gross petty trade income	Sale of firewood; Bee-keeping/honey sales; tobacco sales; beer (occasional); herbalist/traditional medicine; tea/sugar/soap, etc.; Vegetable trade (tomatoes, onions, etc); selling *shukas*; selling fodder (*sagarami*); carrying water by bicycle; livestock association; *Moran* in Malindi	May be differentiated from business income due to scale and investment (e.g. occasional sales of small quantities of tea and sugar at weekly markets versus selling tea and sugar in a shop)
Gross business income	Trader; shopkeeper/butchery/*duka* Livestock trader; *Fundi* (dam builder, carpenter, artisan, well digger, blacksmith, fence builder); midwife; beer/pub; *Posho* mill; mineral dealer; hotel owner; skins/hides trader; property/business rental; milk vendor; livestock holding pen	
Gross wage/salary income	Government employee (chief, sub-location chairman…); employee; MP; councillor; teacher; church; salaried position on association/board; paid shepherd; watchman; labourer/*Kibarua*; driver; school sponsorship; farm labourer; livestock driver/trekker; employed in shop/butchery; borehole minder	Includes formal and informal, regular and irregular
Gross annual income	Sum of: Gross livestock income; Gross agricultural income; Gross petty trade income; Gross business income; Gross conservation income; Gross wage/salary income	

Other secondary sources of data included information on crop and livestock prices in local markets (based on interviews with key informants). In some case study sites, additional information was collected to delve further into identifying the factors explaining the range of livelihood strategies found in the study sites. For example, in Kitengela, other data collected at the household level included changes in land ownership over time (land sales and fencing issues), probable future land-use plans, drought coping strategies based on the two previous droughts of 1997 and 2000, household consumption patterns across seasons, peoples' attitudes towards wildlife, wildlife populations and dynamics over the past 5 years, and perceptions as to how the land-leasing programme is impacting on people's attitudes towards wildlife.

2.2.3 Family Portraits

Detailed qualitative studies of a small sample of households brought additional depth to the quantitative data for Mara, Amboseli, Tarangire, and Longido using 'family portraits'. Family Portraits methodology involves a participatory action research approach, developed for pastoral communities in West Africa (Thébaud, 2004; IIED, 2005) and adapted to Maasailand by Cochrane et al. (2005). In the context of this research, the family portraits are used to inform, enrich, and support the conclusions of the quantitative analysis by providing narratives of livelihood aspects difficult to capture with quantitative methods, and historical timeline perspectives not addressed by horizontal snapshot surveys.

The implementation of family portrait methodology starts with the communities selecting families according to specific criteria (see below). These families then take ownership of a process of recording their 'story'. Together with a team of facilitators (including men and women, and in this case all Maasai), household members build up a picture of the family, their history, their livelihood system, the institutions they interact with and the relationships they have. Most important are the family's analyses of how these different dimensions are changing, what is driving these changes and how they have been able to respond.

Although family portraits cannot equate to long term ethnographic work, and are inevitably subject to some of the caveats that apply to rapid 'participatory' methods (IIED, 1995; Kiwasila and Homewood, 1999), they involve a considerably more in-depth and sensitive process than do standard household survey and PRA techniques. A team of facilitators initially stays with the family for 3 or 4 days, talking and gathering information loosely based on an interview guide developed ahead of time that defines the areas for discussion. Information is gathered using a combination of techniques including formal and informal interviews with different members of the family, group interviews using visual and participatory techniques, and observation. On the basis of this initial stay, the team writes up the family's story, and then returns for a shorter period (1–2 days) to follow up on any issues that have not been covered or that require clarification. The team translates the story into Maa and then returns for a third time to feed their work back to the family. Once the family has

considered, amended and verified the accuracy of the work, a copy of the final version of the story, translated into the appropriate language (in this case Maa) and including photographs, is given to the family to keep. A factor that distinguishes the method from classic rural appraisal and academic research techniques is that from the outset it is made clear to the family that the portrait belongs to the family. The method was developed primarily as a development tool, intended to promote analysis within families and communities and to engender ownership of both the analysis and its outcomes. Any further use of the portrait must be agreed by the family members, who may decide that portions of the portrait should remain confidential.[2]

The final stage in the process involves feeding back a number of family portraits to the community as a whole. This is an opportunity for the community to verify whether the experience of the families concerned is representative of others in the community. The analysis and discussion of the portraits can help the community identify problems facing specific parts of the community or the community as a whole, and in some cases these findings challenge commonly stated assumptions and sticking points.

The selection of families is critical to the success of the process. The families concerned need to be prepared to discuss their livelihoods in some depth, and to be interested in owning their own story, if they are to take an active role in the process. The follow-up with communities tends to be more productive if the communities concerned are aware of the process and involved in the selection of families from the start (Cochrane et al., 2005). In this case, families from Longido, Mara, and Amboseli areas were selected in order to cover the following household types:

- Households representing different levels of wealth or poverty, according to their communities.
- Households located close to protected wildlife areas.
- Households that had an older head of household (60–70 years old) or a younger head of household (~40 years old).
- Households that illustrated any very significant differences in land tenure in the area. For example, in Amboseli and in Mara, households were selected from group ranches that had not been subdivided and from an area where land had already been subdivided.

In the case of Tarangire, only one family was selected for a formal family portrait. The second portrait presented in this book derives from semi-structured interviews conducted with the individual portrayed, his family, associates, and other observers.

2.2.4 Institutional and Policy Analyses

Policy chapters (8 and 9) and areas of policy and institutional analysis in individual case study chapters (e.g. Chap. 6: Longido) draw primarily on informal

[2]In the case of this book, abridged versions were produced and the families revisited in 2007 to seek their consent for these versions to be published as they appear in the book.

semi-structured discussions and on formal village meetings with local community members. They also draw on informal discussions with other stakeholders (such as NGOs, private companies, and researchers), review of many unpublished documents from village and district levels of government, and attendance at various planning workshops concerning the area over a period of 5–10 years in each case (see e.g. Nelson, 2007). The historical/legal review for Tanzania contains a synthesis of the way that rights and power have been defined by wildlife management institutions over time and how those rights have changed in light of the community wildlife management narrative (see Chaps. 1, 8 and 9).

2.2.5 Participatory- and Action- Research

The studies reported here were all linked into ILRI's DGIC-funded *Reto-o-reto* programme led by Robin Reid (then of ILRI; now of Colorado State University Center for Collaborative Conservation). That programme as a whole was predicated on the fundamental importance of two-way communication and engagement in development-related research. It was particularly aware of the problems of outsider formulation of priority research issues, results, and conclusions, and the potential bias and lack of relevance to local priorities that such approaches can entail. As part of the *Reto-o-reto* programme, skilled local facilitators were active in two-way engagement, and researchers attended frequent, lively meetings in each site with local stakeholders, formulating research issues, testing preliminary findings, and facilitating exchanges of insights and understanding. Those meetings were inevitably political as much as scientific. Without claiming to be expert observers, facilitators or analysts of such processes, the researchers contributing to this volume learnt from their involvement, and that learning process has contributed to the insights that shape our findings.

2.3 Characterizing Livelihood Strategies

2.3.1 Identifying Groups of Pastoralists with Similar Livelihood Strategies

Previous sections have set out the full range of common variables on which quantitative data were collected for each of the five main study areas. The present section looks at how these data were analyzed and integrated to tackle the central research questions.

People across Maasailand are operating in a complex social, economic, and policy environment that is constantly changing. Past studies have established considerable knowledge of qualitative patterns from social, cultural, historical, and

political points of view (see Chap. 1). However, those well-established, qualitative works have left open some running debates, not least over issues of perceived land degradation, and over the role of wildlife conservation in local development. Maasai households are well documented as diversifying the range of activities in which they are involved (Thompson and Homewood, 2002; Kristjanson et al., 2002; Brockington, 2001). This book seeks to understand Maasai livelihoods, and in particular the economic drivers underlying household decisions to diversify, particularly in ways that may be on the one hand compatible with, and in other cases conflicting with wildlife conservation. For the purposes of this study, we wanted to compare livelihood diversification across, as well as within, different sites, and to look at economic drivers and correlates at household level. We sought a method of analysis that would allow us to characterize in an objective way the range of livelihood strategies that pastoralists are involved in, that is, to identify relatively homogenous categories or groups of households engaged in similar economic activities/livelihood strategies.

One of the statistical techniques available for doing this is cluster analysis. Cluster analysis classifies a set of observations into two or more mutually exclusive *unknown* groups based on combinations of interval variables. The purpose of cluster analysis is to discover a system of organizing observations, in this case households, into groups where members of the groups share properties in common. It is cognitively easier for people to predict behaviour or properties of people or objects based on group membership, all of whom share similar properties. It is generally cognitively difficult to deal with a multitude of individuals and to predict behaviour or properties based on observations of the full, ungrouped range of variability in other behaviours or properties.

Each study needed a common clustering method that could classify households on the basis of the range of livelihood activities. As preliminary steps we tried a range of clustering methods, and experimented with the use of principal components as a procedure prior to cluster analysis to reduce collinearity in the selected variables. In most cases, we could not achieve a level of cluster segregation yielding clear groups of pastoralist livelihood strategies. To achieve greater separation between the clusters, we then decided to treat the livelihood options as binary variables (e.g. engaged in cropping: yes/no) because this reflected more closely questions as to what the diversification strategies are, independent of the level of investment or return in each activity (e.g. number of hectares of cropping). For doing this, we used the statistical procedures available in the SAS software (SAS Institute 2002, version 9.1).

The CLUSTER procedure in SAS finds hierarchical clusters of the observations in a data set. The data can be coordinates or distances. To perform a non-parametric cluster analysis on binary data (non-Euclidean distances), we use the DISTANCE procedure. This procedure can produce an appropriate distance data that can then be used set as input to PROC CLUSTER. The DISTANCE procedure computes various measures of distance, dissimilarity, or similarity between the observations of a SAS data set. These proximity measures are stored as a lower triangular matrix or a square matrix in an output data set that can then be used as input to the

CLUSTER procedure. The input data set contains asymmetric binary variables, of which the two possible outcomes: 1 (positive/present) or 0 (negative/absent) are not equally important. The most important outcome is coded as 1 (present) and the other is coded as 0 (absent). The agreement of two 1's (a present–present match or a positive match) is more significant than the agreement of two 0's (an absent–absent match or a negative match). If a variable is defined as an asymmetric nominal variable and two data units score the same but fall into the absent category, the absent–absent match is excluded from the computation of the proximity measure. The measure used to calculate the distances between the asymmetric binary variables is the JACCARD dissimilarity coefficient.

All clustering methods are based on the usual agglomerative hierarchical clustering procedure. Each observation begins in a cluster by itself. The two closest clusters are merged to form a new cluster that replaces the two old clusters. Merging of the two closest clusters is repeated until only one cluster is left. The various clustering methods differ in how the distance between two clusters is computed. In Ward's minimum-variance method, a common clustering method used for classifying household data, the distance between two clusters is the *ANOVA* sum of squares between the two clusters added up over all the variables. At each generation, the within-cluster sum of squares is minimized over all partitions obtainable by merging two clusters from the previous generation. The sums of squares are easier to interpret when they are divided by the total sum of squares to give proportions of variance (squared semi-partial correlations). Ward's method joins clusters to maximize the likelihood at each level of the hierarchy under the following assumptions:

- multivariate normal mixture
- equal spherical covariance matrices
- equal sampling probabilities

Ward's method tends to join clusters with a small number of observations, and it is strongly biased towards producing clusters with roughly the same number of observations. It is also very sensitive to outliers. One of the decisions facing the investigator is the choice of level (and therefore number) of clusters appropriate to show statistically significant and inherently meaningful categories in any given analysis. Pseudo-F and pseudo-T statistics were used here to select the appropriate number of clusters.

Clustering has been used in a range of studies for characterizing households in studies of mixed crop-livestock systems (Solano et al., 2001, 2003; Waithaka et al., 2003; Baltenweck et al., 2003) and pastoral studies (Thompson et al., 2002; Williams, 1994).

It is a technique that has well-recognized limitations. For example, the clusters selected may lack mutual exclusivity; there may be wide ranges in levels of the variables selected (e.g. someone with 50 cows could be in the same cluster as one with 1,000 cows); the clusters reflect statistical groupings, which may not represent the way people group systems on the ground; choosing the number of clusters sometimes involves subjective decisions. Nevertheless, we found that using non-parametric binary clustering techniques for representing livelihood choices provided an improvement over methods using continuous variables. Non-parametric binary clustering

techniques gave us a useful tool for tackling the range and fluidity of different activities contributing to multi-stranded livelihoods.

2.3.2 *Variables Representing Livelihood Strategies of Maasai Pastoralists*

Key to this clustering approach is the choice of factors or variables that provide the basis for the clustering. Unlike other pastoral studies, we chose not to group people *a priori* based solely on their assets or a wealth ranking. Instead, based upon discussions and consultations within the socio-economic team and key informants from the different pastoral systems, key variables that incorporated income, assets, and investment strategies were identified as factors critical to opportunities and subsequent choice of livelihood strategies in pastoral systems.

In the Amboseli, Kitengela, Mara, and Longido sites, households were clustered on the basis of what assets households have (land, labour, and capital), and what they are getting from those assets (income, food), or are doing with the income (purchasing livestock, off-land activities). The clusters were thus derived based on 11 or 12 asymmetric binary variables,[3] representing the different income-generating activities in the region, and on the presence/absence for each of the households of each of those activities.

- Livestock production (four binary variables)
  - Livestock owned
  - Income from livestock or livestock products
  - Livestock slaughtered
  - Livestock purchased.
- Agricultural production (three to four binary variables depending on site)
  - Cultivating lowland/upland (Amboseli, Longido);
  - Cultivating (Mara, Kitengela);
  - Crops harvested for household consumption
  - Crops sold
  - Income from land leasing for commercial cultivation (Mara)
- Income from a wildlife or conservation related activity (one binary variable)
  - Includes irregular sales of crafts to tourists, employment as a tour guide or park ranger, land-leasing programs or wildlife-related land rents).
- Off-farm income (three binary variables)
  - Income from *wage or salaried* position (e.g. permanent skilled employment such as teacher, or government employee, and casual, regular or irregular employment such as night watchman, labourer, herdsman or driver);

[3]In Amboseli and Longido, cropping was differentiated as lowland or highland, whereas in the other sites only one cropping variable was defined.

- Income from *petty trade* (including regular or irregular small-scale sales of firewood, groceries such as tea, sugar and soap, honey, and hides);
- Income from *business* (including regular trading of livestock or hides; dealing in gems; shop or hotel owner; beer brewing, or artisan).
- Income from *remittances* not included as a binary variable as it was not available for all sites.

The clusters derived were based on binary data (yes or no to each livelihood component). Subsequent analysis of the value of income/assets/investment for each cluster was used to establish the extent to which wealth distribution is influenced by *what* people are doing. Analysis of variance of gross income generated through the different activities (the values of produce consumed as well as sold were included in calculations of gross income), as well as livestock holdings per household, frequently required log or inverse transformation of the variables due to skew in data distribution. All means were calculated using only those households involved in the activity, so as to compare the real returns for each activity. As a result, cluster means for the value of each activity do not include any zero values.

The Tarangire case study provides an exception to this method of analysis, depending on a complex and long-term wealth ranking categorization of households on which to compare economic diversification across the community.

2.4 Household Choice of Livelihood Strategy

Multinomial logistic regression analysis was used to identify which factors were influencing membership of households in the different clusters, equivalent to their choice of livelihood strategy (e.g. cropping, livestock, wildlife, off-land, and various combinations thereof). Cluster membership was used as the dependent variable. The independent variables varied slightly across sites to account for regional differences, and included:

- Spatial and geographic variables (NDVI measures, distances to the nearest all-weather road, primary school, dry season domestic water, national park/conservation area, major town and major livestock market, and population density),
- Household demographics (total household size measured in Adult Unit Equivalents (AU)[4] sex and age of household head, proportion of 5-16 year-olds in school, education level of household head, years resident in the area)
- Status of household head (Longido)
- Socio-economic variables (herd size, gross annual income)
- Number of off-farm activities
- Land size (Kitengela)

[4]Adult equivalents are a system for expressing a group of people in terms of standard reference adult units, with respect to food or metabolic requirements. A reference adult is taken as an adult male: other categories are a fraction of that adult equivalent: Adult male = 1AE; adult female = 0.9AE; M/F 10–14 years = 0.9AE; M/F/5–9 years = 0.6AE; infant/child 2–4 years = 0.52AE (Homewood and Rogers, 1991; Sellen, 2003).

Multinomial logistic regression does not require that continuous variables are normally distributed and it can include categorical as well as continuous independent variables. The analysis does not follow the same rules of parsimony as standard linear regression, and multicollinearity reduces the stability of the model significantly. Selection of the variables to include in the model must therefore be carefully decided before the analysis, as all selected variables are then included within the model. Where factors were highly correlated, variables were selected based on the specifics of the model and the area concerned. For example, in Longido, distance to national park was highly correlated with distance to a major town, although the relationship was not linear. Longido is an important wildlife corridor and distance to the national parks does not correlate strongly with wildlife populations or the potential for damage to crops, therefore distance to major town was included in the model and distance to park was not. The same may not be the case in, for example, Amboseli.

The odds ratios generated by multinomial logistic regression show the relative likelihood of a household with a particular characteristic being allocated to a particular cluster, as opposed to the reference cluster. The reference cluster therefore needs to be selected for carefully. One method for selecting the reference cluster is simply to choose the largest cluster; another is to look for an extreme in terms of the central issue under study – in this case diversification. In Mara, earlier studies used pure pastoralists as the reference category (Thompson et al., 2002). In Kitengela, the reference cluster used was pastoral households with wildlife income. In Amboseli, diversified agropastoralists – the most diversified group of households, one of the richest clusters, and one of the largest –was used as the reference cluster basis for regression analyses. In the case of Longido, the least diversified pastoralist cluster (*undiversified pastoralists*) was chosen so as to identify factors that increased diversification away from the "traditional" model of Maasai pastoralism. Cluster analyses for Tarangire were not available in time for inclusion in the present volume.

2.5 Factors Influencing Income and Wealth Levels

Generalized linear regression analysis was used to delve further into the factors influencing income levels obtained from the different livelihood strategies and address the following research questions[5]:

- What factors help explain overall gross annual income levels?
- What factors help explain returns from livestock?
- What factors help explain returns from crops?
- What factors help explain returns from off-land activities?
- What are the determinants of per capita herd sizes?

For this, a series of regression analyses were performed for Mara, Amboseli, Kitengela, and Longido data, based on general linear models using STATA and

[5]In Mara and Longido, this analysis was limited to examining factors influencing gross annual income according to available data.

SPSS. One advantage of using general linear models is that this method deals well with unbalanced design (since there were different numbers of observations in each category and in each variable that was included in the regressions). Prior to the analysis, data were checked for normality, and some variables were transformed where necessary (where, for example, they contained many zeros). The natural log transformations of some of the variables improved their distribution tremendously so they approximate to a near-normal distribution. These included the dependent variables and a few of the explanatory variables.

Total yearly income was used as the dependent variable in a generalized linear model, to analyze to what extent socio-economic household characteristics and biophysical environment variables help explain variations in family income levels. Total yearly income was defined as the income derived from milk sales, livestock sales, livestock gifts in, livestock slaughtered, crops consumed, crops sold, income from land rent, income from wage petty trade, businesses, and, where relevant, remittances from these various categories (Table 2.5).

Socio-economic variables used include the age of the head of household, number of reference adults in the household, and herd size (livestock equivalents, LE or Tropical livestock units, TLUs). Information on the education level of the head of household as well as his/her leadership position (none, minor, and major leadership position) were also included. Dummy variables were used to indicate whether the household owned land or not and cultivated or not. All variables were tested for multi-collinearity before the mixed model was constructed. In the Mara and Kitengela, SAS MIXED procedure was used to build the models to account for spatial autocorrelation patterns in the data. In Longido and Amboseli, models were likewise tested for spatial auto-correlation and heteroskedasticity using SPSS 12. Non-zero covariance among all of the observations in the dataset was modelled with different covariance structures, with or without nugget[6] effects.

2.6 Discussion

In summary, active collaboration between independent researchers over a 5-year period has allowed for a common cross-border comparative approach, focused on livelihoods, and based on cross-sectional survey data, with common variables, data collection methods, and data analysis across all sites. The household was chosen as the main decision-making unit and hence as the main unit of data collection and analysis. Quantitative and statistical analyses examine livelihoods, and those factors that shape them and are associated with their relative success or failure. Complementary methods, including long term participant observation and more

[6]When a variogram is extrapolated back to zero distance, it may *not* approach zero variance. The amount by which the variance differs from zero (the constant) is known as the nugget effect. This term derives from mining geostatistics where nuggets literally exist. A pure nugget effect corresponds to the total absence of auto-correlation.

short term participatory work, were used to present the livelihoods material in the context of policy and institutions. And supporting data were gathered on a range of dimensions from historical through social and cultural to development studies on the one hand, and for wildlife trajectories on the other.

There are inevitably pros and cons to the overall methodology used. This section reviews the limitations, puts them in context and explores the measures employed to minimize their effects.

2.6.1 Sustainable Livelihoods Framework

Although not rigidly formulated within the sustainable livelihoods framework (SLF), all the studies in this volume use the concept of livelihoods, and of the different component dimensions of livelihoods, as a useful way of structuring understanding and analysis of the way people make their living and of the factors influencing their decisions over land use. Qualitative and quantitative data on livelihoods provide a basis for exploring everyday life in Maasailand and, by extrapolation, how it is changing (or staying the same), as well as for unpacking economic and other factors affecting land use decisions, conservation and development for Maasai in East African rangelands.

There are well-recognized limitations to the sustainable livelihoods approach. While offering a useful heuristic tool, it is hardly a grand unifying theory. The focus on cross-sectional data gives little basis for understanding the dynamics of people's lives and strategies, nor the scale of social and cultural factors' influence on people's choices. The concept of 'social capital' offers fewer insights than Sen's concept of entitlements (upon which the SLF draws). The livelihoods approach tends to lack historical and site-specific depth, generating 'thin' descriptions (see, by contrast, Anderson, 2002). It does not capture life cycle effects well (c.f. Chayanov, 1966), nor the long-term dynamics of livelihoods and their interplay with social and cultural institutions. It tends to focus primarily on datum line and threshold concepts of poverty, rather than fully embracing the different implications of structural and conjunctural poverty so salient in pastoralist systems (Iliffe, 1987; Anderson and Broch-Due, 1999; Little et al., 2008). Although it tends to centre on concepts of diversification as a major development trajectory, it may not deal adequately with the very heterogeneous nature of diversification, and particularly with the implications of fragmentation and downward spiral of livelihoods on the one hand, as against specialization, and development of investment portfolios on the other. It deals primarily with those open to sampling by household survey, which means missing absentee landowners who may be major players, as well as potentially missing the poorest – in Maasailand, the landless and stockless migrants, or dependents in patron households.

These potential weaknesses have been addressed in various ways in the case studies and analyses presented in this volume. While relying primarily on cross-sectional panel data, and on quantitative and statistical associations, at the expense

of pursuing more qualitative, dynamic, and historical insights, there is a significant body of expert historical, social, and cultural work, as well as ecological and biodiversity studies, on which all of these case studies have been able to draw. The research questions and questionnaire tools have been formulated on the basis of a combined understanding of that body of knowledge, as well as the interpretation of the results. In addition, in-depth, qualitative family portraits, as mini-ethnographies, go some way towards bridging the gulf between systematic quantitative survey and 'thick descriptions' based on more sensitive, long term, qualitative work.

2.6.2 Evaluating Community-Based Conservation

Given the importance of wildlife and conservation across Maasailand, researchers in this book were particularly concerned with documenting the nature, scale, and importance of wildlife conservation on Maasai livelihoods. Such impacts are diverse and have been measured in detail in a number of different ways, including land tenure issues, household economies, and land use, potential for benefit sharing, for example, from wildlife-based tourism, livestock health, and crop damage, and conflicts of interest, politics, and power.

However, the studies in this book were also concerned with avoiding some of the pitfalls associated with focusing entirely on conservation. Research that focuses directly on people's attitudes and perceptions to conservation risk operating at face value, without taking sufficient note of the inequalities of power which are involved in developing country contexts, nor of the problems constraining discussion of sensitive issues in such a political context. While concerned with conservation issues in Maasailand, studies in this book took a broader focus on livelihoods issues, in order to provide a more balanced view than a direct focus on conservation impacts. Income and expenditure are in themselves potentially sensitive issues, but they are relatively neutral with respect to conservation impacts and conservation politics *per se.* To help frame questions over the impacts of conservation appropriately, it was important to be aware of the social, political, and economic context of different types of conservation initiatives and approaches, and of the ways those contexts can influence or seriously distort research findings.

2.6.3 Potential for Statistical and Simulation Modelling

Those interested primarily in social, cultural, and political dynamics may find this approach overly quantified and statistical. However, at the other end of the scale, the approach set out in this and subsequent chapters is open to the criticism that it has not gone far enough with the possibilities offered by available datasets on wildlife and habitat, nor with those offered by modelling techniques, particularly by simulating policy impacts in ways that offer the opportunity for nuanced policy decision

support. The case studies presented focus on comparing and contrasting actual returns to economic activities across all five sites, and teasing out the main factors associated with those returns. In doing so they have established some of the basic data necessary for others to pursue more sophisticated modelling exercises, both statistical modelling of associations between wildlife and economic outcomes (c.f. Homewood et al., 2001) and also simulation of development and conservation outcomes following on specific interventions. For example, Thornton et al. (2006) and Boone et al. (2006) build on BurnSilver's Amboseli data to model the implications of different ecological, economic, and development scenarios.

In spite of inevitable limitations to the scope of the study, the approach, and methodology make possible for the first time an in-depth understanding of the comparative micro-economics of pastoralist and agropastoralist households across a wide range of sites in Kenya and Tanzania Maasailand. They make available a cross-border and cross-site comparative analysis which allows the first comprehensive exploration of the full implications of rural development conditions in East African rangelands and of the role that wildlife plays within people's livelihoods. This work gives new insight into the superficially perverse land use decisions governing trajectories of change for people and wildlife in East African rangelands.

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Family Portraits – Mara[1]

Kanyinkei Ole Kasoe and Wuantai Ole Kariankei live with their families in Narok district, close to the Masai Mara National Reserve. Both families are primarily dependent on livestock, earning additional income through their membership in wildlife associations and other opportunities linked with tourism. However, the income from conservation and tourism has proved erratic and agriculture is not practicable in the area because of the concentration of wildlife that depend on resources outside the reserve, placing livestock central to the families' survival. Subdivision of land and privatization are considered important drivers of change for both families. Wuantai's family has had land allocated to them, while Kanyinkei is still waiting to receive his allocation. Both families are concerned that subdivision will reduce mobility and access to resources and ultimately the number of livestock that they can keep, and have observed a trend towards individualization and poor people selling their land. However, they also seek to benefit from the changes and intend to buy land themselves.

Kanyinke Ole Kasoe

Kanyinkei Ole Kasoe, born in 1958, lives with his family 320 km south of Nairobi at Ng'ueng'ueny, near Talek trading centre in the former Koyiaki Group Ranch. His boma is located 200m inside the eastern boundary of Kenya's most visited protected area, the Maasai Mara National Reserve. He is married with five wives, aged between 34 and 17 years. He has 15 children, 5 girls and 10 boys aged from 14 years to 2 years. Ole Kasoe lives with four of his wives,

[1]Adapted from Cochrane, K., D. Nkedianye, E. Partoip, S. Sumare, S. Kiruswa, D. Kaelo, L. Onetu, M. Nessele, M. Said, K. Homewood, P. Trench, R. S. Reid, and M. Herrero. 2005. Family Portraits report — Family fortunes: Analysis of changing livelihoods in Maasailand. These portraits were compiled on the basis of discussions with Kanyinkei Ole Kasoe, Wuantai Ole Kariankei and their families. These abridged versions are published here with their express permission.

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Box 1

Ole Shorono and his wife Kijoolu left their home in Samburu due to poverty and they came to live with the family in 2003. Ole Shorono is not only an age mate to Ole Kasoe but also a clan member. Living with Ole Kasoe's family favours them because they get milk and meat and occasional support from Ole Kasoe's family. In turn, they also participate in managing the livestock herd, especially when Kanyinkei is not at home. In addition, Ole Shorono is paid a fee by the neighbouring families for collecting herbs especially the type used in making local brews for ceremonial occasions.

their children and the 5-year-old brother of his youngest wife. He has also hired Ole Shorono (see Box 1), who stays at Ole Kasoe's boma with his wife to help herd the animals and look after his family when Ole Kasoe is away. Ole Kasoe's first wife, Norkuashen, lives at the Kolong Cultural Boma 3 km away. Kayiok, 12 years old, is the only child who attends school, although Ole Kasoe intends to educate all of his sons and maybe some of his daughters. During term time, Kayiok lives with his mother at Kolong and attends school at Talek and during school vacations Kayiok moves back to his father's boma to herd his father's livestock.

Ole Kasoe was born in the Olkinyei Group Ranch in Narok district. His father died before he was born and he grew up with his mother, his brothers and sisters, and an uncle. In 1968, the family moved to Olesere at the northern end of Koyiaki Group Ranch in search of better pastures and to avoid an outbreak of rinderpest. Over the next 6 years, the family moved between Talek and Olesere in Koyiaki Group Ranch. They would move to Olesere during the rainy season when pastures were plenty and water available from the temporary water pans. During the dry season, this water would dry up and they would move to Talek to be close to the Talek river. As soon as it rained they would leave Talek to avoid tsetse fly. An outbreak of East Coast Fever in 1974 forced the family to move back to the Olkinyei Group Ranch. They returned to Talek in 1976 and settled there for a couple of years, only occasionally moving out to Ilchurra 5 km away when there were conflicts between the community and the Kipsigis over livestock theft. At that time, Ole Kasoe remembers that there was very little settlement in Talek area and the families that stayed in Talek were only there temporarily before moving north. In 1978, the family moved again, this time to Emarti near Sekenani, still in the Koyiaki Group Ranch, where Ole Kasoe was circumcised. Two years later, he and his brother moved to Ng'ueng'ueny, a few kilometres from where he lives now. In 1997, Ole Kasoe separated from his brother to develop the current boma. He plans to stay at this boma until the Koyiaki group ranch committee allocates him his share of land.

Ole Kasoe is a successful livestock keeper and trader from a relatively wealthy family. When he separated from the rest of his family 26 years ago he had 200 cows. Today, he has 360 cattle staying with him at his boma and a further 65 cattle

that he has distributed among friends and relatives. This satellite herd is a deliberate strategy to maintain close ties with family and friends, and reduce the risk of disease and drought affecting his entire livestock holdings. His livestock earns him respect in the community, provides food for the family, and allows them to meet the family requirements for customary practices such as payment of dowry, gifts to friends and relatives. His livestock is also a mobile 'hospital' – urine, fat, skin, bone marrow, and dung are used in treatment of various illnesses and augment the power of medicinal herbs. He keeps sheep because they are such prolific breeders and goats because they are more disease resistant, have better meat and fetch better prices at the market.

In the last few years, Ole Kasoe has started trading in livestock having realized that the returns from his own livestock were not sufficient to cover the family's needs without depleting the herd. His profits help him meet daily family requirements, buy household items and veterinary drugs for his livestock, as well as build up his herd. He observes that in the past, cattle trading was an activity done by the poor, but this has changed and now it is mainly the young people from wealthy families that are involved in trading. While he occasionally visits Ewaso Ng'iro (118 km away) and the Dagoretti market in Nairobi, Ole Kasoe does not speak Kiswahili and so is dependent on his partners or unknown interpreters to translate for him when he goes to the bigger markets. This, together with the risk of carrying a lot of money in cities and the problems associated with being away from home over long periods, means he prefers to trade livestock at the market at Aitong 25 km away where most traders are Maasai.

Ole Kasoe does not keep improved breeds at present because of their inability to withstand droughts, low tolerance to diseases and high management requirements. However, he has seen that improved breeds fetch better prices in the market, grow faster and produce more meat and milk. He expects that the number of animals he will be able to keep will decline following privatization of land and so, in spite of their disadvantages, he intends to introduce improved breeds once he is allocated his land. Disease is a major constraint to the success of the herd. While Ole Kasoe uses antibiotics to treat a number of diseases, Trypanosomiasis in cattle and Enterotoxaemia in sheep are of particular concern since the former is difficult to manage without being able to move the herd to avoid tsetse flies during the rainy season and the latter can only be controlled through vaccination. Ole Kasoe feels that most of the currently used veterinary drugs are not effective in treating livestock diseases the way they used to be when he was growing up. Not speaking or reading Kiswahili, he is unable to read the instructions for veterinary drugs and work out the correct dosage based on livestock weight and it is possible that incorrect use of drugs in the area due to the lack of veterinary extension services in the area has led to drug resistance.

In addition to livestock, the family earns income from selling artefacts and beadwork to tourists. In 2003, Ole Kasoe gave money from the sale of a cow to his first wife, Noorkusashen, and she used the capital to move to Kolong to sell to the tourists visiting the Mara National Reserve. Noorkusashen visits the family boma once a week and remits part of her income to the family to purchase foodstuffs and drugs for

the livestock. On average, she can earn US$50–65 per week during the peak tourist season (July–September and December) and less during the low tourist season.

Finally, Kasoe's family also receives payment in form of shares from the two campsites at Olare orok inside the Reserve. The family receives up to US$250 per year, but this income is irregular and is highly affected by the number of tourists in that particular season. In 2002, he received US$71 from his wildlife association, which helped the family purchase clothing, but he has not received land within the conservation area and he did not receive any revenue in 2003–2004. Because of the unpredictable nature of these payments, they rank fourth in importance for the family after livestock herding, livestock trading and remittances from selling artefacts. Ole Kasoe does not cultivate at present, but he plans to start, particularly if rangeland diminishes with further privatization.

In spite of Ole Kasoe's relative wealth in livestock, the family is still under pressure to find enough food without reducing the herd. During the dry season when nearby water pools and stream dry up, his wives must walk 4 km to Impuuai or to Talek river to get water for domestic purposes and for livestock left at home. Milk is scarce which increases demands for cooking and collecting firewood and at times, when food is scarce, they mix boiled herbs with milk and eat wild fruits. The dry season also increases the workload on the two men, Ole Kasoe and Ole Shorono, as livestock must walk increasingly long distances, mainly into the reserve.

The family is known to be living 200 m inside the reserve, having moved there when there was speculation that the land would be degazetted together with the Talek area in 1984. While the reserve management has not attempted to evict them, their livestock are seized when they are found further inside the park. There is a flat rate fine of US$125 for any herd caught grazing inside the reserves. Ole Kasoe argues that it is unfair for wildlife to roam the entire community land freely yet he is charged for grazing in the reserve, and he finds the flat rate fine particularly unfair to poorer households with fewer livestock. Given the proximity to the reserve, almost all wildlife species utilize Ng'ueng'ueny area. The herbivores compete with the family's livestock for pastures and water and spread disease such as MCF and ticks, and predators are also a potential nuisance. Lions and hyena only take the family's livestock at night when they are lost in the bushes, but elephants and buffalos will attack people and the community's livestock. Ole Kasoe believes that like him, wildlife have a right to live and access the resources in the area, but feels that the flow and regularity of dividends and other revenues from tourism to the family should be enhanced. He hopes that the creation of Koyiaki Land Owners Conservation Association (KLOCA) may open up a new opportunity for receiving revenue. While his wife's activities at Kolong cultural boma has resulted in increased income and access to schooling it also adds to a shortage of labour and division in the family.

By virtue of being a registered member of Koyiaki group ranch, Ole Kasoe expects to get 150 acres of land located somewhere between Olesere and Emarti where his other brothers also expect to get land when land demarcation is completed. He also plans to buy an additional 150 acres at a rate of one cow per acre. Because of having friends and family living at Olesere, Emarti, and Olare orok, Ole Kasoe's

herd will still be able to access pasture and other resources outside of his plot even after subdivision. However, the family fears that land subdivision will reduce access to some important resources in the group ranch. A few members in the group ranch who recently received titles to land at Olare orok have threatened to move families off their land and Ole Kasoe fears that this is beginning a chain of activities that will eventually stop livestock movements in the group ranch. He is also concerned about the way in which land allocation has been hijacked by committee members who have allocated their relatives and political associates land in important wildlife areas so as to benefit from revenue from tourism, in total disregard of the families that were already living there. Some have already received larger parcels than agreed by the entire community while others are yet to get any. The establishment of conservation areas that has accompanied subdivision, where livestock grazing is discouraged, has blocked access to salt licks and watering points that are critical to livestock. Furthermore, revenue no longer goes to families who do not have land in an area set aside for conservation even though wildlife still occur on their land.

Ole Kasoe sees some advantages of land subdivision. Each person will have a place of his own, where he can build a permanent house or cultivate, and he hopes that privatization will enhance the growth of better infrastructure in the area. It will also give the poor an asset that they can sell or lease in exchange for livestock. However, he still fears that subdivision will inevitably lead to his family losing access to grazing in the national reserve and that the reduction in access to pasture and mobility and in drought refuge areas will lead to fewer livestock overall.

Wuantai Ole Kariankei

Wuantai Ole Kariankei, born in 1932, lives with his family at Osero Lorkumum in the former Lemek group ranch, north of the Maasai Mara and 250 km south of Nairobi. Born into the Ilmakesen clan, Ole Kariankei is the only child of Pianto Gilisho, the daughter of the legendary Maasai leader (Olaiguanani) Ole Gilisho and Nking'iis Ole Kariankei.

Unlike most of his age mates, and contrary to the Maasai custom of polygamy, Ole Kariankei is married to only one wife, Sempeyo Koriata, aged 59. He has two sons, Isaka Morosua aged 33 and Fredrick Simiren aged 32, and one daughter, Namerai, aged 40. He could not raise a big family because he has been poor and sickly for most of his adult life and was only recently diagnosed with Asthma. His daughter is married with seven children and lives 17 km away at Nkorrkori. His eldest son, Isaka, works as a game scout at Olosirua Wildlife Conservation Association. Isaka's two wives, Kaaka and Kisinyunye, and their three children live together with Ole Kariankei. Kaaka's sister also lives with them and helps with the children, as does a herder, hired by the family to help with the livestock. Simiren, Ole Kariankei's second son, is a second-year student at Daystar University taking a degree in communication and community development, and stays with his father

when he is not at college. The family lives in a traditional Maasai Enkang', with three huts and a house with a corrugated tin roof.

Isaka, like his mother and father before him and his two wives, did not go to school. His children, aged between 2 and 5, are too young to be in school and stay with their mothers. Simiren, however, completed both primary and secondary school with the support of a Catholic Missionary, Fr Frans Mol, and the Koyiaki Lemek Wildlife Trust, a local wildlife conservation and community development association. He then took a 6-month certificate course in Kenya Tourism at Air Travel and Related Studies centre in Nairobi in 1998 and was working as a naturalist/culturalist at Voyager Mara Safari Lodge when he met the family of Mr. Ludwig Enders. Mr Enders is paying Simiren's school fees at Daystar. The family has high expectations of Simiren finding a good job in the future and supporting the family's well-being. Because of this, they are positive about education. However, Ole Kariankei does not regret not educating his elder son since he had to rely on Isaka to help take care of the family and take his father to hospital when sick. Isaka accepts that his absence from home would have seriously affected the family, but on the other hand he wishes that he had gone to school. He plans to educate all his children – through education, he argues, it is possible to get good jobs, have large herds, better houses, and be successful in life.

Today, Ole Kariankei's family is moderately wealthy, but this has not always been the case. When Ole Kariankei separated from his extended family in 1952 he owned 10 cows, 30 sheep, and 10 goats. By 1980 his herd had grown to 50 cows. However, ill health caused by his asthma and then an attack by a buffalo in 1982 resulted in the family having to sell off their herd to pay for medical bills. In 1987, Ole Kariankei sold his last cow, donated to him by AMREF, to settle his hospital bills.

Ole Kariankei used various strategies to reconstitute his herd. In 1989, after realizing the gravity of their situation, he pleaded to his Ilmakesen clan to contribute livestock to his then impoverished family through a cultural practice called *engelare* (contribution). He was given 40 sheep and 4 goats. He also used the US$350 he received in compensation from the Kenya Wildlife Service (KWS) after the buffalo attack to buy sheep and goats. The family realized that the returns from livestock were not sufficient to cover the family's needs without depleting the herd and decided to diversify. Isaka and Simiren decided to seek individual alternatives to support the family. Isaka worked for the Koyiaki Lemek Wildlife Trust until it broke up in 2001 due to political difficulties prior to the 2002 general election. After the break up, the organization split into five associations and Isaka joined one of them, Olosirua, as a game ranger earning an annual income of KShs 72,000. However, his pay has become increasingly unpredictable and whereas he was paid promptly when he started the job, he now may not be paid at all, especially during the low season. The family also receives revenue (~KShs 45,000 per year) from the Oliopa wildlife trust by virtue of Simiren owning land in the conservation area. This revenue comes as a lump sum at the start of every school term, making it easier for Simiren to travel and meet living expenses while in college, although the income is highly dependent on the success of the tourism season. Simiren joined Oliopa in 2001 for political reasons but has been disappointed by poor management and

political interferences. He is currently planning to shift to the Olosirua Wildlife trust, where he thinks the finances are better managed. Owing to the extra money the family is getting from Isaka's salary and the revenue from the conservation area, they are now able to reduce the number of livestock they sell per year, buy more livestock to increase the size of the herd, buy more veterinary drugs, and meet household needs and most of their health costs.

Today the family herd combined stands at 70 cattle, 160 sheep, and 50 goats and livestock provides the major source of livelihood for the family. Since both sons are away much of the time, the herd is managed on a daily basis by Ole Kariankei with the assistance of a hired herder and Ole Kariankei's daughters-in-law. When one of his daughters-in-law is herding the sheep, she is helped in her normal daily tasks by Ole Kariankei's wife Sempeyo. In the dry season this includes fetching water from 3 km away.

Ole Kariankei's family moved south from Laikipia before Ole Kariankei was born, when the Maasai 'were tricked into moving south to live in the southern reserve by the colonial administration'. He remembers moving periodically throughout his childhood and moranhood between Mau, Olkiriaine, Koyiaki, and Lemek. In 1972, the family settled a few kilometres from Lemek and has stayed there ever since. They have shifted their boma four times during the last 30 years, at most 300 m from the previous site. Initially, they moved because the families they lived with had increased in size. The second time they moved was because there was too much dung accumulation in the boma, and lastly, they moved to position themselves at their preferred location in readiness for land subdivision. However, when the Lemek Group Ranch was privatized and subdivided in 2003 they were not allocated the land on which they are living and so they are dependent on the current owner allowing them to stay at their current home. The family was allocated three pieces of land of 100 acres each. Simiren's 100-acre parcel is at Inkilenya inside the area designated by the community for wildlife conservation and tourism. Human settlement is not allowed in this zone according to a land use plan developed by the community in 2000. The two other parcels belonging to Isaka and his father are on the sides of the Olkinyei hill. They are not suitable for settlement as they are steep and stony. Ole Kariankei, being a native of Lemek group ranch and one of the first people to settle at Osero Lorkumum area, feels that land allocation in Lemek group ranch was not done fairly and this was because no one in the family has a political or leadership position of influence. Without a place to make their boma in the parcels they received from the group ranch committee, the family has recently bought an extra 13 acres of the land they are currently living in. Ole Kariankei initially contested the allocation of land along with other families who were forced to move from where they had been living, petitioning the District Committee (DC). But the DC did not support their claim and the family withdrew their case because it was proving too expensive.

Ole Kariankei and his family see some advantages to privatization of land. They appreciate being able to buy and sell land and when funds become available they intend to buy land on the Ole Gilisho hills, an important area they lost at subdivision. And they see privatization allowing the owner to use the land as he or she sees fit. However,

Ole Kariankei is also concerned at some of the changes he sees. In the past the family would move livestock in times of drought to access pasture and water. Since 1994, the family has limited their grazing to their more immediate surroundings and since land subdivision, movement of livestock has been reduced even more because land access now depends on the relations the family has with individual landowners. A number of dams built with public money have been privatized and are no longer available to the community, and access to salt licks along the Lemek stream and other important resources has been largely blocked. Ole Kariankei is also unhappy to see so many non-Maasai buying land in the area, without the knowledge of the community. Ole Kariankei feels that land subdivision will eventually kill both livestock keeping and wildlife conservation and will break up the social ties that held the society together. He has observed an increasing commoditization of livestock – families prefer to sell livestock instead of exchanging them, as they would have done previously, unless they are able to exchange with relatives. While this change has been largely brought about by the cash economy, the family feels it is also linked to the increasingly strained relations amongst the community.

Chapter 3
Maasai Mara – Land Privatization and Wildlife Decline: Can Conservation Pay Its Way?

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3.1 Introduction

The rangelands around the Maasai Mara National Reserve (MMNR) provide an important example of the ways in which land use and land ownership are changing rapidly in Kenya Maasailand, particularly in areas of higher agricultural and economic potential. Privatization of once-communal rangelands and subsequent subdivision into individually owned plots are far advanced. Land privatization has potentially major impacts on wildlife conservation, as fencing and land-use intensification reduce availability of land for the formerly free-ranging wildlife-livestock mix. At the same time, there has been a proliferation of game viewing enterprises and tourist camps on sites throughout the Mara rangelands, particularly in areas close to the MMNR.

Data from surveys undertaken in 1998–2000 and in 2004 are used here to describe the livelihood strategies characterizing the Mara, and to document the pattern, scale and extent of diversification. The two sets of surveys allow us to look at how livelihoods changed over a 6-year period during which land in parts of the study area was privatized. The data allows us to discern trends in the spread of (or decline in) cultivation, in who captures the benefits flowing from wildlife conservation and in overall wealth differentiation, and to explore the implications of these trends on land-use change. Our analysis shows the enduring importance of livestock, the widespread benefits flowing from wildlife enterprises to the study households and the fluctuating importance of off-farm employment and cultivation. A more nuanced picture of land-use change due to commercial cultivation emerges. Whilst opportunities for leasing out land for commercial cultivation are still lucrative, rather than widespread conversion of land, cultivation pressure is decreasing in some areas, partially as a result of local conservation initiatives, amidst an overall trend during the two study periods towards a reduction in cultivation. In terms of wildlife returns, whilst the majority is captured by the most wealthy, wildlife revenue provides an important contribution to household income across the Mara study areas. Overall, while income streams from

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high value commercial cultivation and wildlife have been cemented with wealthy households through land privatization, outside of these groups, households retain the ability to make rapid switches into and out of competing production systems (cultivation and wildlife conservation) alongside a growing reliance on off-farm income and a continued reliance on livestock. This suggests a continued dynamic resilience of Maasai households in the Mara in diversifying their income streams, and the continued potential for wildlife conservation initiatives to be part of the land-use systems in this globally important wildlife area.

3.1.1 The Setting

The Mara ecosystem comprises the northern part of the world-famous Serengeti–Mara Ecosystem (SME). This encompasses the seasonal movements of the migratory wildebeest and includes the Serengeti National Park, Maswa, Grumeti and Ikorongo Game reserves and Ngorongoro Conservation Area in Tanzania, and the MMNR and adjacent rangeland areas in Kenya (Fig. 3.1; Pennycuick 1975; Sinclair 1995; Lamprey and Reid, 2004). The Mara ecosystem covers an area of about 6,500 km^2, including the MMNR covering some 1,500 km^2. The MMNR is Kenya's highest-earning protected area, grossing $15–25 million per year (Norton-Griffiths et al., 2008). It is a critical part of the larger SME; its high rainfall, permanent water sources and high grassland productivity make it a dry season refuge for the Serengeti's migrant wildlife populations.

The Mara ecosystem is bordered to the west by the Mara River and by the Siria escarpment, which separates the MMNR from the Transmara Plateau. The natural mix of forest, woodland and scattered bush on this plateau is rapidly being transformed into cultivated land. To the north of the area, the Mau Uplands comprise high-potential lands that have been extensively opened up for agriculture (Said et al. 1997). The area is bounded on the east by the Loita Plateau and on the southwest by the Kenya–Tanzania border.

The rangelands in and immediately adjacent to the study area comprise what were previously the Koyiaki, Ol Kinyei, Lemek and Maji Moto group ranches, as well as land on Siana (which is technically still Trust Land, although it operates as a group ranch), and private land making up the Olchoro-Oiroua Wildlife Association area. The grasslands of the former Koyiaki Group Ranch and the MMNR grade into the dwarf shrub and whistling thorn grasslands of the Loita Plains (comprising the former Lemek, Ol Kinyei and Maji Moto group ranches) in the north-eastern part of the study area. The northernmost part of these Loita plains is higher in altitude and more productive, forming part of the wheat belt that stretches north into the Mau Uplands. Siana, bordering the eastern end of the park and Tanzania, is an area of hills and more arid plains supporting Croton bush and several other woody species interspersed with grasslands (Stelfox et al., 1986).

Typically, Mara has two rainy seasons, with the 'short rains' occurring during November–December, followed by the main rains from March to May. There is a rainfall gradient from the dry south-eastern plains (500 mm/year) to the wet north-west (1,200 mm/year) (Sinclair 1995) and in the hills there is a sharp increase in

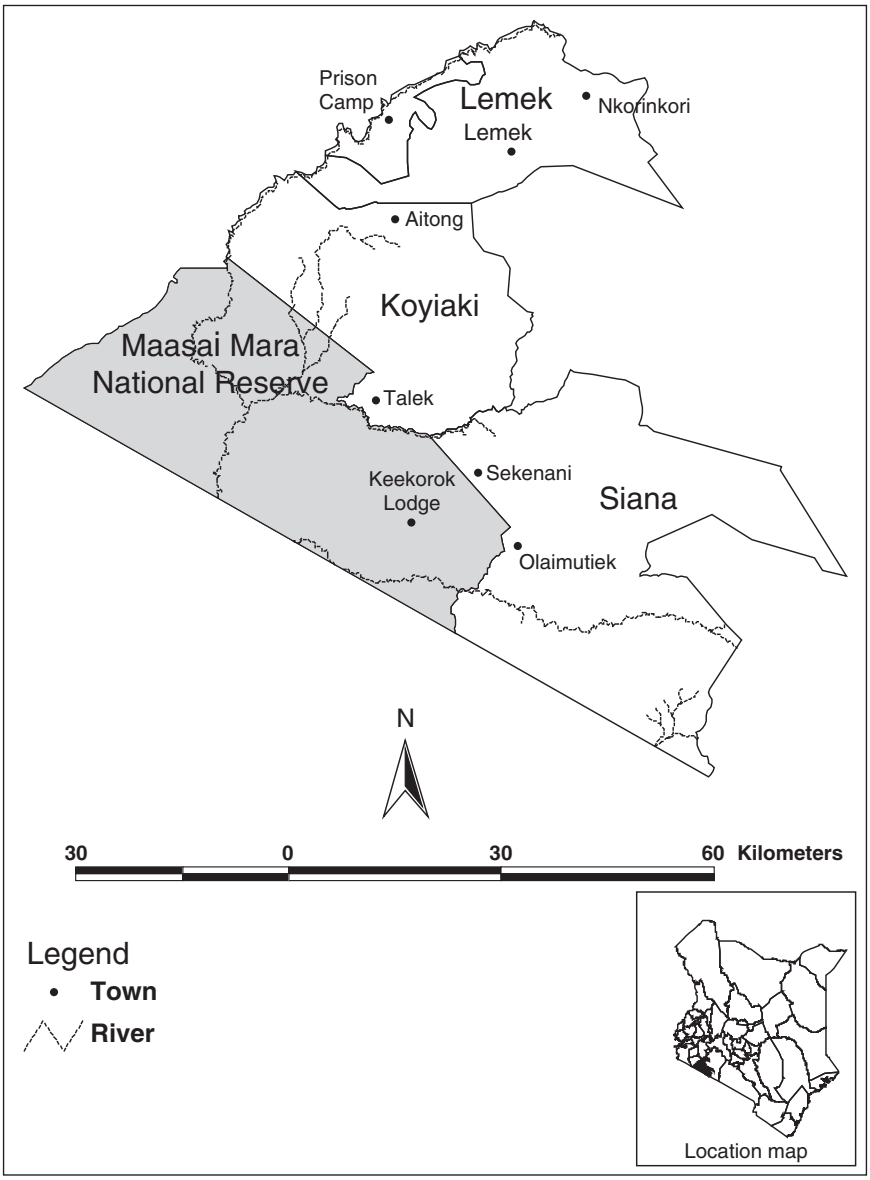

Fig. 3.1 Map of Mara

rainfall with altitude. The Loita Plains and part of the Siana Plains lie in rain shadow, with a mean rainfall of ~400 mm.

The MMNR bordering Tanzania's Serengeti National Park was established in 1961, and is a formal conservation estate under the jurisdiction of the Narok and Transmara county councils (Seno and Shaw 2002). Land use in MMNR is restricted to wildlife tourism, with periodic cattle grazing, although this is technically illegal.

The rangelands surrounding the reserve are critical to the MMNR as the main dispersal area for both resident and migratory wildlife, supporting higher wildlife densities than the MMNR at certain times of the year (Ottichilo et al. 2000a b). They have acted as a buffer zone between the national reserve and the high-potential areas in the northern part of Narok District that have now been brought more intensively under cultivation.

3.1.2 Historical Changes in Policy and Land Cover

Since independence in 1963, the Government of Kenya has pursued a policy of privatization of rangelands in Maasailand and elsewhere. The 'Land Group Representatives and Land Adjudication Act' of 1968 enabled land previously held in trust for its inhabitants by the government to be adjudicated into group ranches. The principle behind the formation of group ranches was for a number of families to come together and jointly register title to land; formal title would then open up opportunities for lines of credit with which to develop the land. Management of an individual group ranch was vested in a management committee (Galaty 1992; Thompson 1998). The first group ranches were established in the 1970s.

However, this adjudication process was associated with a number of problems concerning the allocation of large areas of land to individuals both from within and from outside the Maasai community (Galaty 1992). Individuals with influence over the procedures for land titling were able to register title and privately own significant areas hived off from the group ranches. This process occurred from the earliest experimental introduction of private ranches in the 1950s, and continued through the main period of adjudication of the group ranches in the 1970s and 1980s. This resulted in an aggregation of land holdings in the hands of influential or educated Maasai with access to the administrative system (Galaty 1999; Thompson and Homewood 2002; Thompson 2002; Homewood et al. 2004). The emergence of this influential group controlling large areas of land has had knock on effects on access to land, which are described throughout the remainder of this chapter.

During the 1980s and 1990s, the confluence of access to large land holdings and of formal leadership positions (such as elected group ranch directors, nominated local council members, administration chiefs and in some cases elected council members/MPs) allowed a few influential Maasai to become spokespersons for the wider group ranch members when outside entrepreneurs sought to lease land for wheat farming or tourism operations (e.g. Daily Nation 2000a; Thompson and Homewood 2002). Their incomes increased as they became more assertive in their negotiations. These individuals became influential in the choice of administration chiefs and, from the 1990s onwards, in the choice of officials for the newly forming wildlife associations (Thompson and Homewood 2002). These groups have thus been able to entrench their own position using the income generated from group ranch resources and their knowledge of the administrative processes by which outsiders have leased land (Galaty 1981; Southgate and Hulme 1996; Thompson and Homewood 2002).

In the area covered by this study, group ranches began to be subdivided into individual private land parcels held by the former group ranch members from the early 1970s (Sindiga 1984; Galaty 1992; Campbell 1993). Details of the subdivision process in the area are provided with the study site descriptions below.

3.1.3 Study Sites

Six study sites were selected as representative of the broader study area: Megwarra and Nkoilale, in Siana, Aitong and Talek on the former Koyiaki Group Ranch, and Lemek Centre and Nkorinkori on the former Lemek Group Ranch (see Fig. 3.1). These are all rural areas with small trading centres providing primary schools (and in Lemek, a secondary school), dispensaries and road access to Narok, Bomet and the MMNR.

These sites are dominated by livestock production, with varying degrees of involvement in small-scale (hand implement or hired tractor) cultivation, leasing of land out to, or involvement in, mechanized cultivation, and conservation tourism-related activities. Subsistence farming is practiced in most parts of the study area, mainly on small fields close to the homestead. The main exception to this is Talek, in the former Koyiaki Group Ranch, where wildlife damage is greatly discouraging cultivation. Talek has grown up around a MMNR entrance gate, and residents do not farm, but are commonly involved in tourism-related as well as livestock activities. Lemek and Nkorinkori in the former Lemek Group Ranch are located close to a large belt of mechanized wheat cultivation to the north. Since 1998, the area under mechanized cultivation has contracted (Serneels, in preparation) and by 2004 involvement in wheat cultivation in Lemek Centre had greatly reduced (this trend is discussed further in this chapter). By contrast, households from the former Koyiaki Group Ranch (Aitong and Talek) and from Siana have no opportunities for leasing land out for mechanized cultivation.

Land tenure across our study area reflects the progressive shifts in policy described above.

- In Lemek Group Ranch, some 20,000 ha were allocated to ~11 individuals in the early 1970s (Narok Land Registry) at the same time as the creation of Lemek group ranch. Thereafter, land surveys demarcating individual private parcels of land took place from the early 1990s until subdivision was completed in 2000. The process for subdividing the remainder of the area was a long one; registration for full privatization in Lemek began in the 1980s and land surveys only began in the early 1990s. The process was further prolonged when it was decided to redraw the land surveys in the late 1990s due to the high level of disputes and accusations of corruption associated with the initial surveys. A significant spate of land buying and selling then took place in the mid to late 1990s before title deeds were allocated in 1999–2000.
- In Koyiaki Group Ranch, one block of land adjacent to the Talek River was excised from the MMNR, subdivided and allocated as 154 plots in 1984 (Olindo and Talbot 1990; Narok Land Registry, 2000). Over the remainder of the group

ranch, land surveys took place from 1999 and allocation was substantially completed in 2003–2004 with the exception of one block where land allocation has been delayed by protracted conflicts over demands for registration of new members and allocation irregularities.
- Siana, although effectively operating as a group ranch under a management committee, has yet to be adjudicated (as a group ranch) and in theory remains trust land. At the time of our study it was undergoing a registration exercise prior to subdivision.

Unlike many areas of Maasailand there is minimal in-migration into the study area with the exception of some trading centres (Coast 2001; Sindiga, 1987; Thompson and Homewood 2002; Homewood et al. 2004). Natural population growth is high, however, at an estimated rate of 3.4% per annum (Coast 2001). The study area has good access to agricultural markets at Narok and cattle trading markets at Ewaso Ngiro and Dagoretti near Nairobi (to the north). As well as the recent rapid changes in land use (Serneels et al. 2001), the area has experienced a decline in wild herbivore numbers, while the livestock population has fluctuated around a consistent long-term mean (Ottichilo et al. 2000a; Serneels et al., 2001; Said et al. 1997).

3.2 The study

Land tenure change and the high incomes potentially available suggest that mechanized cultivation will provide higher returns compared to other land-use possibilities, including (non-consumptive) wildlife tourism, and result in an increasing rate of conversion of land to cultivation (Norton-Griffiths 1995 1996, 2007). For example, from 1975 to 1995 there was a tenfold increase in land area under mechanized cultivation (Serneels and Lambin 2001) prompting fears of cultivation sweeping down towards the Mara reserve itself. Subsequently, pump irrigation from the Mara River has developed (from 2001 to 2002 onwards), to irrigate high value export horticultural crops. There is evidence that this is affecting the hydrology of the whole ecosystem (Gereta et al. 2003; Wolanski and Gereta 2001). This scenario of spreading commercial cultivation could have a catastrophic impact on livestock production and wildlife populations due to fragmentation of the landscape and loss of mobility and access to key resources (e.g. Douglas-Hamilton, 1988; Norton-Griffiths 1995, 1996; Sitati 1997). Trends of differentiation suggest that economic prosperity in Mara is at least in part won through exclusion of the less well-placed (Homewood et al. 2004; Thompson and Homewood 2002). Previous livelihood work shows that some local Maasai inhabitants have been able to derive great wealth as they gain access to and control of land in prime locations for mechanized cultivation or tourism. The converse has also been true, with less well-connected inhabitants in some cases being dispossessed and moving from newly privatized land altogether (see Family Portraits – Mara). In between these two extremes, the differentiated impacts of privatization for the bulk of group ranch members are complex.

The process of land privatization in the study areas was recently completed (on the former Lemek Group Ranch in 1999 and on Koyiaki in 2004) and has been

accompanied by expectations of large-scale land-use and livelihood change (Norton Griffiths and Said 2008). The overarching research questions addressed by all the case studies in this volume were as follows:

– What do people do?
– How well do they do at it?
– What factors influence what people do?
– What factors influence how well people do?

In addition to these questions, the follow-up 2004 survey around Mara allows us to explore trends in wealth differentiation, in the spread or conversely decline of commercial cultivation, and in who captures the economic benefits flowing from wildlife conservation. Although, as for other case studies in this volume, the present study was only able to survey households resident in the rangelands, and thus missed the wealthiest absentee landowners (Maasai and non-Maasai) who constitute part of the national and international elite, the data presented throw light on these issues through the livelihood choices and changing income streams of Maasai households across the study area.

Our analysis commences with a review of the data obtained through surveys and interviews undertaken in 2004, and is followed by a comparison with data obtained from 1998 to 2000.

3.2.1 Methods

3.2.1.1 Data Collection

In 1998–2000 a broad scale survey of 288 households was applied to collect data on household structure, education, overall involvement in different economic activities and assets (including livestock and land). Detailed data on household income were collected from a subset of 38 households using repeat round surveys. Households were surveyed within a radius of 2–10 km from the immediate settlement centres and the location of each homestead was taken with GPS, or located on a 1/50,000 topographic map when technology failed. The 1998–2000 survey households at Aitong and Talek were accessed from a sample frame provided by a linked demographic survey (Coast 2001); elsewhere households were chosen from a total list of household heads provided by key informants, tending to focus on areas closer to the centres. Detailed interviews were conducted with household heads. We were not able to access the absentee landowners who constitute the biggest drivers of commercial cultivation, and the sample is restricted to locally resident households.

In 2004, a second broad scale household questionnaire was conducted among 219 households. Where possible, household heads sampled in 2004 were identified from the 1998–2000 surveys and interviewed again. Where this was not possible a neighbour was approached instead. A total of 85 households were captured in both 1998 and 2004. Table 3.1 below gives the breakdown of household interviews by locality. Most households in our study were long-term residents of the group ranch; the 2004 survey households had on average moved to the group ranch they are

Table 3.1 Location and number of household interviews

	Previously Koyiaki Group Ranch (subdivided 2003)		Previously Lemek Group Ranch (subdivided 2000)		Formally ungazetted	
Location/no. of interviews	Talek	Aitong	Lemek/ Emorijoi	Nkorinkori	Siana	Total
2004	45	55	52	26	41	219
1998–2000	104	59	46	33	46	288
Interviewed in 2004 and 1998–2000	11	22	21	18	13	85

currently living on about 30 years previously. These interviews were supplemented by the three family portraits illustrating in greater depth the trajectories that Maasai around the Mara are following in terms of land use decisions and livelihood strategies (see Family Portraits – Mara).

The two data sets were compiled from substantially the same household survey questionnaire, allowing direct comparison of household characteristics data, and on aspects of the livestock and cultivation economies detailed hereafter. The surveys gathered information on household structure and education levels, crop production (cultivars and acreages grown, yields and production techniques used), livestock production, (herd size and structure, milking patterns, off-take rates and marketing arrangements), and household income characteristics (other economic activities and predicted future production choices). The 2004 data set was also designed to identify sources of income linked to conservation from wage labour, remittance wages (sent back to the household by absent household members) and petty trade. The 9/11 bombing in September 2001 had a devastating impact on tourism and resulted in a decline in gross revenues for all Kenyan tourist destinations, including the MMNR, which lasted until 2004 (World Resources Institute, DRSS, MENR, CBS, MPND, ILRI 2007) and is reflected in our data. There was no significant difference in rainfall during the two study periods, although during the intervening years, the pastoral areas of Kenya had suffered a relatively severe drought in 2000–2001 followed by floods in 2001–2002.

3.2.1.2 Clustering of 2004 Households to Define Livelihood Strategies

Clusters were derived based on 11 asymmetric binary variables, representing the different income generating activities in the region, and the presence/absence of each of the households for each of those activities (Chap. 2). In the case of the Mara these were: own livestock, sell livestock, purchase livestock, own land, lease land, cultivate land, sell crops, buy crops, engaged in petty trade or business, receiving wage or salary and receiving income from wildlife-related activity. For further analysis, income-generating activities were grouped into four categories: livestock, agriculture (including income from leasing land for mechanized agriculture), conservation and off-farm activities.

On the basis of Pseudo-*t* statistics, we grouped our data into five clusters, which are described below. Analysis between clusters compared the proportion of households involved in different activities, assets, actual income or production values from different activities, and the relative importance of the different income sources to the overall household economy.

3.2.1.3 Regression Analysis of Household Net Income Against Explanatory Variables

Gross annual income was used as the dependent variable in a generalized linear model to test the extent to which socio-economic household characteristics and biophysical environment variables determine the family income. Gross annual income was defined as the income derived from livestock sales, livestock gifts received, livestock slaughtered, crops consumed, crops sold, income from land rent, income from wage, petty trade and businesses. We did not include expenditures since we had only partial data for this.

All independent variables were tested for multicollinearity, and the variance inflation factors and condition indices examined. We found considerable multicollinearity amongst the data, so we tested each individual variable against the dependent variable in the mixed model and chose the variable with the highest explanatory power amongst the ones that were intercorrelated. This led us to remove average Normalized Differentiated Vegetation Index (NDVI) from the model, in favour of ln (livestock TLU) and variance of NDVI. We tested linear, exponential, spherical, Gaussian, and power functions for the local spatial autocorrelation, but none of the models performed significantly better than the null model without spatial autocorrelation and with a homogeneous residual error. We thus decided not to include the spatial autocorrelation function in the final model.

The biophysical environment variables that were used are listed in Chap. 2. They were all assembled in a Geographic Information System (GIS) and we extracted the information for each of the boma locations in our database. Distances to the nearest road, nearest permanent water source, nearest town centre and distance to the MMNR were calculated per kilometre. NDVI and NDVI-CV values were calculated as the average monthly NDVI over a 10-year period for the nearest 5 × 5 km pixel to the homestead. The NDVI-CV is the coefficient of variation for monthly NDVI. Average wildlife and livestock TLU densities/km^2 were calculated based on three aerial surveys conducted by the Department of Resource Surveys and Remote Sensing (DRSRS) at a scale of 5 × 5 km, for the years 1997, 2000 and 2002. We calculated the percentage of rangeland available in a radius of 5 km around the homestead, as the percentage of grassland, savanna and bushland in the area, derived from the Africover classification (see also Pratt and Gwynne 1977).

Socio-economic variables used include the age of the head of household, number of adult equivalents in the household, size of the herd (TLU), as well as the number of cattle, sheep and goats in the herd. We also used information on the education level of the head of household as well as leadership position (none, minor and major leadership position). Dummy variables were used to indicate whether the

household owned land or not and cultivated or not. Where necessary, data were logged to normalize the distribution (adding 0.01–0 values). All variables were tested for multicollinearity before the mixed model was constructed. We used the SAS MIXED procedure to build our models, because this procedure allowed us to explicitly account for spatial autocorrelation patterns in the data. We modelled non-zero covariance among all of the observations in the dataset with different covariance structures, with or without nugget effects.

3.3 Livelihood Strategies in the Mara in 2004

In 2004, gross annual income in households around the MMNR averaged US$2,626 (Table 3.2). However, income varied considerably across households. The median income was just US$1,627, suggesting a few wealthy households considerably inflated the mean. Income per Adult Equivalent (AE) averaged US$474 with a median of US$315, just under a dollar per day per Adult Unit Equivalent. Gross household income in this study is defined as the value derived from livestock production (livestock sales, livestock gifts received by the household and livestock slaughtered), agriculture (crops consumed and crops sold) and income from land rent, conservation dividends and rents, wages, petty trade and businesses. These are minimum estimates; no data were available on income from remittances or the value of milk sales and milk consumed.

In 2004, livestock remained the central part of Maasai economy (Table 3.2 and Fig. 3.2). Households derived on average nearly 70% of their income from livestock-related activities, although this figure is highly variable. Livestock holdings per capita vary from 0.5 to 97, with a mean of 12.8 and a median value of 6.2, suggesting wealthier households skew the mean sharply upwards to almost double the value of the median. Mara households average relatively high livestock holdings. A comparison of livestock holdings taken from the 1998–2000 surveys compared to a similar survey undertaken in Ngorongoro and Loliondo (in Tanzania) in 1999 (Kivelia, 2005) and to work undertaken by International Livestock Centre for Africa (ILCA) in Kajiado (Bekure et al., 1991) shows much higher average livestock holdings in the Mara study sites. The median contribution of livestock to the

Table 3.2 Summary of household income from different sources

Income source	Mean[a]	Households (%)	SD	Median
Livestock	2,078.93	94	2,775.72	1,063.63
Conservation	600.61	64	691.44	390.93
Off-land	380.90	31	334.62	202.12
Land lease income (for commercial cultivation)	1,592	4	762.6	1,696.8
Crop value[b]	52.40	24	105.41	0
Total gross income[c]	2,625.80	100	2,892.68	1,626.95

[a]Mean values only include households involved in particular activity
[b]Households that cultivated but had no harvest are included
[c]Mean across all households (whether or not involved in a specific activity)

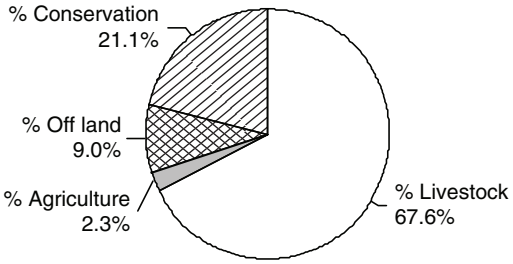

Fig. 3.2 Proportion of gross household income from different sources ($N = 215$)

Table 3.3 Proportion of households involved in different activities among different clusters

Activity	Pastoralist/ wildlife	Wealthier diversified agro-pastoralist / wildlife	Poorer diversified pastoralist / wildlife	Wage earning agro-pastoralist	Subsistence agro-pastoralist
Own livestock	100	100	100	100	100
Sell livestock	78	82	65	40	68
Slaughter livestock	71	100	5	25	95
Purchase livestock	0	99	100	0	92
Own land	59	100	65	90	5
Lease land	0	5	0	25	3
Cultivating	10	20	24	40	42
Sell crops	0	11	0	15	3
Consume crops	2	2	5	0	29
Income from conservation	75	76	69	5	56
Income from wages	10	2	15	5	8
Income from petty trade/business	5	40	20	58	22

household economy (78%) is much closer to, and actually higher than, the mean (67%). Conservation-related activities (including income from petty trade, business and wage labour specifically related to conservation tourism and income from wildlife association membership) were the most significant of other sources of income generation for households, bringing in about 32% annual income for those households involved (and 21% of income overall).

However, as Table 3.2 shows, households pursue different combinations of activities. In the rest of this section, we examine the variation that exists between different households in the overall livelihoods strategies that they pursue.

Cluster analysis, using binary data (presence or absence of a particular activity in the household), differentiated five categories of livelihood strategies defined by their involvement in (or absence from) particular activities (Table 3.3):

- *Pastoral/wildlife:* Pastoralists with income from livestock sales and wildlife (58 households). A high proportion of these livestock owning households sold or slaughtered livestock, but did not purchase livestock during this study period.

Very few households cultivated, and with almost no success. Three quarters of these households earned income from conservation or tourism sources, while fewer than 10% of households were involved in other off-land activities.

- *Wealthier diversified agro-pastoral/wildlife:* Wealthier diversified agro-pastoralists (65 households). All these households invested in livestock purchases, and 76% of these households earned income from conservation or tourism ventures. These households exhibited high involvement in local markets, with some households growing crops for sale and 40% of households getting income from petty trade or business sources.
- *Poorer diversified pastoral/wildlife:* Pastoralist, small scale cultivation and wildlife income (37 households). All households in this cluster purchased livestock, and most (65%) also sold livestock. Very few livestock were reported slaughtered. Conservation or tourism ventures provided an income for 69% of households. A quarter of the households cultivated, though just 5% reported any harvest. Fifteen to twenty per cent of these households earned income from other off-land sources.
- *Wage-earning agro-pastoralists:* Agro-pastoralists with petty trade and lease/sale of cultivation (20 households). A higher proportion of these households earned income from petty trade or business (58%) than from livestock sales (40%). Forty per cent of these households cultivated their own land and most of the households that received an income from leasing land for wheat cultivation were included in this cluster (25% of households). Wage-earning agro-pastoral households were more likely to be selling crops than were any other clusters, although this was still only the case for 15% of these households in 2004. Only one of these households earned any income from conservation or tourism-related activities.
- *Subsistence agro-pastoralist* (39 households): Sixty-eight per cent of these households sold livestock, and 42% cultivated, but only 3% sold crops. Cultivation was primarily to feed the household, with livestock used for income; most households also slaughtered livestock for home consumption. Conservation and/or tourism-related ventures provided an income for just over half of these households, while almost 25% were involved in off-farm activities.

Table 3.3 shows over 50% of households receiving an income from conservation in all except the wage earning agro-pastoralist group. Involvement in cultivation is less widespread (e.g. land leasing for commercial cultivation, with less than 25% of households in the wage-earning agro-pastoralist group; a total of only four other households in just two of the other four clusters are engaged in this), while the greatest percentage of households cultivating for themselves was 42% (in the subsistence agro-pastoralist group). This shows wildlife conservation incomes are more widely accessed across the study households than is the case for cultivation incomes. The value of tourism and conservation-related ventures is rather consistent across all clusters among households with this income source. The high risk and low returns associated with agriculture in the area are well demonstrated by the zero median values representing failed harvests for more than half of the households that cultivated in 2004.

There is considerable variability within each cluster in actual income levels from the different livelihood activities as well as in total annual income, with, for the most

Table 3.4 Mean income/production value (US$) from different livelihood activities across clusters[a]

	Pastoral/ wildlife	Wealthier diversified agro-pastoral/ wildlife	Poorer diversified pastoral/ wildlife	Wage-earning agro-pastoral	Subsistence agro-pastoral	Total
N	58	65	37	20	39	219
Livestock (sale and slaughter)						
Mean	1,807	2,551	1,271	2,212	2,038	2,030
N	56	65	32	14	38	205
SD	2,497	3,310	1,625	2,718	2,413	2,690
Median	903	1,491	631	1,238	1,380	1,051
Land lease for mechanized agriculture						
Mean		2,129		1,250	1,697	1,593
N		3		5	1	9
SD		681		752	–	763
Median		2,246		1,248	1,697	1,697
Conservation/tourism (includes wildlife-related wages/petty trade)						
Mean	562	602	634	915	635	603
N	38	45	22	1	20	126
SD	486	927	587	–	569	693
Median	496	250	386	915	427	393
Off-land (excluding all tourism related)						
Mean	755	209	390	388	534	381
N	6	23	11	11	10	61
SD	358	124	352	431	313	335
Median	833	150	180	150	756	202
Agriculture (sale and consumption, excluding land lease income)						
Mean	3	92	5	48	67	52
N	6	13	9	8	16	52
SD	8	170	12	87	83	105
Median	0	36	0	0	36	0
Total gross income						
Mean	2,340	3,408	1,538	2,134	2,676	2,575
N	51	59	31	19	34	194
SD	2,499	3,593	1,447	2,543	2,492	2,812
Median	1,335	2,195	1,250	1,380	1,947	1,626

[a]Mean values exclude zero values except agriculture which includes zero values from households that cultivated and did not harvest

part, a few households inflating the mean way beyond the median income (Table 3.4). Overall, the high variation within groups is such that a significant difference is only evident between the gross income of poor diversified pastoralists with wildlife (US$1,538) and that of the wealthier diversified agro-pastoralists (US$3,408).

Figure 3.3 shows the similarity in the relative importance of livestock and conservation income across the different clusters. On average, livestock production makes up more than 60% of income across all clusters. With the exception of the wage-earning agro-pastoralists, income from conservation-related activities (including tourism based ventures) account for a further 20–30% of income. Agriculture provides a significant proportion of income for just one cluster – the wage-earning agro-pastoralists – and the mean value is strongly skewed by the five households

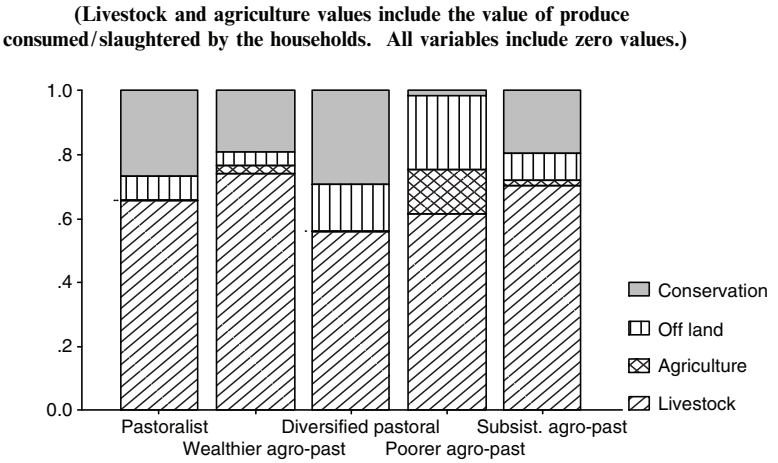

Fig. 3.3 Proportion of overall income from different livelihood activities (Livestock and agriculture values include the value of produce consumed/slaughtered by the households. All variables include zero values.)

Table 3.5 Distribution of households within each cluster between different sites (proportion of households)

	Pastoral/ wildlife	Wealthier diversified agro-pastoral/ wildlife	Poorer diversified pastoral/wildlife	Wage-earning agro-pastoral	Subsistence agro-pastoral
Lemek	19	20	46	50	3
Aitong	24	37	22	10	18
Siana	16	–	24	5	55
Talek	38	22	5	–	18
Nkorinkori	3	22	3	35	5
	100	100	100	100	100

receiving lease income for their farmland, as opposed to the 40% of households cultivating for whom the average annual return from crops is only $48. Even for this cluster, crops and cultivation lease income combined is less significant than off-land income sources.

Geographically, the different clusters are distributed significantly differently across the different study sites ($\chi^2 = 109$, df = 16, $P < 0.001$). Subsistence agro-pastoral households are more common in Siana than elsewhere, while households in the pastoralists/wildlife group are most likely to be found in Talek, where problems of crop damage due to wildlife discourage agriculture (Table 3.5). Despite these broad differences, diversification is evident across all sites. Households that live close to each other often pursue different land-use strategies (Table 3.5), emphasizing the fact that the biophysical conditions of the immediate environment of the household are not the main determinant of the income generation strategy employed by the household.

Land subdivision theoretically allows sons to move away from their father's plots and onto their own individual plots. The land subdivision process was

Table 3.6 Household assets within each livelihood cluster

	Pastoral/ wildlife	Wealthier diversified agro-pastoral/ wildlife	Poorer diversified pastoral/ wildlife	Wage-earning agro-pastoral	Subsistence agro-pastoral	Total
Hectares cultivated (includes only households that do cultivate)						
Mean	0.66	1.82	0.39	1.86	0.46	1.02
N	6	12	9	7	14	48
SD	0.90	1.82	0.21	1.81	0.47	1.34
Median	0.20	1.21	0.40	1.21	0.40	0.40
Hectares owned (all households)						
Mean	23.99	45.05	24.61	42.01	2.13	28.22
N	58	65	37	20	38	218
SD	27.37	23.97	29.56	19.44	10.30	28.13
Median	12.14	40.47	12.14	40.47	0	33.18
Herd size (livestock equivalents)						
Mean	66.81	92.23	52.97	43.13	70.99	71.06
N	58	65	36	17	38	214
SD	88.13	84.61	47.77	39.04	78.18	77.72
Median	29.02	59.00	34.62	36.60	43.34	43.85
Livestock equivalents per capita						
Mean	11.22	18.02	9.81	5.44	13.38	13.00
N	55	63	35	16	36	205
SD	16.86	20.03	10.79	4.63	18.29	17.04
Median	4.64	10.55	6.42	3.73	5.48	6.24

underway during the 2004 survey, although not all households in the study population had been allocated land (see Sect. 4.1). Comparing only households that had been allocated land, there was no significant difference in household size or age of household head between the different clusters or in the area owned by each household. However, differences were evident in terms of area cultivated and livestock holdings (Table 3.6). Amongst households that do cultivate, households in the wealthier diversified agro-pastoralist/wildlife and wage earning agro-pastoral clusters cultivate greater acreages (likely to be linked to the prevalence of land leases for commercial cultivation in these clusters) while acreage is lower for households in the subsistence agro-pastoralist cluster than for the other two agro-pastoral clusters. The wealthier diversified agro-pastoralists likewise own significantly more livestock than both the poorer diversified agro-pastoralists and the wage earning agro-pastoralists, both in terms of total herd size and livestock per capita.

3.3.1 Factors Influencing Gross Household Income

Livelihood strategies, wealth and income streams are variable amongst the 2004 Mara study households. Here we look to see the extent to which household income can be predicted from social, economic and biophysical variables. In spite of the

variation in total income between households, there is similarity in the relative importance of different income generating activities to total mean income across households of different wealth (measured here in terms of livestock holdings or TLU) (Fig. 3.4). From the poorest to the wealthiest there is a consistent pattern with livestock providing 60–70% of gross annual income. Conservation-related income (including tourism rent and dividends and income from salaries and businesses linked to the tourism or conservation industry) provides between 16% and 25% while agriculture provides less than 3% of income across all quartiles. The only source of income that shows a significant variation across the different wealth quartiles is off-land income, which is significantly more important to households with fewer livestock ($F = 3.21$, df = 4,185, $P < 0.01$). While income varies, these data suggest considerable conformity in the percentage of income from different sources amongst households of different wealth.

While the proportional contribution of different activities to household income is strikingly consistent across livestock wealth quartiles, these results conceal considerable variability within each wealth group; not all households within each group have access to all the different income streams. Households in the poorest quartiles are more likely to be engaged in agriculture and significantly less likely to have an income from conservation or tourism-related activities than households in the other quartiles ($\chi^2 = 16$, df = 4, $P < 0.01$, Table 3.7). Households in the poorer quartiles are also more likely to get an income from an off-land activity than those in the wealthiest quartiles.

Fifteen independent variables were used in a regression against gross household annual income from 2004, of which only three were significant at the 0.05% level: livestock holdings; and a set of biophysical variables indicating agro-ecological potential (Table 3.8). R^2 was 0.239 and adjusted R^2 0.151. The small adjusted R^2 suggests that the model, while significant, is not a very good predictor of wealth, and that other factors at play have not been captured. Nonetheless:

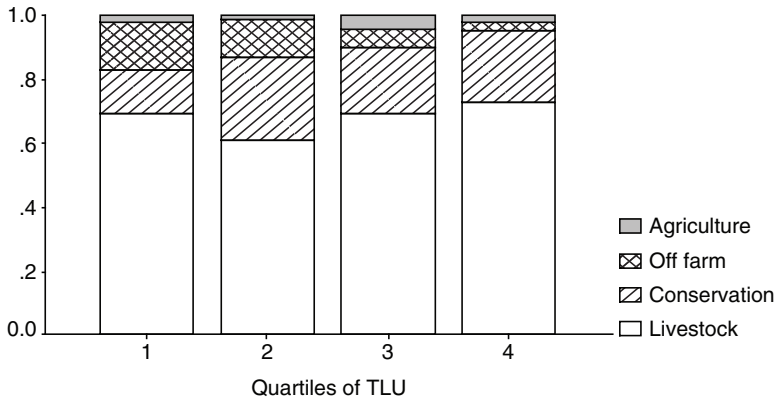

Fig. 3.4 Proportion of income from different activities by wealth quartiles (quartiles based on livestock holdings from 1 [lowest TLU/household] to 4 [highest TLU/household])

Table 3.7 Proportion of households from within each quartile engaged in different activities (quartiles based on livestock holdings [TLU], 1 = poorest, 4 = wealthiest)

Quartiles	Livestock	Agriculture	Conservation / tourism	Off-land	No. of households (*N* valid = 193)
1	93	30	44	40	46
2	94	20	60	36	47
3	96	27	73	22	50
4	98	15	80	26	50

Table 3.8 Relative importance of different social, political and economic variables in influencing mean gross annual household income

	B	Standard error	*t*	Significance	Partial η^2
Parameter					
Intercept	6.713	1.235	5.437	0.000	0.186
Natural log age of household head	–0.144	0.241	–0.597	0.552	0.003
Natural log livestock nos.	0.319	0.073	4.371	0.000	0.129
Natural log km to road	1.150E-02	0.063	0.183	0.855	0.000
Nat log wildlife TLU density	0.126	0.050	2.512	0.013	0.047
Nat log livestock TLU density	6.808E-02	0.129	0.529	0.598	0.002
Total adult unit equivalents	2.405E-02	0.020	1.181	0.240	0.011
Coefficient of variance NDVI	–0.152	0.152	–1.002	0.318	0.008
Distance to town (km)	7.136E-02	0.032	2.224	0.028	0.037
Distance to MMNR (km)	–2.010E-02	0.013	–1.514	0.133	0.017
Previous ranch: Lemek	0.896	0.671	1.336	0.184	0.014
Previous ranch: Koyiaki	0.150	0.446	0.336	0.738	0.001
Previous ranch: Siana	0.000				
Natural log of acres land owned	–8.609E-03	0.032	–0.268	0.789	0.001
Leadership category	0.445	0.340	1.310	0.193	0.013
Cultivation (not cultivating))	–3.063E-02	0.191	–0.161	0.873	0.000
Privatization stage (not privatized)	–0.103	0.377	–0.274	0.784	0.001

- Households with larger herds (lnTLU) were more likely to have higher incomes.
- Proximity to high average wildlife densities correlated positively with gross annual income, indicating that households living in areas with higher densities in wildlife were likely to generate more income than those living in less densely used areas. We can interpret these variables as proxies for the conservation potential of a given area. High wildlife densities increase the conservation potential of a region, and thus the chances of a household to derive income from conservation.
- Household income increased with distance to the nearest town. This suggests that the advantages of living further from rural markets (e.g. more space for livestock and agriculture) outweigh the immediate advantages of easier access to local markets and alternative income sources. Conversely, as observed in many cases, the effect may be partly produced by poorer households gravitating to towns where there are better opportunities for work including petty trade.

- Neither involvement in small-scale cultivation, private land ownership, household size nor educational level of the head of household correlated with gross annual income in this model.

Thompson (2002) and Homewood et al. (2004) have pointed to the importance of a leadership position (and associated political connections) in a household's acquisition of wealth. This association also did not emerge from our regression analysis, perhaps because of the collapse of tourism income in 2004 compared to 1998–2000, depressing conservation incomes as a whole, and reducing the large wealth differentials seen in 1998. There was however significant cross-correlation between leadership position (measured in terms of whether or not a household head holds influence in land allocation) and livestock holdings (mean for leader = 122.28, $n = 12$; mean for non-leader = 70, $n = 199$, $t = 2.24$, df = 209, $P < 0.05$).

Taken together, these data suggest that those with the most livestock wealth and the best-placed land allocations close to wildlife populations are able to capture the greatest income. As will be discussed below, the land allocation process was closely tied with livestock wealth and political power.

3.4 Trends in Mara Livelihoods, 1998–2004

Section 3.3 describes a snapshot of the Mara at one moment in time. However, the Mara ecosystem, and the livelihoods and household economies of its people, are anything but static. Between 1998, when our first set of surveys were undertaken, and the 2004 surveys, Lemek Group Ranch completed a process of subdivision; Koyiaki Group Ranch underwent a land subdivision process that was substantially completed (with the exception of a single block still to be allocated) while the third area, Siana, prepared for subdivision while still retaining *de jure* Trust Land status. Of the two group ranches that were subdivided, one was completed by 1999 while the other was completed during the study period in 2004. In this section, we compare household composition, assets and income streams over time for the study population overall and within the different study areas and examine the implications of these changes for Maasai households. Where necessary, this comparison used data only from those 85 households that were interviewed in both years.

3.4.1 Land Allocation

Of the 85 households that were surveyed in both years, in 1998 only 9% of households owned land. By 2004, that had increased to 74% (Table 3.9). Excluding households in Siana where land was still communally owned, 88% of households owned land by 2004. While the proportion of households owning land increased, the mean area owned decreased by more than 50%. There was no significant difference in the mean

Table 3.9 Allocation of land, 1998–2004 ($N = 85$)

Year	Households allocated land (%)	Mean area (ha)	SD
1998–2000	9	99.3	100.1
2004	74	44.5	22.6

area owned per household between the different study sites in 2004. In Talek, only 50% of households had been allocated land compared to 90–95% of households in the other areas. In 1998, amongst those households that had been allocated land, those with household heads in a position of major influence over land use owned significantly more land (65 ha) than those that did not (42 ha) ($t = 2.78$, df = 42, $P < 0.01$). In 2004, there was no clear relationship between livestock wealth and area of land owned. These data do not include any measure of the quality of land owned in terms of its agro-ecological potential, its situation relative to tourism or other opportunities.

3.4.2 Socio-Demographic Characteristics

Among the 85 households that were sampled in 1998 and in 2004, mean household size had reduced from 8.2 AE to 6.8 AE ($t = 1.88$, df = 77, $P = 0.06$). Among the total sample in both years, the average age of the head of household was also significantly greater in 1998 (46 years) compared to 2004 (41 years) ($t = 3.3$, df = 480, $P < 0.01$). This confirms a general observation of households subdividing during and in anticipation of the land privatization process as younger adult sons take up their own plots and form smaller household units (cf. Family History Ole Kariankei, Family Portraits – Mara; see also Grandin 1986; Homewood 1992). Education levels among household heads remained low over the study period (1.4 years in 1998, $N = 277$, compared to 1.9 years in 2004, $N = 219$). However, there was a significant increase in the proportion of household heads that had received at least 1 year of education from 16% in 1998 to 23% in 2004, which would again be explained by the separation of many households into smaller units, headed by younger household heads.

3.4.3 Livelihoods

Table 3.10 summarizes the proportion of households involved in different activities in 1998–2000 and 2004 across all study sites. This analysis compares only households that were interviewed in both years so as to focus on shifts evident *within* households. As with the broader 2004 survey, Table 3.10 describes a largely pastoralist community, with all households owning livestock. Throughout the period studied, livestock-related activities are by far the most common of income generating activities throughout the study area; over two-thirds of the households reported livestock-related activities (sales, purchase, slaughter and exchange/gifts) in both years.

Table 3.10 Proportion of households involved in different livelihood options, 1998–2004 (maximum $N = 85$) and probability (P) of significant difference

	1998–2000		2004		
	Households involved in activity (%)	Number of households for which data is available	Households involved in activity (%)	No. of households for which data is available	P
Keep livestock	100	85	100	85	Ns
Sold milk	39	14	25	85	*
Sold livestock	85	40	72	85	*
Cultivated	68	85	28	85	***
Sold crops	16	75	9	85	*
Consumed crops	24	42	8	85	**
Land leased	11	73	8	85	Ns
Petty trade/ business	37	65	59	75	**
Remittance	33	55	14	85	**
Conservation[a]	54	84	41	85	Ns

[a]Wildlife association, campsite rent, curio sales; excludes wage/petty trade income from tourism
Ns not significant
* Significant at 0.05 level
**Significant at 0.01 level
*** Significant at 0.001 level

The most significant change was in the proportion of households cultivating which reduced from 68% in 1998–2000 to 28% in 2004. The proportion of households consuming crops also fell to one third of its 1998 value, while the proportion of households receiving an income from crops halved to less than 10% in 2004. This is consistent with a reduction in area farmed across the study site as recorded in remotely-sensed data (Serneels, unpublished data). The proportion of households receiving an income from conservation sources (including only income from wildlife association payouts and campsite rents) underwent a non-significant decline from 54% to 42% over the same time period. There are no data from 1998 on the proportion of households that were engaged in a tourism-related business or petty trade or employed in tourism-related work. There was a significant increase in levels of engagement in petty trade and business over the period – the only activity to show an increase in the numbers of households involved – and slight but significant declines in the proportion of households selling livestock and milk.

3.4.3.1 Pastoralism

In both 1998–2000 and 2004, 99–100% of households had livestock (sheep, goats and/or cattle), typical of a predominantly pastoral population. Across the area as a whole, our data show a slight but non-significant downward trend in livestock holdings from 1998–2000 (mean livestock holdings per household = 98, SD = 92, median = 77) to 2004 (mean livestock holdings per household = 79, SD = 86, median = 47). This was equivalent to 15 TLU per adult unit equivalent in

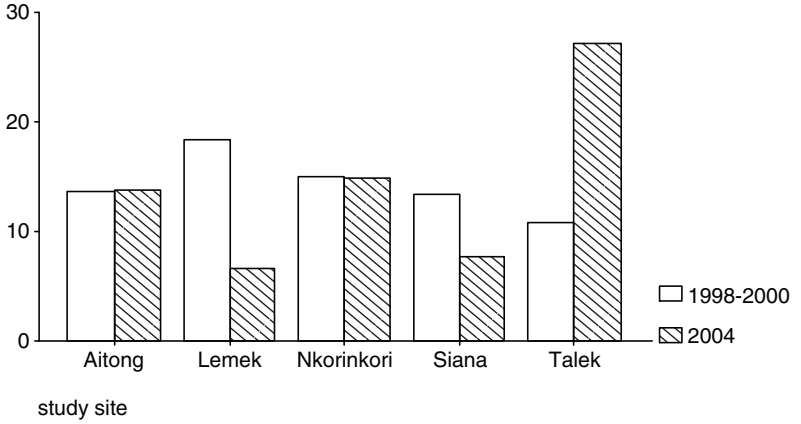

Fig. 3.5 Livestock holding (TLU/RA) ratios by Mara study site, 1998–2000 and 2004 – 85 households interviewed both years

Table 3.11 Distribution of livestock per household among wealth quartiles (based on household herd size in 1998 (TLU), $N = 85$, 1 = poorest, 5 = wealthiest)

	1998–2000		2004	
Quartiles	Mean	Percentage of total (%)	Mean	Percentage of total (%)
1	19	5	60	20
2	54	13	48	15
3	95	24	88	29
4	238	58	123	36
Total		100		100

1998–2000 and 13 TLU per adult unit equivalent in 2004. Disaggregating the study sites (Fig. 3.5), Lemek Centre showed a significant decline in herd size from 110 LE per household to 68 LE per household ($t = 2.5$, df = 35, $P < 0.05$). This would correspond with a reported spate of livestock sales prior to land privatization to buy influence over the land allocation process or to pre-negotiate land redistribution between households – a process said to be dominated by the wealthier households.

Table 3.11 describes the overall trends in distribution of livestock between wealth quartiles, defined by the number of livestock owned by each household in 1998. The data suggest that many of the households that in 1998 were in the wealthiest quartiles (based on livestock ownership) had lost a significant number of cattle and were relegated to a poorer quartile in 2004; overall, there was a more even distribution of livestock holdings among household quartiles in 2004. However, it is interesting to consider livestock trends by site.

Looking at the disaggregated data, livestock ownership among the wealthiest and the poorest shows relatively little change 1998–2004 for Koyiaki and Lemek sites. Table 3.12 shows the poorest 50% of households in both sites owned just 14–16% of livestock in both years. There were small changes in the proportion of

Table 3.12 Livestock wealth in former Koyiaki and Lemek group ranches, 2004

	Koyiaki (N = 33)		Lemek (N = 36)	
Former group ranches	1998–2000	2004	1998–2000	2004
Total herd (%) owned by wealthiest 25%	70	60	57	62
Total herd (%) owned by poorest 50%	15	14	16	16

Table 3.13 Value of livestock sales by wealth quartiles (quartiles based on livestock holdings (TLU)N = 85, 1 = poorest, 4 = wealthiest)

	Mean value of livestock sales (US$)		Households in quartile selling livestock (%)	
TLU quartiles	1999	2004	1999	2004
1	228±258	377±373	90	73
2	350±431	1,062±1,493	70	79
3	747±639	1,257±1,435	89	73
4	3,532±6,699	2,197±3,929	91	63

livestock owned by the wealthiest 25% of households, from 70% to 60% in Koyiaki and from 57% to 62% in Lemek. Literature from Kajiado in 1990s showed an accumulation of livestock wealth in fewer hands, and described the process by which this happened as land privatization advanced (e.g. Bekure et al. 1991). Our data from these two areas show only small but perhaps indicative decreases in the livestock held by the wealthiest quartile over the period 1998–2004. Although the numbers are too small to infer trends, livestock sales increased in total value from $459 in 1998 to $1,906 in 2004 for sample households in the former Koyiaki Group Ranch (N = 12 out of 33) and from $76 to $461 in Siana ($N$ = 4 of 16). This compares to a decrease during the same period from $1,898 to $1,491 in the former Lemek Group Ranch (N = 24 of 36). It was observed that during the period of land survey prior to subdivision, manoeuvring to gain access to the most land and the best quality land was at its highest. The higher 2004 values of livestock sales in Koyiaki and in Siana, and the indicative distributional changes in Table 3.12, are consistent with (though not definite evidence for) transactions involving transfer from wealthier households to less well-off in exchange for land in the run-up to titling. Similarly, the fall-off in transaction value in Lemek, and the slight build-up in proportional ownership by the wealthiest, is consistent with but not definite evidence of the decline in such transfers in the aftermath of land subdivision.

As with livestock holdings, the income generated through livestock varies considerably across the household sample, with very rich households that are active traders inflating the average income generated through livestock (Table 3.13).

While the value of livestock sales is much higher for the wealthiest households, households of *all* wealth levels are selling livestock. The similar proportions of households selling livestock from different wealth quartiles, compared to the differences in value of livestock sold, suggests a qualitative difference in what animals people are selling (the poorest selling mainly small stock while the wealthiest are selling cattle) as well as quantitative (how many animals).

3.4.3.2 Small-Scale Cultivation

Both the numbers of households involved in small-scale farming and the average acreages cultivated have changed significantly since 1998 (Kruskal Wallis, $n = 359$, df = 1, $\chi^2 = 7.005$, $P < .008$) (Table 3.10 and Fig. 3.6). Overall, far fewer households cultivated their own fields in 2004 (28%) than in 1998 (80%), although among those households that still cultivated, the area under crops increased significantly (from 1.09 ha to 1.41 ha, paired t test, $P < 0.05$, $N = 85$, mean values calculated only for households cultivating). These figures mask considerable variation across the different sites (Fig. 3.6). Talek remains a largely pastoral area; its proximity to the park, competition from wildlife and the reliance on income from the tourism industry mean no households cultivate there.

Trends in cultivation are different for the two different study sites in the former Lemek Group Ranch. At Lemek Centre, where elephant damage greatly discouraged cultivation, the number of households cultivating was down in 2004 (Mann Whitney, $n_1 = 52$, $n_2 = 45$, $U = 727.5$, $Z = -3.706$, $P = 0.000$), as were the months of the year that harvests fed the household. At Nkorinkori, the number of people cultivating halved, but field sizes almost doubled (Mann Whitney, $n_1 = 12$, $n_2 = 34$, $U = 99.5$, $Z = -2.636$, $P = 0.008$). Aitong (in the former Koyiaki Group Ranch) and Siana did not see large changes in field sizes, although the number of people cultivating declined significantly in both areas (Mann Whitney, $n_1 = 56$, $n_2 = 59$, $U = 1340$, $Z = -2.074$, $P = 0.038$, $n_1 = 41$, $n_2 = 46$, $U = 637$, $Z = -3.05$, $P = 0.002$, respectively). Since 2004, small-scale cultivation appears to be picking up again around Aitong (which was undergoing subdivision in 2004), with old fields revived, as well as expansion and opening up of new fields. This could be in part driven by good harvests in 2005, and/or by tenure strategies, with households seeking to confirm their occupancy of plots prior to land subdivision.

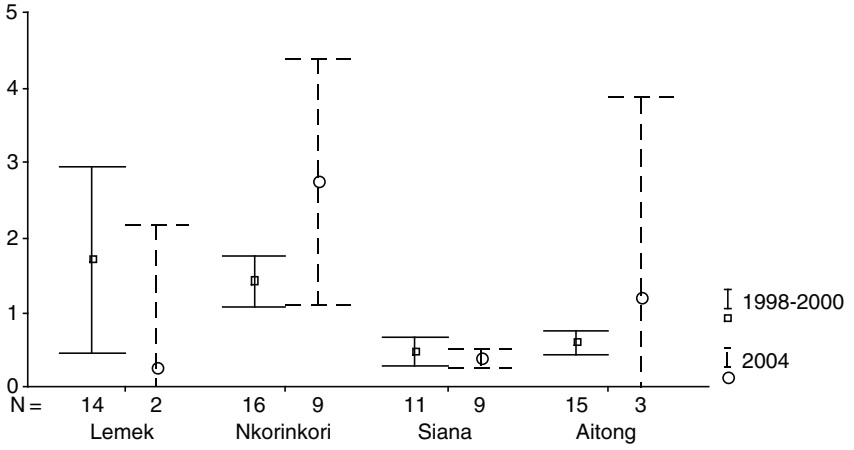

Fig. 3.6 Mean area cultivated per household by study site in 1998 and 2004 (showing 95% confidence intervals)

Table 3.14 Value of agricultural production in US$ (value of crops sold + crops consumed) (including only households that cultivated)

Year	Valid *N*	Mean (US$)	SD	Std. error mean	Median	*P*
1999	33	84	129	17	0	Ns
2004	24	47	106	15	0	

Ns not significant

These trends suggest that around Lemek Centre, Aitong, and Siana conversion to agriculture is driving piece-meal and irregular fragmentation of the landscape. Cultivation plots expand in climatically favourable years and/or as a tenure strategy in the run-up to subdivision. Cultivation then contracts again in years when risks of wildlife competition or drought increase, or in the aftermath of land titling (Serneels and Thompson, personal observation). Discussions with some householders and key informants revealed yet another aspect, that of households turning to cultivation as a reaction to being excluded from wildlife dividends despite being close to wildlife association areas (Thompson, field data book 2).

In contrast to the livestock economy, overall household income from agriculture was at best stagnant (showing a non-significant decline) between 1998 and 2004, mirroring the decline in area under cultivation (Table 3.14). The gross value of cultivation (the sum of crops consumed and sold) declined between 1998 and 2004 from $84 per household (±$128) to $47 per household (±$106), although variation is so high that the difference is not statistically significant. The probability of getting any harvest remained the same over both time periods, at just 54%.

3.4.3.3 Land Leasing and Wheat Cultivation

Leasing out of land to large-scale wheat cultivation enterprises is available only in the two study sites from the former Lemek Group Ranch (Lemek Centre and Nkorinkori). Leasing out land to wheat farming contractors results in greater potential land-use change than small-scale household cultivation because of the scale of this mechanized farming, although it is limited in terms of the area where wheat and maize are viable crops and adequate investments. In 1998–2000, the total area leased to large-scale wheat farmers amongst Nkorinkori and Lemek study households was 788 ha; in 2004, this had reduced to 214 ha. Much of this reduction was due to a reduced number of households leasing land: down from 94% to 33% in Nkorinkori, while in Lemek Centre it dropped from 14% to 5% ($N = 85$). The total value of land leases also declined, but less dramatically, from a total of $14,185 in 1999 (summed across all households) to a total of $11,389 in 2004. This corresponds to a contraction of wheat farming indicated by recent landsat images (Serneels et al., unpublished data). Amongst our study households, which did not include the absentee landlords cultivating on a large scale, there has thus been a decline in a significant and relatively widely distributed source of income among households in what was Lemek group ranch. This decline could also in part explain the expansion of maize field sizes in

Nkorinkori, suggesting Maasai shifted into their own maize production as wheat-leasing options dry up.

These trends correspond with an overall decline in rain-fed mechanized cultivation in the Mara area (Serneels, unpublished data). Wheat farmers themselves report that this decline in land leasing for wheat cultivation is due to local land subdivision. Whereas contractors could originally negotiate leases with only one or two spokespersons (typically the area chief and council member) over large areas of group ranch land, they now have to negotiate with many individual landowners, who increasingly offer land on a short-term basis. In some cases, contractors have found it easier to move their operations to other parts of the study area (Olchoro Oiroua) or to places further afield (Nakuru or Naivasha).

A number of authors have predicted an increasing shift towards wheat cultivation and a decline in rangeland due to the higher potential income from leasing land to wheat than that obtainable from conservation (e.g. Norton-Griffiths, 1995, 1996 2007; Sitati 1997; Douglas-Hamilton 1988). This prediction may have been exacerbated by statements made by landowners in areas closer to the MMNR threatening to convert their land to wheat farming if tourism dividends do not improve. In practice, the complexity of assembling land entitlements and mobilizing the resources necessary for large-scale wheat farming tempers these predictions (Thompson and Homewood 2002; Thompson 2002). Landowners also now have alternatives to leasing their land out for mechanized farming from conservation-related sources that provide income and mesh better with livestock keeping – the emergence of formal conservancy agreements (see below), and lodge owners who have reportedly offered Maasai money in return for their stopping expansion of acreage using tractors. The decline of lease cultivation identified in 2004 following subdivision illustrates the complexity of processes underlying land-use conversion to cultivation. The biggest changes to land use under present conditions are likely to come from Maasai undertaking small or medium-scale cultivation of maize using hired-in tractors and labour (Lamprey and Reid 2004).

3.5 Conservation Dividends, Rents and Politics: Wildlife Associations and Conservancies

The history of wildlife associations and tourism-related activities in the Mara region has been fast-changing and contentious. From 1988, under pressure from the then MP for Narok South, the Narok County Council started making payments of 19% of the gate receipts collected from the Maasai Mara reserve to eight group ranches immediately adjacent to the reserve. These were initially made as *ad hoc* payments towards community projects run by local council members from the locations involved. However, the impact from the receipts of this income source were not apparent to most group ranch residents. As a result, in 1998 the Maasai Mara Group Ranches Association (MMGRA) was created as an association of Maasai group ranch representatives to handle this income and the projects arising from it

(Daily Nation 2000b). Despite this move, the benefits arising from funds flowing through this association again failed to reach most group ranch members. With the subdivision of Lemek Group Ranch in 1999, Koyiaki Group Ranch in 2002, and Ol Kinyei in 2003, the MMGRA is now defunct, in part due to a struggle between the elected MMGRA officials and elected councillors to the County Council to control resources. In 2005, Narok County Council agreed to channel the 19% allocation to the 46 wards making up the eight former group ranches following the advice of a government task force. This is in effect a reversion to the 1988 situation, where projects are identified by the ward councillors supposedly for community development projects. Problems of lack of transparency and low impact of community delivery from this income source still hold true today.

In a parallel move, from 1991, groupings of Maasai landholders formed their own wildlife associations that collected gate receipts from tourists staying on their land. These wildlife associations disburse a proportion of this income to registered members of the association in the form of a dividend, and use the balance of funds to undertake community development activities. In addition, groups of individuals (shareholders) have formed lease agreements with tourism operators for lodges and luxury/temporary campsites. Patterns of access, the mechanism by which these shareholder groups were formed, and the exclusive nature of these shareholding groupings, have been described by Thompson and Homewood (2002) and Thompson (2002). Since the privatization of land, these multiple shareholdings have reverted to individual ownership, with individuals being granted private title to the land on which specific campsites and lodges are located.

Since 1994, and the establishment of the first wildlife associations on private land (the Olchoro Oiroua Wildlife Association) and on what were the Koyiaki–Lemek Groups Ranches, management arrangements surrounding wildlife income have been characterized by instability. The period from 1998 to 2004 saw a fragmentation of formerly spatially continuous wildlife associations that had originally been congruent with group ranches. This fragmentation accompanied the growth of multi-party democracy in Kenya prior to 2002.

Without detailed data for wage and petty trade income from 1998, this section focuses on income received at household level from wildlife associations and other conservation-related schemes such as rent from campsites.

During the mid-1990s, 16% of the Koyiaki–Lemek Wildlife Trust income went on members' dividends, split between Koyiaki and Lemek 57%:43% in favour of Koyiaki. Payments were made in Lemek to families in the southern part of the ranch up to Olmesereji (north of Lemek Centre) and including families in Emorijoi in the vicinity of the Lemek forests behind Lemek Centre. Initially this was shared by all members of Lemek Group Ranch as 60%:40% in favour of those whose land parcels were used for game viewing on the southern end of the group ranch. However, by 1997, all households located to the north of Lemek Centre were excluded by the wildlife association from receiving dividend payments on the basis that they could benefit from leasing their land out for wheat, and so should not benefit from the tourism activities in the southern part of the group ranch. By reducing its overall membership, the wildlife association was able to increase the payments to the remaining individuals.

In 2001, and linked to the multi-party elections of that year, the Koyiaki–Lemek Wildlife Trust fragmented initially into four associations each with 10–15 board members, which then underwent further splits over the following years, so that in 2008 there were ten different associations. For example, on the former Lemek Group Ranch, two smaller associations were formed, Oliopa and Olosirua Wildlife Associations, each supporting a different local parliamentary candidate. Funds disbursed to these associations were used to assist in the election campaigns of 2001, while dividends were also paid to their members. The number of households who were members of these associations was lower, and schedules of dividends were higher than under the previous Koyiaki–Lemek Association.

On Koyiaki Group Ranch, the rump Koyiaki Association was split further. The reasons behind the splitting of the rump Koyiaki Association appear to be a mixture of local political rivalry and economics. The rump association, despite receiving significant income from tourism, failed to give dividends for 3 years from 2001, while the assets of the former Koyiaki–Lemek Wildlife Association were run down and lost.

With the creation of these competing wildlife associations, Maasai neighbours could be members of different associations. A single association was no longer limited to representing households within distinct geographical areas. Individuals first joined associations based on political preferences, but eventually decisions were made more on economic lines, with those associations that pay higher dividends proving more popular.

In Siana, a new wildlife association was established in 2001. Households benefitted from the wildlife association through payment of school or medical expenses with the amount of income received by households initially comparable with that of the well-off Olchoro–Oiroua Association. However in 2004, only 32.4% of households surveyed in Siana received an income from the association and there were considerable discrepancies in the amounts being paid to individual households that did receive a payment.

How have these changes impacted on the amount of income received at household level? Our data suggest considerable changes in each site both in terms of the amount of income received at household level and the proportion of households receiving income.

The proportion of households reporting income from wildlife associations and/or land rent from tourism enterprises and other schemes declined (though not significantly) from 55% of households in 1998 to 41% of households in 2004 (Fig. 3.7; Table 3.10). Disaggregating site data, numbers receiving such income fell by 25–50% at Aitong and Talek (on the former Koyiaki Group Ranch) and by 50% at Lemek Centre (Fig. 3.7). At Siana, however, the formation of the new wildlife association in 2001 increased the proportion receiving income, while at Nkorinkori, dividends from associations remained available only to those households that had additional land parcels in the areas closer to the MMNR (Fig. 3.5). This decline was more pronounced in the proportion of households receiving income through shares in a wildlife association, which fell from 55% in 1998 to 37% in 2004.

Among those households that did receive an income from wildlife associations or campsite rent, there was also a significant decline in levels of this income from US$1,263 ($N$ = 46, SD = 4,555, median = 212) to US$280 ($N$ = 35, SD = 779,

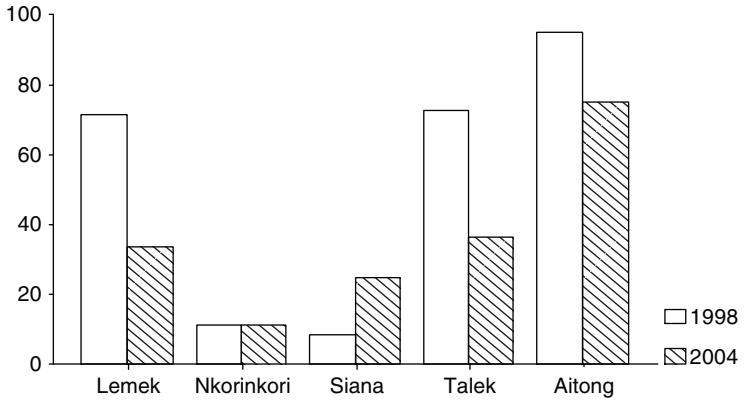

Fig. 3.7 Percentage distribution of Mara households receiving income from wildlife associations, 1998–2004 ($N = 85$)

Table 3.15 Household level income from wildlife associations and camp shares, 1998–2004 ($N = 85$)

Study site	Year	Mean	*N*	SD.	Median
Lemek	1998	627	14	592	450
	2004	279	7	381	175
Nkorinkori	1998	167	3	58	200
	2004	439	2	29	439
Siana	1998	135	1		135
	2004	77	5	58	62
Talek	1998	4,322	10	9,473	200
	2004	975	5	2,017	87
Aitong	1998	303	18	240	200
	2004	106	16	143	76
Total	1998	1,263	46	4,555	212
	2004	280	35	779	89

median = 89) (Table 3.15). Mean income values from wildlife associations and rents are skewed for both years of our analysis, inflated by a few households making a very large income from conservation, although this skew appears less acute in 2004 compared to 1998. In 2004, our data do not show the big dividends paid to the few 'elites' as recorded in the earlier surveys, even though the biggest earners from 1998 were also included in the 2004 survey. The declines partly reflect the national decline in tourism income received from 2001 onwards following the impact of terrorism on the tourism market.

The dividends paid by the wildlife associations depend on the revenue collected, on whether the management committee passes on the income as a dividend to members, and on the number of members. Income received at household level declined in all sites except for Nkorinkori, in spite of the decline in the number of households receiving income (Table 3.15). In Koyiaki, those members that received a dividend saw an 80% decline in income.

While conservation income was distributed relatively evenly across the different livelihood clusters in 2004, a breakdown by wealth (based on livestock holdings) shows a highly uneven distribution of conservation income. Despite enormous variability in the returns to individual households, and a significant decline in overall conservation-related income, the top quartile consistently gets around 60–70% of conservation income, whether from wildlife associations and campsites, or from associated wages and business revenues. The bottom quartile gets around 5% of wildlife association and campsite income, rising to nearer 15% if all forms of associated conservation-related employment are included. The two middle quartiles together get a steady 25% across the board. Change between 1998 and 2004 was minimal.

The rapid factionalizing and splitting of wildlife associations in the study area is consistent with the exclusion of socially, politically and spatially less well-placed members from wildlife conservation income and the sharing of the dividends amongst a smaller and more entrenched set of core households. Those excluded households are left with little incentive to conserve wildlife.

Since 2004, partially in response to this dynamic and partially to protect top-end tourism campsites' exclusive access to high quality habitat, two conservancies have been formed, one on the former Koyiaki Group Ranch (of some 22,000 acres with 160 members) and one on the former Ol Kinyei Group Ranch (of some 12,000 acres with some 1,100 members). The conservancies involve a partnership between tourism investors and landowners, with investors paying an agreed rent per acre (as opposed to the previous payment system based on bed-night occupancy). This provides a minimum guaranteed payment to the landowners. In return, the landowners must join a land holding company and covenant their land to this company (through the Narok Lands Office) for a period of 5 years, during which they are restricted from selling their land on, and from constructing permanent bomas or cultivating or fencing on the land without the permission of the land holding company, which is entirely owned by the Maasai landlords.

These conservancies are recent developments described in greater detail elsewhere (Ole Kaelo and Thompson, in preparation). They are said to work well for both people and wildlife conservation. For landowners, they deliver better distribution of returns and better collaboration between individuals owning the campsite locations and their neighbours across whose land wildlife and tourists must move. They limit onward land sales to outsiders and they guarantee wildlife habitat. However, they create knock on effects in that Maasai move their homesteads, herds and farming activities to other areas negotiated with family or friends only returning to graze at prescribed times of the year, particularly during the dry season (Ole Kaelo and Thompson, in preparation).

The long term ability of these conservancies to provide a reliable source of income to Maasai inhabitants in the face of a collapsing tourism sector, alternative land-use options, political manoeuvring around past land allocations, and in the wake of recent governance turmoil is unknown. Nevertheless, the conservancies represent a fresh way of distributing the benefits of tourism to more landowners, in addition to the mechanism offered by the constantly splitting and ever-transient wildlife association structures. Evidence for an ability of the conservancies to impact

on wildlife conservation, both in terms of providing suitable wildlife habitat, and in terms of their impact on household incomes, is only just beginning to emerge (Western et al. 2006).

3.6 Discussion

Looking back at our original questions (Sect. 3.2), the two immediately salient points that emerge from our findings on Mara are first and foremost that livestock remain strongly central to livelihoods, and secondly that in this site, wildlife does bring significant returns to local people.

3.6.1 Livestock

Livestock are consistently the biggest proportional contributor to household incomes throughout the Mara rangelands. Despite immense variability in people's livelihood strategies and in their degree of economic success, livestock contribute over two-thirds of mean annual income overall, around 60–70% of income for all five different livelihoods clusters and a consistent 60–70% of income across wealth categories from the poorest to the best-off quartile. These figures are minimum estimates, given that it was not possible to quantify and include income from milk sales nor the value of milk consumed directly.

3.6.2 Wildlife

But what is striking about Mara is the clear importance of wildlife earnings. The average of 21% mean annual household income from this source (Fig. 3.2), the fact that four of five livelihoods clusters get significant wildlife returns (Fig. 3.3), and the fact that wildlife revenue makes up a significant proportion of earnings for households across the whole spectrum of wealth (~15–25% across all wealth quartiles, Fig. 3.4) shows that wildlife income is currently second only to livestock in Mara household economies. In Mara, even the most purely pastoral livelihoods cluster has a very significant wildlife income. These data show there is widespread access to wildlife returns. However, it is important to establish a more differentiated understanding as to how and under what conditions and for whom wildlife revenues are working.

At the outset, among the wider research issues in Sect. 3.2, we posed the question as to who captures the benefits from wildlife conservation. Our results suggest that local elites are consistently better able to capture returns from wildlife conservation. From the data in Table 3.16, the top 25% wealthiest households consistently capture 60–70% of conservation income. Conservation-related income benefits

Table 3.16 Income from conservation sources 1999–2004 by quartiles (quartiles based on livestock wealth in 1998 – includes zero values)

	1998–2000				2004				2004 (all wildlife associated income including WA, shares, wage, petty trade activities, etc.)			
Quartile	Mean	Median	SD	Sum (%)	Mean	Median	SD	Sum (%)	Mean	Median	SD	Sum (%)
1	211	100	194	4	81	79	49	7	370	211	385	14%
2	645	400	760	12	28	23	26	1	282	187	340	10
3	840	400	1,440	13	258	180	347	24	318	189	354	17
4	2,741	300	7,839	71	549	133	1282	67	868	504	1,204	59
Total	1,263	212	4,555	100	280	88	779	100	515	227	793	100

fewer than half of the households in the poorest quartile but over 80% of those in the top quartile (Table 3.7). The history of the mechanisms and channels for distribution of wildlife revenue around the Mara show how hotly contested these wildlife-related returns are, and show a conflict between the strategies of individuals and groups for maximizing their share, alongside externally inspired moves to restructure institutions to improve management of the wildlife resource and associated income source (e.g. Walpole and Leader-Williams 2001; Norton-Griffiths and Said in press).

The wildlife-related returns whose distribution is explored here, however, represent only an estimated 5% of the total earnings to tour operators and national parks. These other layers of the 'tourism cartel' capture by far the largest share (Norton-Griffiths 2007). As well as the issue of distribution, there are issues around the total volume of returns, which fluctuate with the political context in Kenya, and tourism figures overall. The share captured by the elite between 1998 and 2004 stayed remarkably consistent at 60–70%, despite a major collapse in total tourism revenue.

A proportion of households from across the wealth spectrum get something from wildlife; it represents on average one-fifth of household income, and it is very lucrative for some. Our findings represent evidence for at least partial success of green development in the Mara. Wildlife based income makes a very significant contribution to the economies of households from all wealth categories and livelihoods strategies, although distribution is skewed. Its proportional contribution to total household income fluctuates unpredictably from year to year (dependent on wider tourism trends), and access to these revenues is contingent on keeping place within a dynamic, fast-evolving, continuously contested situation. Figure 3.7 suggests many are unable to do so, with proportions of households benefiting dropping drastically in Lemek, Talek and Aitong during 1998–2004: only in Siana did numbers rise, as a presumably temporary result of the creation of a new wildlife association.

For conservation-related activities around the Mara to qualify as sustainable use of wildlife for development, benefits should translate into conservation-compatible land-use choices, and ultimately into stable or increasing wildlife numbers. With wildlife numbers continuing to decline (Western et al. 2006), there is as yet no evidence that this is the case. One of the most potentially far-reaching developments in the Mara is the establishing of private conservancies with restrictive land covenants placed on Maasai landowners in return for a guaranteed minimum payment from the tour operators operating in the conservancy. Nationally, private conservancies now hold 40% of Kenya's wildlife; they are seen by many as the solution to wildlife conservation (Western et al. 2006; Norton-Griffiths 2007). The newly created wildlife conservancies will provide land for wildlife and the tourism industry to continue. However, in the face of the recent collapse in the tourism sector with post election violence in Kenya in 2007–2008, the ability of tour operators to continue meeting the guaranteed payments is in doubt. The impact of these conservancies on local livelihoods and for wildlife conservation in the longer term remains to be seen.

3.6.3 Off-Land Employment

In Mara, the importance of off-land work to household incomes at first sight ranks below that of livestock and wildlife. However, its distribution across wealth categories is illuminating as is the trend in its uptake. Involvement in off-land work increases with declining wealth, with 40% of the households in the poorest quartile engaged in off-land work as against 26% in the wealthiest (Table 3.7). Of all the activities contributing to livelihood strategies in the Mara, off-land work (particularly petty trade) is the only one to have involved an increasing proportion of Mara households between 1998 and 2004 (from 37% to 59%, Table 3.10). With well over half of all households participating in off-land work, with its ability to complement and buffer natural resource-based livelihoods (Chap. 1; also Mortimore, 2005), and with the wide range of different types and levels of such work potentially available to individuals with different levels of education, skills and networks, diversification into off-land employment represents a vital and growing part of Maasai household economies in the Mara. In this, it bears out the predictions in the wider literature (e.g. Sandford 2006) of broader trends of diversification among the pastoralist societies of African arid and semi-arid lands.

3.6.4 Cultivation

By contrast to off-land work, cultivation is practiced by a rapidly dwindling proportion of households around MMNR. Of the 85 households sampled in both 1998 and 2004, over 64% cultivated in 1998, but only 28% in 2004 (Table 3.10). This decline may be driven by poor harvests or by better alternative opportunities, but is also likely to have been affected by tenure strategies, with households cultivating in the run-up to privatization as a way of staking claim to specific sites, then abandoning the activity once they have secured title. With around 50% of households attempting cultivation failing to harvest each year, subsistence rainfed agriculture is a poor man's choice in Mara: 30% of the poorest wealth category engaged in cultivation, as against 15% of the top quartile (Table 3.7).

In Sect. 3.2, we raised questions as to whether conversion to commercial cultivation increased or decreased during the study period (coinciding with the aftermath of land allocation). Commercial cultivation is generally seen as the most profitable land use in areas most suitable for cultivation to the north and along the Mara River; (e.g. ACC 2001). However, remotely sensed data, local opinion and direct personal observation concur in suggesting that large-scale cultivation has decreased since 1998. During the period 1998–2000, the large returns from commercial farming and wildlife tourism were particularly associated with those households with members in leadership positions (Thompson et al. 2002; Thompson and Homewood 2002). The process by which large absentee landlords cemented their holdings over cultivated land around Nkorinkori is described in Thompson and Homewood

(2002) and Thompson (2002). This survey did not include these absentee landlords amongst the study population, and the description of the data collected above understood in this light. The data taken on the study households shows that opportunities for leasing land for commercial wheat cultivation, while still lucrative, declined during 1998–2004, as have both the numbers engaging in this activity and the volume of returns. Contractors are said to have been discouraged by the transaction costs of negotiating with multiple smallholders, and also by soil fertility declines, drought and poor harvests. On the contrary, a proportion of Mara households use tractors to cultivate maize on their own land, consistent with a continuing fragmentation associated with patches of cultivation for both home consumption and commercial markets (Lamprey and Reid 2004). Our data do not allow any investigation of the potentially ecosystem-wide impacts of extraction of irrigation water from the Mara River for growing high value vegetable crops (Gereta et al. 2003; Wolanski et al. 2001).

The more nuanced picture of change in commercial cultivation that is emerging offers some hope for more conservation-compatible land use. Although currently wildlife populations continue to decline (Western et al. 2006), large-scale cultivation has not continued to convert the wildlife habitat. Contrary to fears of cultivation sweeping down towards the Mara, human impact is decreasing in some areas (Lemek Centre and on conservancies on the former Koyiaki Group Ranch), as wildlife pressure, returns from wildlife associations, and conservancy agreements between the management and members of some wildlife associations (e.g. Oliopa and Orisirwa) have resulted in the removal of homesteads and livestock.

3.6.5 Land Tenure, Land Use, Income and Livelihoods

Levels of prosperity overall are higher among Mara households than in other areas of Maasailand (e.g. Chaps. 4–7), though the variability is high and precludes significant differences between livelihood clusters or strategies. Regression analyses show that households' incomes (as opposed to their involvement in specific activities) are significantly predicted by livestock holdings and by agro-ecological and spatial variables (proximity to areas of high wildlife biomass density; distance to urban centres), although the predictive powers of these models are weak. This again underlines the fact that livestock and access to good quality range remain central to the local economy, despite the fluctuating importance of mechanized cultivation and tourism incomes; also, indirectly, that poorer households are likely to gravitate towards urban settlements. However, livelihood strategies in the Mara are not *per se* strongly associated with spatial location.

Patterns of ownership of land and livestock shifted during the privatization and post-privatization period. Although leadership did not emerge as significant in the regression model of factors determining income, there was a significant association between leadership (in terms of potential influence over land allocation) and livestock owned. As well as this association, our data are consistent with transfers of

livestock from better-off to poorer households in the run-up to privatization (though they do not constitute concrete evidence for such transactions). This would be expected with the better-off households purchasing newly titled land from the less well-off (cf. Kajiado: Bekure et al. 1991). Our data are also consistent with a decline in such transactions post-privatization.

3.7 Conclusion

Despite the data showing inequality arising in the study households, overall, livestock remain the major income source and contribute most to livelihood security for residents around the MMNR. Wildlife benefits remain widespread among households around the Mara, despite a decline in both the number of households benefiting and in wildlife conservation incomes over the study periods. The lack of cohesion of the wildlife associations and their disappointing performance in transferring tourism income to member households is a key factor behind these declines, alongside the continually fluctuating nature of international tourism figures. Nevertheless, wildlife contributes more to the incomes of study households in Mara than is the case for any of the other sites described in this book (Chap. 10). However, wildlife benefits need to be better distributed and less prone to collapse before they can begin to translate into secure livelihoods and conservation-compatible land use choices on a wider scale. As with wildlife, agriculture offers potential benefits, but these are limited by climate, local/national/ international politics and economies, and as a result cultivation (both commercial and subsistence) is currently declining around the Mara. Diversification into off-land work is of growing importance and already far outweighs cultivation in terms of proportional contribution to the household economy.

While income streams from high value commercial cultivation and tourism sites have been cemented with land privatisation, outside of this, change is abrupt and non-linear; people anticipate changes in local politics, in land use and in agro-ecological conditions, and react fast. Rather than conservative traditionalism, cultivation and conservation strategies, alongside a continuing reliance on livestock, represent a long-tried and repeatedly validated flexibility and adaptability to rapidly changing circumstances.

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Chapter 4
Assessing Returns to Land and Changing Livelihood Strategies in Kitengela

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4.1 Introduction

Kitengela comprises an area of ~390 km^2 (GOK, 2001) within Kajiado District and is part of a larger rangeland ecosystem called the Athi-Kaputiei Plains (a 2,456 km^2 ecosystem). The study area corresponds to Isinya Division (one of seven administrative units of Kajiado District). Neighbouring Nairobi, a city with a population estimated to be approaching 3 million, Kitengela is unique in that it supports a large- and long-distance wildlife migratory community (Fig. 4.1) that have lived alongside the resident Maasai for centuries.

Nairobi National Park sits at the northernmost tip of Kitengela. This park is only 114 km^2 in size and is not large enough to support the 24 species of large mammals that exist in this ecosystem. Wildebeest, eland, giraffe and zebra migrate into and out of the park, accessing its water and abundant grass during the dry season and moving south into the open pastoral lands during the wet season when the calves are born (Reid et al., 2008). When Nairobi National Park was established in 1946, Kitengela Plains and the Ngong Hills were declared conservation areas. However, Kitengela was never formally gazetted.

In the mid-1970s, the Kitengela group ranch was created, covering 18,292 ha, with 215 registered members (all Maasai). It was subdivided in 1988, giving roughly 250 acres each to 215 landowning households (Kristjanson et al., 2002). This trend towards privatization was followed throughout Kajiado District. According to official records, in 2006, out of a total of 52 group ranches, subdivision is complete on 32 and is in progress on 15 of which 7 are in dispute and under court injunction (BurnSilver and Mwangi, 2006). Only five group ranches have not started to subdivide. While the official record of the total number of group ranches in the district seems to vary from 56 in 2002 (Mwangi, 2003) to 52 in 2006, it is important to note that five other group ranches that had resolved not to subdivide in 2002 are now in the process of doing so.

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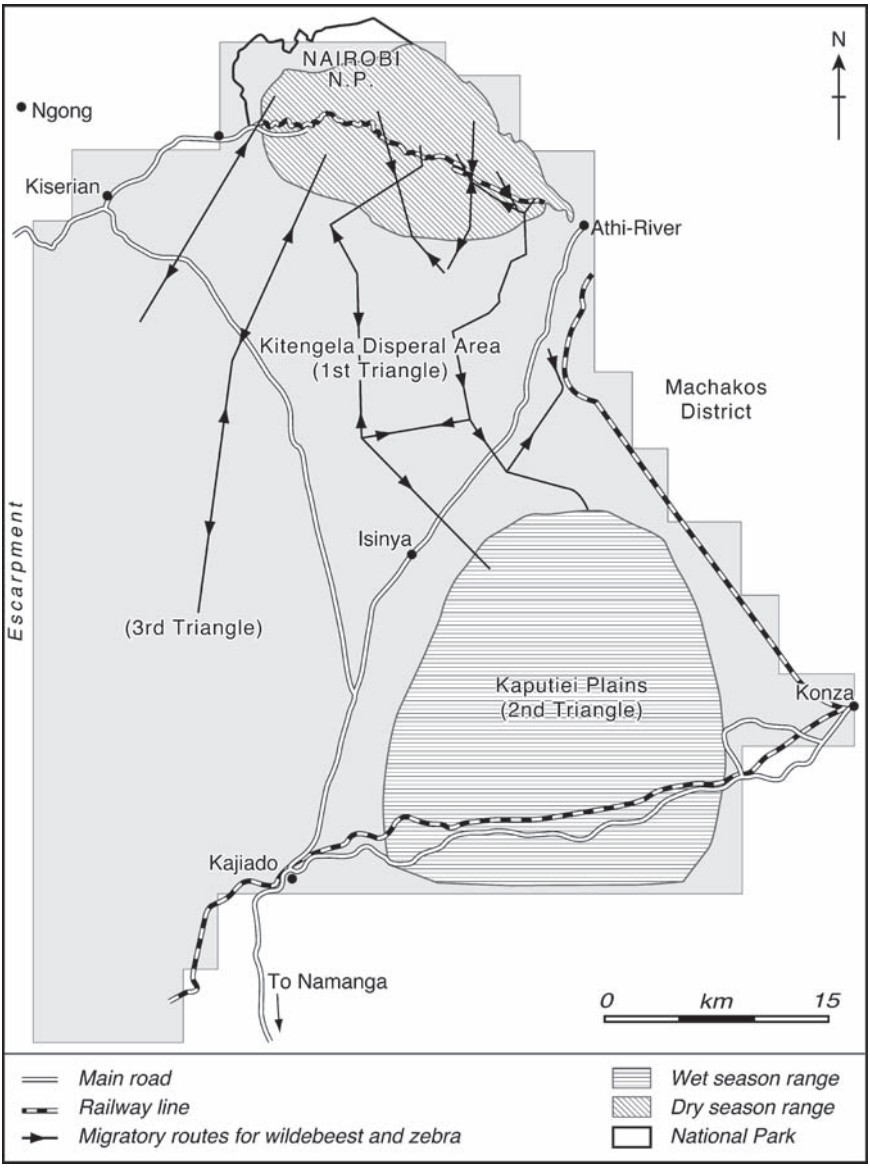

Fig. 4.1 Kitengela area of Kenya

Land sales in Kitengela started occurring in the 1990s, with owners selling parts of their plots, as well as passing on plots to several inheritors (Reid et al., 2008). Many of the sales were to non-Maasai and farmers, a trend echoed throughout Kajiado District, where 75% of all farmers involved in cultivation were non-Maasai only a few years after subdivision (Rutten, 1992). Scenic plots overlooking the park have been

purchased by ex-urban dwellers. Large-scale, irrigated horticultural schemes and quarrying enterprises have been established in the area since privatization. Land prices continue to rise in areas near trading centres, next to the tarmac roads, and near the park. High land values create high incentives for Kitengela landowners to sell pieces of their land.

Annual rainfall is low and unreliable, ranging from only 500 mm to 800 mm spread across two rainy seasons, making rainfed cropping risky (especially for maize, the preferred crop). In spite of this, landowning pastoralists across Kajiado District have also begun to take up cropping, becoming agropastoralists (Campbell, 1993; Campbell et al., 2000, 2003). Nearly all Kitengela residents now fence their homesteads and adjacent gardens (Mwangi and Warinda, 1999).

Population growth and urbanization have occurred in parallel with land tenure changes in Kitengela. During the 1980s and throughout the 1990s, the towns of Athi River and Kitengela grew rapidly with industries and an export-processing zone established in the area. The 1999 population census counted 17,347 residents of Kitengela, up from 6,548 in 1989 (GOK, 2001). More than two-thirds of the population is concentrated in the Kitengela trading centre and other smaller trading centres (Nkedianye, 2004). This rapid population increase has led to more settlements which in turn has led to more fences being built, blocking the traditional wildlife migration routes (Kimani and Pickard, 1998). Compared to western and central Kenya, however, Kajiado District as a whole is relatively sparsely populated, with an average population density of 19 persons per km^2 (GOK, 2001).

A potentially important program affecting a small number of the 888 rural households now found in Kitengela is the Wildlife Conservation Lease Program, initiated in 2000.[1] The aim of this program is to ensure that wildlife in the Athi–Kaputiei Plains can move freely to their traditional habitats (Reid et al., forthcoming). Participants receive Ksh 300 per acre per year (US $3.75 in 2005) and in return they agree to allow free movement of wildlife on their land, refrain from poaching, report poaching by others and avoid fencing or subdivision of their land. In years of poor rainfall, these payments are sufficient to double the annual income of the poorest resident landowning households in the area (Kristjanson et al., 2002). This program started gradually, leasing several hundred acres from 11 participants in 2000, expanding to leases covering 8,545 acres from 117 Kitengela families, disbursing around Ksh 3,000,000 per year by late 2003 with plans to expand to 20,000

[1] This program was introduced as a pilot effort by the Friends of Nairobi National Park (FoNNaP), a local conservation NGO, with support from the Wildlife Trust (USA). In 2002, the program was transferred to the Wildlife Foundation (a Kenyan NGO), which aims to expand it sufficiently to establish a sustainable trust fund such that the program runs off the interest payments. This program has experienced considerable donor interest (since it is a potential model for other conservation areas such as Amboseli and Mara) and pledges of support from the Kenyan government. In 2007, the Kenya Wildlife Service (KWS) began to pay an annual amount of KSh 900,000 (about US $13,235) to support this program. More support has been pledged by KWS and other donors, but only time will tell whether the support will arrive before it is too late to save Kitengela's remaining wildlife).

acres in 2004 (Nkedianye, 2004). There are currently 115 households on a waiting list. Payments are scheduled several times per year to coincide with school payment time. Nkedianye (2004) reports that participants in the leasing program are sending their children to school, including secondary school, have more positive attitudes towards wildlife, are more willing to share water and pastures with wildlife and strongly support keeping the range open without fencing. A majority of participants indicated that they spent most of the money from the lease payments on school fees. Participants also say that the lease program allows them to choose not to sell land, since the pressure to sell, arising from the need for school fees, has reduced. This program constitutes the only real conservation-related income to date for residents, although there are some small local craft initiatives, for example, selling beadwork at the Bomas of Kenya or Maasai markets held in Nairobi, along with emerging employment opportunities including community scouts supported by Friends of Nairobi National Park (FoNNaP) and sale of cultural artefacts from the Olmakao and other cultural Bomas. Lessons regarding the positive role that wildlife conservation can play in livelihood and income diversification strategies are much needed, and this study makes a start in this direction.

Thus, the Maasai of Kitengela have seen considerable change in their environment and livelihood options over the last 20 years. Ongoing processes of urbanization, rapid in-migration, high poverty rates, diversification of land-use activities with little planning and land tenure change are resulting in unprecedented changes in land use and the livelihood strategies that households pursue (Reid et al., 2008; Kristjanson et al., 2002; Gichohi, 1996, 2000). There is some evidence that livestock production is becoming more intensified (e.g. improved breeds and management practices, increased off-take and sales aimed at increasing productivity rather than herd size alone), particularly by younger, more educated households in Kitengela (Kristjanson et al., 2002). This is coupled with a trend towards diversification of income sources, also seen in other pastoral areas such as Amboseli (BurnSilver, 2006) and in northern Kenya (McPeak and Little, 2005).

4.2 The Study – objectives, approach and methods'

4.2.1 Objectives

In this chapter we look at the strategies that Maasai households are pursuing in the face of these changes. Specifically we aim to answer the following four questions:

- What livelihood strategies are households pursuing across Kitengela?
- What are households earning from these different strategies?
- What are the factors that determine household income levels? What is the relative importance to earnings of spatial versus household-level factors?
- What are the livelihood assets/factors that determine the land use/livelihood choices that different types of households are pursuing?

We want to address these questions with the goal of seeing more evidence-based decision-making occurring across Maasailand. Historically, the Maasai have had very little influence over decisions made regarding their resources. This is rapidly changing, and there is now more opportunity to inform land use and other decisions affecting households across Kitengela by providing this and other types of information to local government officials and directly to community members through relatively new community organizations such as KILA, the Kitengela Ilparakuo Landowners Association. It is also the case that a more transparent understanding of the scale and importance of conservation as opposed to other income sources could lead to more effective policy design.

4.2.2 Study Sites

Given the existing variation in terms of land use, access to conservation resources, off-land incomes, roads and markets across Kitengela, this study selected households from two different areas based on proximity to the Nairobi National Park (NNP): four sublocations close to the NNP, and seven sublocations located farther away from the park. Agroecologically, there is no significant difference in the two areas; they are both semi-arid with relatively annual low rainfall (about 600 mm). The two areas differ in a number of significant ways:

- Human–wildlife conflicts are more intense and frequent closer to the park.
- Most areas near NNP are closer to the tarmac road and major towns, and hence experience higher demand for land, translating into more land sales, higher land prices and more fencing.
- Some landowners living relatively close to NNP have been receiving regular payments from the Wildlife Conservation Lease Program since it began; the program commenced in 2000 and plans are underway to make it available to households located farther away from the park, subject to availability of funds.
- Areas far away from the park, on the contrary, are the main wildebeest-calving zones that experience the heaviest competition for grazing and the most severe burden of wildlife-borne diseases such as malignant catarrhal fever (MCF) while East Coast fever (ECF) is more prevalent in areas closer to the park.
- There is much less infrastructure in the areas distant from NNP; thus, households in these areas have to travel further to reach a major town/livestock market.

4.2.3 Approach and Methods

This case study builds upon earlier community and household-level investigations (Kristjanson et al., 2002; Nkedianye, 2004).

4.2.3.1 Selection of Households and Data

An updated list of all households living within the Kitengela Wildlife dispersal area was obtained from discussions with chiefs, assistant chiefs, village elders, and key informants and trained enumerators from earlier studies. A total of 888 households were found to be residing in the study area as a whole; 232 in the area near the park and 656 in the area farther away. A proportional random sampling criterion was used to draw a sample of 150 households from the two areas. Together with 27 households that had previously been surveyed in 2000, a total of 177 households were surveyed, 72 in areas adjacent to the NNP and 105 in areas far away from the park. The survey focused on Maasai households that have been in this area since the group ranch subdivision, and does not include in-migrants (largely non-Maasai) that have purchased small parcels of land around the urban centres and absentee landlords.

Detailed primary data on demographic characteristics, herd sizes, revenues and expenditures from livestock production, crop production and off-farm activities were collected from these households between August and September 2004. Other data collected at the household level included changes in land ownership over time (land sales and fencing issues), probable future land-use plans, drought-coping strategies based on the two previous droughts of 1997 and 2000, household consumption patterns across seasons, peoples' attitudes towards wildlife, wildlife populations and dynamics over the past 5 years, and perceptions as to how the land-leasing program is impacting on people's attitudes towards wildlife. Other secondary sources of data included information on crop and livestock prices in local markets (based on interviews with key informants) and spatial information such as distance of the households to the nearest markets, primary school, permanent water source, all-weather road, town and NNP. These spatial variables were derived from satellite, aerial photo and fieldwork using Global Positioning System (GPS) units that locate the exact geographic coordinates of these households and corresponding resources/infrastructure.

4.2.3.2 Analytical Methods

Details on the analytical methods used in this study are presented in Chap. 2. These are summarised briefly for the Kitengela study below.

Cluster Analysis

The cluster analysis aimed at characterizing the range of livelihood strategies that Kitengela pastoralists are involved in, that is, to identify relatively homogenous clusters/groups of households engaged in similar economic activities/livelihood strategies. As with the other studies presented in this book, 13 variables were chosen as factors critical to opportunities and subsequent choice of livelihood strategies in pastoral systems. These variables were binary, relating to what households have

(land under cultivation, labour, capital), how they use those assets (income, food), whether they are involved in other off-land income-generating activities and how they are investing their income (purchasing livestock, food). The cluster analysis groups households with similar characteristics, minimizing the difference within groups and maximizing the difference across groups.

Regression Analysis

The regression analyses examined the factors influencing the choice of livelihood strategies as well as the income levels obtained from the different livelihood strategies.

We used a multinomial logistic model to look at the major factors influencing households' choice of livelihood strategy to pursue (e.g. cropping, livestock, wildlife, off-land and combinations thereof), using STATA (the method used is described in detail in Chap. 2). The dependent variable in this case was the clusters (1–4, described below), representing the livelihood strategy pursued by each household. We chose the cluster that represented the more traditional pastoralist livelihood strategy in Kitengela for the reference category. We tested linear, exponential, spherical, Gaussian and power functions for local spatial autocorrelation using the Proc Glimmix procedure in SAS, but the results from these models showed similar signs and magnitudes of the coefficients to the model without spatial autocorrelation incorporated, thus it was not necessary to include a spatial autocorrelation function in the final model.

Several multiple linear regression models were formulated to look at the factors influencing income levels, which vary considerably across these households. We examined the factors influencing overall net income, as well as the main components, livestock-related income and crop and off-land income. We also looked at the determinants of household wealth (a stock in economic terms) as opposed to income (a flow) for these households by calculating herd value and regressing it against the same set of independent variables (i.e. both spatial and household factors).

Finally, we asked to what extent spatial variables determine the value of the land that these households own by regressing land price for each household against the spatial factors alone.

For all of these regression models, all the independent variables were tested for multicollinearity, and where this was a problem, we tested each individual variable against the dependent variable and chose the variable that had the highest explanatory power amongst the highly correlated ones. We also checked for normality for explanatory and dependent variables, and found that some variables needed to be transformed to improve their distribution to near normal. Other variables needed to be calculated (income variables were derived from the raw data on price time's quantity, for example). It is well known that when you are dealing with household survey data, for which location attributes are an important source of information, spatial autocorrelation is a concern (i.e. variables in one area are affected by the value of that variable in neighbouring areas). Each of the models

was tested for the different types of spatial autocorrelation (spatial lag and spatial error dependence) and heteroskedasticity. For models where spatial autocorrelation was a problem, we chose to follow the approach of using either spatial lag or spatial error models to correct for the type of spatial autocorrelation found. Similarly, for models where heteroskedasticity was a problem, heteroskedasticity-robust standard errors were used to construct heteroskedasticity-robust *t* statistics. The only difference between the usual ordinary least square (OLS) *t* statistic and the heteroskedasticity-robust *t* statistic is in the method and computation of the standard error.

The dependent and independent/explanatory variables are described in Table A1 of the Appendix. Thirteen independent variables were used in the final models after correcting for multicollinearity.

4.3 Livelihood strategies, land ownership and determinants of wealth in Kitengela

4.3.1 Household Characteristics

The majority of households (80%) surveyed had male household heads, ranging in age from 20 to 95, with a mean age of 44 years. Sixteen per cent of household heads were younger than 31, over 50% were between 31 and 50 and one third were over 51 years of age. Household size, expressed in adult units (AUs), ranged from 1.9 to 28.7, with a mean of 6.22.

The level of education (years of formal education) among the respondents averaged 6 years and ranged from no formal education to 16 years of education. Thirty per cent of the household heads surveyed had no formal education, 32% had primary level education, 24% had finished secondary school, with very few reaching tertiary level. The majority of the households with no formal education (57%) had household heads older than 50.

4.3.2 Returns to Different Livelihood Options

While the local Maasai community still focuses on livestock production, they have over the years been diversifying their livelihood strategies, which now include crop cultivation, land sales, investments in real estate and small businesses, wage labour and other income-generating activities (including the lease program described above). The range of economic activities captured in the survey can be grouped into three broad categories – livestock production, crop production and off-farm/land income (including wage labour, income from wildlife, remittances, petty trade, business activities and income from quarrying). Table 4.1 summarizes the proportion of households involved in the various activities and the average levels, and ranges, of income earned from these various activities.

Table 4.1 Proportion of households involved in the various income-earning activities, mean levels, and ranges of, income earned from these various activities (variable providing basis for cluster analysis)[a]

	Mean	Min	Max	SD	Median	Per cent of house-holds involved
Number of tropical livestock units	41.7	1.4	309.5	51.6	23.3	99
Total number of off-land income-earning activities	1.6	1.0	5.0	0.8	1.0	88
Annual income from salaries/ wages ($ per year)	1,245.3	76.1	4,755.9	1,149.3	760.9	38
Annual income from conservation/wildlife-related activities ($ per year)	247.6	45.7	570.7	134.9	218.8	14
Gross annual income from business and petty trade ($ per year)	1,084.3	25.4	4,565.6	1,048.7	760.9	57
Area under lowland rainfed cultivation (acres)	2.1	0.3	5.0	1.2	2.0	68
Gross annual value of crops consumed ($ per year)	110.9	0.0	806.6	146.1	52.7	68
Gross annual income from crop sales ($ per year)	90.7	0.0	923.3	158.1	33.1	68
Gross annual income from livestock sales, milk sales and sale of livestock products (skins and hides) ($ per year)	1,159.7	0.8	17,159.8	1,809.6	652.1	99
Gross annual value of livestock slaughtered($ per year)	185.4	22.8	1,491.4	229.3	114.1	50
Gross annual value of milk consumed ($ per year)	498.1	68.0	2,511.0	361.0	388.0	95
Gross annual value of livestock purchases ($ per year)	782.8	19.0	8,797.7	1,468.9	334.8	54
Number of active workers (people > 6 years not in school)	6.9	2.0	34.0	3.7	6.0	100
Annual gross income ($ per year)	3,204.7	237.1	19,168.7	2,743.3	2,340.0	100

[a]The descriptive statistics were calculated only for those households that were involved in a particular activity. However, for crop consumption and crop sales the descriptive statistics were calculated for all the households that had some land under crop cultivation irrespective of whether any harvest or income was derived from that activity

4.3.2.1 Livestock Returns

Maasai households in Kitengela keep cattle, sheep and goats; all respondents, with the exception of two households, owned livestock. On average, in July 2004 households owned 40 cattle and 86 sheep and goats ('shoats'). This translates to 42 tropical livestock units (TLU)[2] per household or 7.2 TLU per capita, although variation in herd sizes was high (Table A1).

[2]Tropical livestock units (TLU), arrived at by using the herd and flock weights described by Bekure et al. (1991) for Maasai livestock in Kajiado District. These were derived by multiplying the total cattle numbers per household by 0.72 and total small stock numbers by 0.17 (Grandin et al., 1988).

Virtually all households received an income from livestock (i.e. live animal sales, milk sales and sale of other livestock products such as skins, hides and manure). The total value of livestock production per household was ~US $1,934 in 2004 (a good year in which the long rains did not fail). This translates to ~US $36 per acre.

About 66% of gross livestock output was converted to cash income (mean gross annual income from sale of livestock and livestock products [milk, hides and skins] for these households was US $1,160), while 29% was consumed at home (Fig. 4.2).

In this study, we did not capture exchanges and thus these are not included. Livestock sales are a particularly important aspect of life in pastoral communities as these sales provide the mechanism and opportunity for pastoralists to integrate into the cash economy, allowing access to a variety of non-traditional products (e.g. tea, sugar, maize meal). Actual prices as reported by the households and average market prices were used to value sales and consumption.

Interestingly, milk and live animal sales were equally important, together accounting for roughly 60% of livestock-related income. The total value of milk consumed and sold (US $1,017) was almost double that of animals sold and slaughtered (US $663). Revenues from gifts received and from renting out animals to use for traction accounted for less than 5% of total gross revenues.

In recent years, due to in-migration and proximity to Nairobi, new land use and employment opportunities have opened up in Kitengela, especially with the development of the export processing zone (EPZ). Despite the fact that not many Maasai are directly employed in the EPZ, the influx of so many workers in the EPZ has increased the demand for livestock products, particularly milk and to a lesser extent beef. More milk is being produced and sold in response to this increased local demand, and in general women control the sales and income from milk.

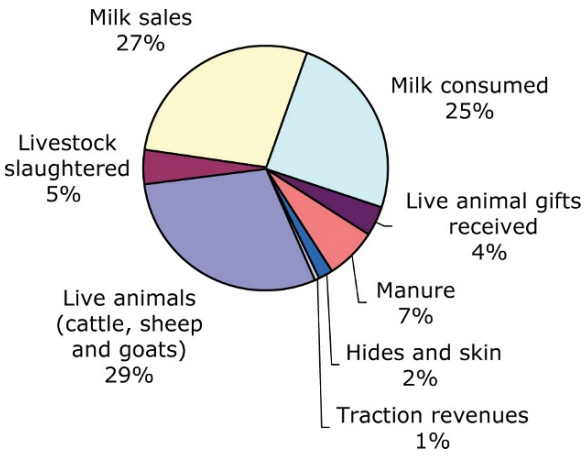

Fig. 4.2 Gross annual income from livestock activities

4.3.2.2 Livestock Input Costs

The average total annual livestock production cost per household was US $971 (Table 4.2). Across all households, livestock purchases, hired labour, livestock gifts given out and spraying were the main costs of livestock production and accounted for over 80% of the total livestock production cost. The cost of livestock production correlated significantly with herd size ($p < 0.01$).

Deducting direct livestock production costs from the annual gross output, average annual livestock net income was US $974 per household. However, 12% (21) of households had negative net livestock incomes in 2004.

4.3.2.3 Cropping Returns

Over the years, there has been increased cultivation in pastoral areas and in 2004, 68% of households interviewed in Kitengela engaged in some cultivation. Land under crops was relatively small; among the households cultivating, the average amount of land under cultivation was 2.1 acres, ranging from 0.25 acres to 5 acres per household. Crops grown in the area include maize, beans, potatoes, onions and vegetables, mainly for subsistence.

The proportion of households engaged in agriculture far outweighs the economic value of agriculture to the community as a whole. In 2004, the average gross annual value of agriculture for those households that succeeded in getting a harvest was just US $202,[3] of which 45% (US $90) was cash income from sales. This figure does not include the one in four households that had no harvest due to crop failure, revealing the precariousness of agriculture in this semi-arid region.

Table 4.2 Average annual livestock input costs (US$) per household and per tropical livestock units (TLU) ($n = 175$)

	Livestock input costs per household	Livestock input costs per TLU
De-worming	58.99	1.79
Spraying and dipping	122.89	4.29
Mineral and feed supplements	30.78	1.34
Vaccination	22.33	1.16
Curative drugs	17.41	0.74
Hired labour	172.53	4.73
Livestock purchases	429.41	10.18
Livestock gifts given out	116.77	4.01
Total expenditures	971.11	28.24

TLU tropical livestock units

[3] This only includes households that were cultivating, and it includes the value of crops consumed within the household plus income from crop sales.

4.3.2.4 Returns to Off-Land and Wildlife Conservation-Related Activities

More than 85% of households surveyed were involved in some kind of off-land income-generating activities. Off-farm income activities were grouped into three main categories: wages and salaries (received by 38% of households), business and petty trade (earned by 57% of household) and income from wildlife-related activities (received by just 14% of households) (Fig. 4.3).

Respondents were asked to indicate their off-land monthly income that corresponded to income ranges provided, so values of off-farm income are not precise but do give a good idea of the relative importance of these sources. Of the households receiving income from wildlife, the average annual income from this source was US $248, ranging from US $46 to US $571 per year. All the households that are receiving income from wildlife are participating in the lease program, which initially started in areas closer to the park. Income from wildlife for these households accounts for 7% of the total household income and 26% of the total off-farm income. The income is fairly distributed among these households, with 48% of the income earned by 42% of the households. Very few households are earning other tourism-related income (e.g. from work as tour guides, community scouts and selling crafts to tourists) (Nkedianye, personal observation).

4.3.3 Land Ownership and Distribution

Kitengela was one of the first areas in Maasailand where group ranches were subdivided into private land holdings. Since subdivision in the mid to late 1980s, land has continued to change hands and the process of land subdivision has had considerable implications for land use, distribution and access, with associated impacts on household economies and on wildlife.

The average amount of land owned by the households surveyed in 2004 was 137 acres, ranging from as low as 2 acres to as high as 870 acres. Forty-five per cent of

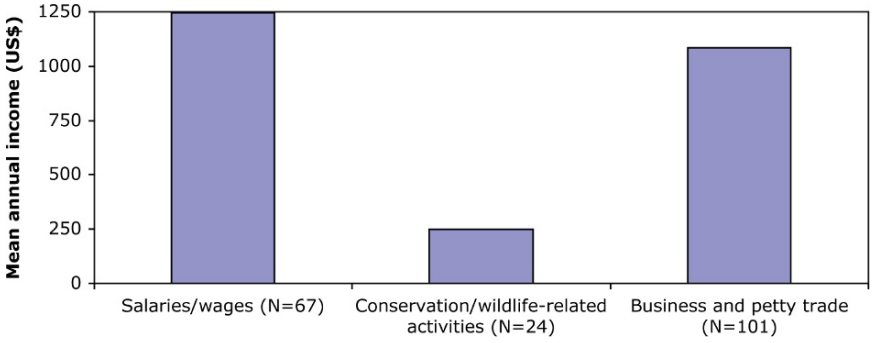

Fig. 4.3 Gross annual income from off-land income-generating activities (means include only those households that are involved in that activity)

Maasai households interviewed obtained their current land through the original group ranch subdivision, 44% through inheritance and 6% through land purchases. The average land size for households who acquired land through subdivision was much higher (179 acres) than the land sizes for those who acquired land through inheritance (118 acres) or purchases (28 acres).

Forty per cent of the households interviewed had sold some land in the past. Of those households that had sold land, the average area sold was 84 acres and ranged from as low as 5 acres to as high as 370 acres. The main reasons these households gave for selling their land included the desire to invest in other forms of enterprises, acquisition of capital for investment in productive assets (primarily livestock) or to meet significant household needs. Land sales started just before and proceeded quickly immediately after the group ranch subdivision occurred (Nkedianye, 2004) and is still continuing. These current average land holdings are much lower than the previous average land holdings in the same area reported in 1999, 2000 and 2003 (Mwangi and Warinda, 1999; Kristjanson et al., 2002; Nkedianye, 2004), particularly in areas nearer the park. This can be attributed in part to further land subdivision among household members through inheritance (e.g. to the sons and between/among co-wives) but probably also reflects continuing land sales (Nkedianye, personal observation), in many cases to non-Maasai who were not included in the surveys. For example, in a survey of 100 households in areas nearer NNP in 2003 (Nkedianye, 2004), the average amount of land owned per household was 150 acres and ranged from 4 acres to 1,216 acres.

Land prices varied widely, ranging from as low as Ksh 20,000 to as high as Ksh 500,000 per acre. The average land price per acre for the entire sample was Ksh 108,452. In Kitengela (as elsewhere), land prices are related to location. In order to examine the most important factors determining land prices across Kitengela, we used a spatial lag model to regress land price per acre[4] on a number of spatial variables. The results show that average pasture potential (Normalized Difference Vegetation Index, NDVI), population density, distance to NNP, distance to the nearest permanent water source, distance to the nearest market town and distance to the nearest primary school were all significant determinants of land price, able to explain 70% of the variation in land prices observed (results not shown, but available upon request from the authors).

Our results support the findings of previous studies. Mwangi and Warinda (1999) found that the average price of land in the area close to NNP was Ksh 157,813 per acre. In an earlier study involving only households in the first triangle (hence closer to the shopping centres and the tarmac road), Nkedianye (2004) found an average land price per acre of Ksh 188,400. Both these earlier studies found a strong relationship between the price of land and distance to the nearest tarmac road, NNP and trading centres with land located closer to these areas having significantly higher prices. Buyers want land situated next to shopping centres (for security and business opportunity reasons) and the tarmac where transportation is

[4] Each household was asked to estimate the current value of their landholdings. They gave a low-high range, and we used the average in the analysis.

much more reliable. Education, health, administrative and social amenities are also easily available near shopping centres. The sale of land in Kajiado after subdivision appears to have followed the 'boom and slump' pattern that Rutten observed earlier in Kajiado (Rutten, 1992). Among those who sold land, there was a significant positive correlation between the amount of the original land allocated and the amount of land sold; households that had more land allocated to them sold more land. Rutten observed a similar pattern in Olkinos with the exception of the wealthiest households (Rutten, 1992).

An examination of land versus herd values for each household highlights the major trade-off in herd-related versus land-related wealth. Households with larger herds and more livestock wealth tend to be living on less valuable land (farther from Nairobi), versus landowners living on extremely valuable land, that are more likely to be located nearer NNP and good roads but with smaller herds and generally lower livestock assets. A trend not seen in other pastoral areas may be emerging within this study area, where more wealth is being stored not just in cattle numbers but also in other forms. Many local Maasai are realizing how difficult it can be to keep large herds within a fast-shrinking grazing space, with multiple landowners and increasing mobility restrictions. More and more are investing in plots in the shopping centres, whether developed or undeveloped, with the hope of earning regular income that is less susceptible to droughts and other periodic shocks. The success of this trend is yet to be fully understood. However, the question of relationship between herd size and proximity to the park or shopping centres should be cautiously interpreted as means are likely to conceal large variations.

Twelve per cent of the respondents indicated that they were planning to sell land in the future. The main reason given by these households for these plans concerned the need for funds for educating their children. Other reasons cited included investing in housing in town (for renting), fencing and meeting other household needs such as wedding expenses for the sons and daughters. Increasing poverty levels are also likely to trigger the desire to sell land.

One of the trends that have most concerned conservationists and many pastoralists alike since the subdivision of land in Kitengela has been that of fencing larger plots of land. These fences keep livestock and wildlife away from the small plots cultivated by local residents. However, on a much larger scale they have also been used to define vast areas of land owned by absentee landlords and to discourage herds from accessing privately owned land. These fences block wildlife routes between refuge areas and have challenged traditional management of natural resources by limiting livestock movement and access to areas at critical times of the year.

Approximately 60% of the respondents in this survey had fenced off some portion of their land. Most of these households had fenced less than 10 acres of land. The major reasons cited for fencing were to keep wildlife away from the homesteads, in order to cultivate gardens and to reduce competition for grazing space, an indication of the human–wildlife conflicts predominant in this area. Fence types included barbed wire (most common), high tensile wire, traditional fence and the net wire. Thus fencing is an integral part of the shift in livelihood strategies towards a greater reliance on agriculture among the resident Maasai.

4.3.4 Livelihood Strategies

The results above demonstrate the degree to which the Maasai of Kitengela have highly diversified livelihood strategies. Cluster analysis revealed four distinct livelihood groups with relatively homogeneous households pursuing a similar mix of activities and with similar assets. These are as follows:

1. **Diversified agropastoralists.** Households in this group are entrepreneurial and highly diversified, earning their livelihoods in a variety of ways, including livestock production and trading, farming and business. This group has the highest gross annual income compared to other livelihood groups.
2. **Pastoralists with wildlife income**. This group represents more traditional pastoralists who are relatively successful, and include households signed up with the land leasing program that are benefiting in new ways from wildlife conservation.
3. **Marginal pastoralists**. This group includes pastoralists who are not doing well with their livestock, appear not to be succeeding at farming and have limited alternative sources of income. This group has the lowest gross annual income compared to other livelihood groups.
4. **Wage-earning agropastoralists**. Households in this group have a wage-earning member, are having some success at farming and depend much less upon livestock than the other groups.

The overall characteristics of each cluster are described in more detail in Box 4.1.

Box 4.1 Description of Livelihood Groups

Livelihood Group 1: Diversified Agropastoralists. This is the largest cluster with a total of 57 households or 32% of the total number of households surveyed. All households in this cluster earn some income from livestock production, crop cultivation, and from business and petty trade. Sixty-five per cent of households are also purchasing livestock. They have relatively large herds (with an average TLU of 49.4). This group receives the highest income from petty trade and business (US $1,077 per year on average), the highest average returns from crops and the highest value for crops consumed. Twenty-six per cent of these households have a wage or salary income, but for those that do, the value of that income is comparable to other clusters. Few households (11%) in this cluster receive income from wildlife conservation. This group also has the highest annual gross income (US $3,822 per year on average).

Livelihood Group 2: Pastoralists with Wildlife Income. This is the second largest cluster with 46 households, or 26% of the households surveyed. All households own livestock and derive the highest income from that livestock. The cluster is again characterized by households with relatively

(continued)

Box 4.1 (continued)

large herd sizes (49 TLU/household) and 85% of households purchase livestock. Twenty-six per cent of households (highest of all clusters) benefit from wildlife-related income, but the amount earned does not differ from households with wildlife income in other clusters. Nearly half the households in this group receive income from a wage or salary and/or from business or petty trade (43% and 46%, respectively) and in both cases the mean value is high compared to other groups. Despite the involvement in crop cultivation by some households in this cluster (30%), crop failure appears prevalent; no household harvested any crop in 2004.

Livelihood Group 3: Marginal Pastoralists. This is the smallest cluster containing 20% of the total households surveyed (36 households). This cluster is characterized by households with relatively small herds (32 TLU) and no livestock purchases. Livestock provide an income for 97% of households. However, this income is lower than in all other groups. Forty-two per cent of the households in this group are involved in crop cultivation, but their crop failed entirely in 2004. These households earn no income from wildlife, and have relatively low earnings from, petty trade or wages. This group also has the lowest annual gross income (US $2,162 per year on average).

Livelihood Group 4: Wage-Earning Agropastoralists. This is also a relatively small cluster with 38 households. Households in this cluster have the smallest herds (30 TLU), although they still gain a higher income from their livestock than the marginal pastoralists. Ninety-five per cent of households are involved in crop cultivation, all of which had a harvest in 2004 and 89% sold crops for cash. Seventy-one per cent of households in this cluster also have wage earnings, while none are involved in petty trade or business. Few households (17%) receive income from wildlife.

Figure 4.4 shows the spatial distribution of the livelihood groups. There does not appear to be a distinct spatial pattern to the different livelihood groups, that is, households living close to each other can be pursuing dissimilar livelihood strategies. This suggests that the biophysical environment/spatial location of a household is not the main driving force behind choice of livelihood strategy in this area. This is further explored in the multinomial logistic regression analysis.

A description of the household characteristics found in each livelihood group (means, median and standard deviation and the proportion of households in each cluster involved in each of the activities) is presented in Table 4.3. While there appear to be differences between the clusters in terms of the values of each activity, variance was sufficiently high within clusters that the only significant difference found was with respect to total annual gross income – Average total gross annual income was significantly higher for the ‘Diversified Agropastoralists’ cluster

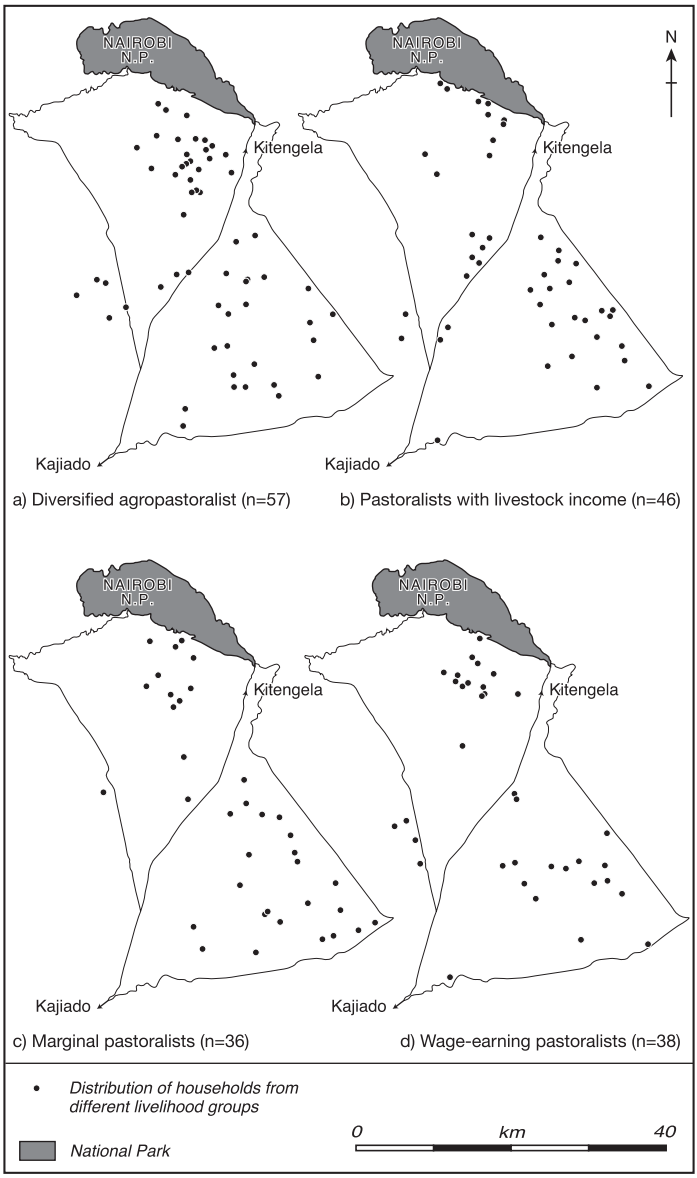

Fig. 4.4 Spatial distribution of sampled households from different livelihood groups

compared to the 'Marginal Pastoralist' cluster. For the rest of the clustering variables the differences in means across livelihood groups were not significantly different. Thus, with the exception of the two extremes, our findings suggest that a household's *livelihood strategy* does not appear to relate to *how well* it is doing in terms of overall income.

Table 4.3 Descriptive statistics of households by cluster

	Diversified agropastoralists (n = 57)			Pastoralists with wildlife income (n = 46)			Marginal agropastoralists (n = 36)			Wage-earning agropastoralists (n = 38)		
	Mean (SD)	Median	Per cent of hh	Mean (SD)	Median	Per cent of hh	Mean (SD)	Median	Per cent of hh	Mean (SD)	Median	Per cent of hh
Numer of tropical livestock units[a]	49(52)	31	100	49(60)	24	100	32(54)	14	97	30(32)	17	97
Total number of off-land income-earning activities	2 (1)	2	100	2 (1)	2	89	1 (1)	1	78	2 (1)	1	80
Annual income from salaries/wages ($ per year)	1,357 (1,069)	951	26	1,348 (1,261)	761	43	774 (951)	381	17	1,212 (1,177)	761	71
Annual income from conservation/wildlife-related activities ($ per year)	217 (197)	152	11	262 (124)	219	26	0 (0)	0	0	251 (99)	245	17
Area under lowland rainfed cultivation (acres)	2 (1)	2	100	3 (2)	2	30	2 (1)	2	42	2 (1)	2	95
Gross annual value of crops consumed ($ per year)	153 (162)	102	98	0 (0)	0	30	0 (0)	0	42	136 (136)	89	95
Gross annual income from crop sales ($ per year)	131 (180)	74	98	0 (0)	0	30	0 (0)	0	42	102 (158)	63	89
Gross annual income from livestock sales, milk sales and sale of livestock products (skins and hides) ($ per year)	1,240 (1,424)	720	100	1,477 (2,617)	886	100	769 (1,118)	372	97	1,011 (1,620)	518	97

Gross annual value of livestock slaughtered ($ per year)	213 (276)	121	56	183 (195)	114	63	195 (243)	152	25	138 (191)	95	50
Gross annual value of milk consumed ($ per year)	574 (406)	428	95	475 (279)	388	98	522 (444)	388	92	395 (272)	320	97
Gross annual value of livestock purchases ($ per year)	714 (1,105)	381	65	818 (1,906)	254	85	0 (0)	0	0	841 (1,092)	377	53
Gross annual income from business and petty trade ($ per year)	1,077 (1,100)	761	100	1,295 (1,119)	856	46	910 (842)	761	64	0 (0)	0	0
Number of active workers (people > 6 years not in school)	6 (2)	7	100	7 (4)	6	98	7 (5)	6	100	8 (4)	7	100
Total gross annual income ($ per year)	3,822 (2,430)	3,181	100	3,563 (3,367)	2,641	100	2,162 (2,070)	1,588	100	2,834 (2,661)	2,058	100

hh household

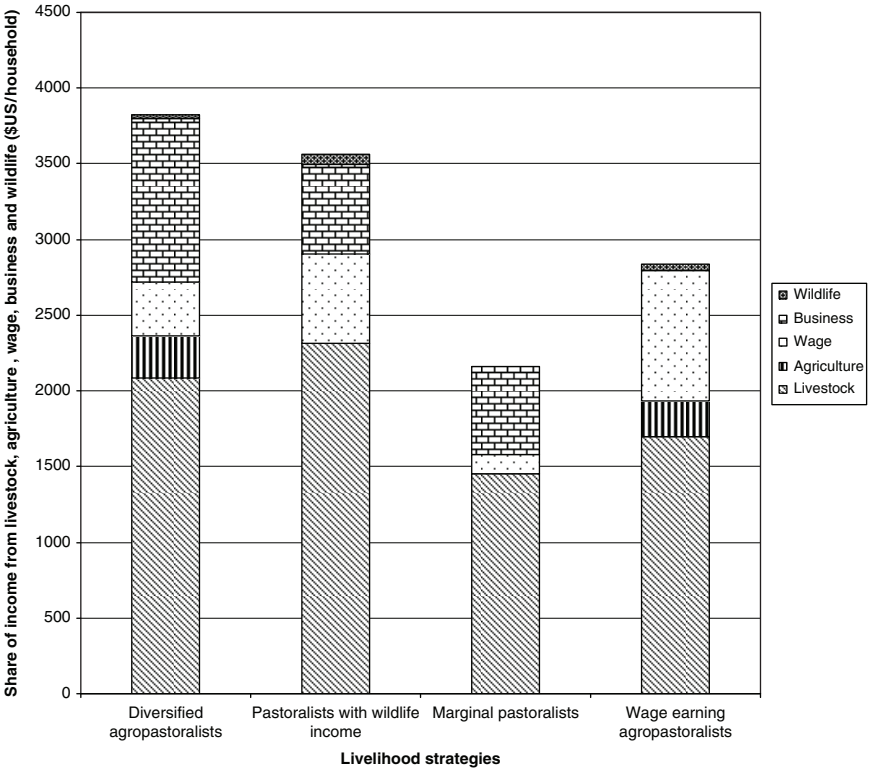

Fig. 4.5 Income sources in levels by livelihood strategy

Figure 4.5 shows the contribution of livestock, agriculture and off-farm income (wage, business and wildlife income) to overall annual gross household income across livelihood groups. While there are differences between the groups, it is striking how narrow the differences appear to be. Livestock still makes up the majority of income for all four groups, ranging from 55% to 67% of total income. The contribution of off-farm income is substantial for all groups, ranging from 32% to 38% of total income. Income from business and petty trade is substantial for all but the wage-earning agropastoral group, ranging from 17% to 28% of total household income. Households earning wildlife conservation income are doing almost as well as the diversified agropastoral group; however, wildlife-related revenues still account for less than 3% of total gross income across all households in the wildlife income cluster because not all households were receiving this income. Income from agriculture accounted for less than 10% of total household income for households from the two agropastoral clusters.

We found no significant difference in age of household head across the livelihood strategies, in average household size across livelihood groups or in levels of education.

The results of the multinomial logistic regression that examined what factors in particular appear to be driving each livelihood cluster (Table A3 in the Appendix) did

not add appreciably to our understanding of why Maasai are choosing different livelihood strategies. Taking the pastoralist households with wildlife income cluster as the reference point, the analysis suggested that an increase in herd size decreases the likelihood of a household being engaged in both agriculture and wage-earning activities. Households with more labour are more likely to be pastoralists than agropastoralists. And more marginalised, poorer households are likely to be found further from village centres and a permanent water source. It is striking that social and geographical factors played little part in determining what livelihood strategies a household pursued.

4.3.4.1 Land and Livelihoods

Table 4.4 shows the average land holdings for the different livelihood groups and also compares the average amount of land originally allocated to that currently owned.

There were slight variations in average land holdings across livelihood group, ranging from 119 acres for the 'Wage-earning Agropastoralists' to 156 acres for the 'Marginal Pastoralists', but the differences in mean current land holdings across livelihood clusters were not statistically significant.

Across all livelihood groups, *landholdings have fallen by 46–73% since the land was originally subdivided in the late 1980s.* The average amount of land sold per household ranged from 54 acres for diversified agropastoralists to 114 acres for the pastoralists with wildlife income. Marginal pastoralists in particular have sold a lot of land – going from a mean of 571 acres to a mean of 155 acres. These are the poorest households, but they had the largest amount of land originally and land holdings are now the same as everyone else. Unfortunately we did not explore the reasons for these sales by poor households in particular, but this is an important issue that should be further explored.

In conclusion, our data show little in the way of clear patterns between what a household does, defined statistically on the basis of absence or presence of specific activities and socio-economic or geographical factors associated with that household. We can describe the broad range of activities that households are involved in, but we cannot, at this level, predict which households are more or less likely to be found involved in specific activities, except, to some small extent, on the basis of size of their livestock holdings. While pastoralists can be grouped according to *what* they are doing at any moment in time, the reasons explaining why a household has chosen or been forced to be involved in any particular activity are many and complex.

Table 4.4 Average land holdings (in acres) by livelihood group

	Current land holding (acres)			Original allocation (acres)		
Livelihood group	Mean	SD	Median	Mean	SD	Median
Diversified agropastoralists	133.6	99.2	100	267.9	365.2	170
Pastoralists with wildlife income	143.2	156.0	100	399.2	532.8	215
Marginal pastoralists	155.6	182.9	100	571.1	745.2	240
Wage-earning agropastoralists	119.0	111.9	60	219.8	158.5	200
Total	137.4	136.8	100	348.7	489.6	200

4.3.5 Determinants of Household Income

The cluster analysis and the multinomial logistic regression have addressed our research questions regarding what livelihood strategies households are pursuing across Kitengela. This section addresses the question 'which factors help explain the observed variation in household income levels/earnings and wealth and what is the relative importance to earnings and wealth of spatial versus household level factors?'

In order to explore the major factors that help to explain variation in income levels across households, several OLS regression models were run, using annual gross income, livestock income, crop income and off-farm income and a wealth proxy, livestock herd value, as dependent variables.

The explanatory variables (described in Table A1) were sometimes used interchangeably and in different forms (categorical and continuous). The natural log transformations of some of the variables improved their distribution tremendously to near normal distribution. These included the dependent variables and a few of the explanatory variables. All models were corrected for spatial autocorrelation and heteroskedasticity where relevant (see Appendix, Table A2). Table A2 summarizes the diagnostics for spatial dependence for all the models. Where the OLS model had problems of heteroskedasticity (based on the Breusch–Pagan test for heteroskedasticity), despite using the logarithmic functional form of the dependent variable, heteroskedasticity-robust standard errors were used to construct heteroskedasticity-robust *t* statistics. Table 4.5 gives a summary of the results of the analysis of the determinants of annual gross income, livestock income, off-farm income and crop income and livestock herd value. Detailed results of this analysis are described in Table A4.

4.3.5.1 Determinants of Overall Income

Turning to the analysis of the factors influencing overall income levels, Table A4 shows the results of the best performing OLS model with natural log of annual gross income as the dependent variable. The model was tested for spatial dependence, with the results indicating no evidence of spatial lag or spatial autocorrelation in the error terms. The Moran's I and the Robust Lagrange multiplier tests are not significant, supporting the null hypothesis of no spatial dependence. The explanatory power of the OLS model was relatively high with an adjusted R^2 of 0.65.

Not surprisingly, herd size (TLU) was the principal factor explaining variation in levels of annual net income. Log of TLU was highly significant and positive, and herd size alone explained 57% of the variation in overall gross income levels. The parameter estimate for TLU suggests that an increase of TLU by 10% (e.g. an additional four TLUs from an average TLU per household of 42) would correspond to an increase in annual net income of 5%.

Diversification of household income sources, measured as the number of income earning activities pursued (other than livestock or agriculture), was another

Table 4.5 Determinants of annual gross income, other income (off-farm and crop income) and livestock wealth

Dependent variable	Ln gross annual income OLS model	Other income (gross annual crop and off-farm income) (spatial error model)	Ln value of livestock assets (spatial lag model)
Household factors			
Age	ns (−)	n.s (+)	ns (+)
Years of education	*** (+)	*** (+)	*** (+)
Leadership	ns (−)	ns (−)	ns (−)
No. of workers	ns (+)	ns (+)	** (+)
Log of land size	ns (+)	ns (−)	** (+)
Log of TLU	*** (+)	*** (+)	na
No. of off-land activities	*** (+)	*** (+)	ns (+)
Acres under crop cultivation	ns (+)	ns (+)	ns (−)
Spatial factors			
Distance to primary school	ns (+)	ns (−)	ns (+)
Distance to town	** (+)	** (+)	* (−)
Distance to water	ns (−)	ns (+)	ns (+)
Distance to park	ns (+)	ns (−)	** (+)
NDVI average	*** (−)	ns (−)	ns (+)
Observations	173	174	174
Adjusted R^2 (OLS)	0.65		
Variance ratio (spatial lag/error)		0.41	0.21

*$p < 0.1$; **$p < 0.05$; ***$p < 0.001$*na* not applicable, *ns* not significant, *OLS* ordinary least square, *NDVI* normalized difference vegetation index, *TLU* tropical livestock units

significant household variable influencing how well households in this area are doing. Together with TLU, 60% of the observed variation in gross income across Kitengela households can be explained. Increasing the total number of off-land activities by one, from a mean of 1.4 per household, would increase annual net income by 16%.

Education of the household head was also significant with the expected sign. An additional year of education of the household head increases net income by 2.8%.

Only two spatial factors (distance to the nearest livestock market town and NDVI) showed up as significant in terms of explaining variation in overall incomes across households, increasing the explanatory power of the model to 68%. However, both had the opposite sign to that expected. NDVI was negatively correlated with gross income. Counter-intuitively, this suggests that households living in areas with higher NDVI (a greenness, or pasture potential indicator) are associated with lower gross incomes. Distance to the nearest livestock market town was significant and positively correlated with annual gross income, thus households farther away from markets (in more remote areas) are associated with higher gross incomes.

Although the context of these results differs from those of other studies in northern Kenya where land ownership is communal or under group ranches, our findings are consistent with the pattern seen elsewhere in which the poorest households tend

to migrate towards towns and cities in search of labour markets. In Kitengela, all households we sampled have some privately owned land, and wealthy and poor alike are to some extent scattered across the whole landscape, hence the weakness of the correlation.

While this analysis suggests that spatial factors are not important factors influencing well-being at the household level, Kristjanson et al. (2005) found that pasture potential, livestock density, distance to a livestock market town, road density, access to education, access to security, soil fertility and agricultural potential were important spatial factors at the mesolevel, influencing poverty rates throughout Kajiado District when measured as the proportion of the population falling below the rural poverty line within each sublocation (the fifth-level administrative unit in Kenya).

Our results suggest that more than half of the variation in gross income levels (60%) across these Kitengela households can be explained by household level factors alone, including livestock assets (TLUs), education level of the household head and extent of diversification (i.e. number of off-land activities being pursued).

4.3.5.2 Determinants of Livestock Income

We ran similar regression analyses on livestock incomes to see if the driving factors differed significantly[5] (Table 4.5 and Table A5). Not surprisingly, the results show that herd size (in TLU) alone is able to explain over half (52%) of the variation in livestock income. Households with larger herds still earn significantly more than households with smaller herds of livestock. The results suggest that a 10% increase in TLU per household (e.g. of 4 TLUs from the average TLU per household of 42) would increase livestock returns by 7.5%. Of the spatial variables, distance to the nearest permanent water source was marginally significant ($p < 0.1$) and negatively correlated with livestock returns, implying that households located closer to water points earn more from livestock than those living farther from permanent water sources.

Other spatial variables, such as distance to the nearest livestock market town and pasture potential (NDVI), did not significantly influence livestock returns in this area. However, compared to more remote pastoral areas such as those found in other pastoral areas described in this volume, no households in Kitengela are located more than a day's walk to a livestock market, rainfall and soil variability does not vary hugely across the area studied and the livestock are still being grazed in areas other than their own land, so perhaps it is not surprising that these factors are not significant at the household level.

4.3.5.3 Determinants of Off-Land, Crop and Wildlife Conservation Income

We next explored what factors are driving returns to activities other than livestock, including crops, off-land and wildlife conservation activities (Table 4.5 and Table

[5]Gross returns from animal, milk and other animal product sales; these results are not shown here, but are available on request from the authors.

A5). A spatial error model was estimated due to the evidence of the existence of this type of spatial autocorrelation (as seen in the significance of the Moran's *I* statistic in Table A2). The results are very similar to the gross income analysis, showing positive and significant relationship between years of education, herd size (TLU) and number of off-land activities. The fact that larger herds also mean higher off-land income suggests that livestock and milk sales help households pursue other opportunities (e.g. purchasing rental properties in town); this is confirmed by observations by Nkedianye (2004).

Once again, the spatial variables are largely nonsignificant or the opposite sign to that expected. For example, one might expect less remote households to have better access to off-land opportunities and thus more income from other sources, but our analysis does not support this. Thus the observed trend elsewhere, where pastoralists move close to towns seeking higher income earning opportunities, does not appear to be happening in Kitengela, where people are earning income from rental properties, livestock trading and salaried jobs while still living in their original households outside of town.

4.3.5.4 Determinants of Livestock Wealth

Given that incomes in this region vary considerably from year-to-year, depending on the timing and amount of rainfall, we also looked at the impact of spatial versus household factors on livestock asset wealth, which arguably does not vary as much.

Looking at the explanatory factors behind household livestock asset wealth (Table 4.5), household and spatial factors explain just 21% of the variation across households (i.e. as with incomes, we see huge variation). Land size and household labour now shows up as positive and significant, along with years of education of the household head. So larger, more educated households with more land appear to have an advantage when it comes to accumulating livestock assets.

With respect to spatial determinants of livestock wealth, our results show that households living closer to livestock market towns tend to be wealthier, along with those that are living farther away from NNP.

4.4 Conclusions

Given the pace and extent of change that is occurring in areas such as Kitengela, the range of livelihood strategies that households are now pursuing, and how well they are doing, is critical and timely information for community members and their organizations as well as those that seek to assist them (local and national policymakers, development agencies, etc.). While unique in its proximity to Nairobi, nevertheless Kitengela is an area where lessons can be learned, as the trends in system intensification, diversification and increases in population pressure seen here may be echoed in future years in other pastoral areas. This information can

contribute to more evidence-based decision making occurring across pastoral areas and inform policy decisions regarding land-use policies in drylands, conservation of wildlife and poverty reduction strategies.

The cluster analysis we undertook to see what kind of livelihood groupings exist found no real association between what people are doing (i.e. the livelihood clusters) and how well they were doing, essentially because of large variation still occurring within the clusters. On the contrary, our four livelihood clusters are a good indication of the different directions that these households are headed and represent quite different strategies as they cope with their highly variable environment.

Despite these differences in livelihood strategies, herd size remains the most important factor explaining variation in overall incomes. In fact, just three household characteristics help explain more than half of the variation in gross income levels across Kitengela: livestock asset levels, education level and diversification of income sources.

Diversification in terms of the total number of off-land activities is an important determinant of overall incomes as well as crop and off-land income; however, our results indicate that there is considerable variation found within our three categories of off-farm income sources. Households with more educated household heads have higher gross incomes. The age of the household head is also an important determinant of off-farm income, with younger households having higher off-farm incomes. Despite the importance of land size in determining per capita TLU, amount of land owned is not important in explaining variation in income levels from the different sources, including gross annual income. Indeed, the cluster with the largest land holdings (marginal agropastoralists) is associated with the lowest income and levels of livelihood diversification.

We found that location largely determines land prices: 70% of the variation in land prices can be explained by four spatial variables – distance to the nearest livestock market town, permanent water source, NNP and pasture potential, or NDVI. While NDVI cannot be influenced by policy, investments in infrastructure and services can influence the other factors, so these findings and their policy implications are important for several reasons.

Better information regarding land prices, sales and fencing trends can empower community-based organizations such as KILA and others to pursue more transparent negotiations with district and national officials on land policy (as is now happening with the Ministry of Lands working closely with KILA and the local council towards the formulation of a new local land policy that specifies urban vs wildlife and livestock areas, for example). At present the lease payments are welcome but the data suggest that they are not yet at a scale to make a sustainable difference. Timing of the payments is clearly important in relation to schooling, and this potentially could contribute to greater opportunity for households earning off-land income in the long run.

Policymakers need to know that earnings from livestock are still key in terms of overall household earnings despite the rapid economic and social changes the Maasai in Kitengela have been experiencing in recent years. One-half of the

cattle are owned by the 20% of households with the highest overall incomes. Households with larger herds not only have more overall net income but also have more livestock and off-land income, suggesting that livestock/herd size may be driving diversification strategies in some cases (this is a complex relationship, working both ways, since income from off-land is also used to purchase and sustain livestock). These higher income households also tend to be the ones educating their children past primary school, so they have improved employment opportunities (Nkedianye, 2004; Cochrane et al., 2005). This runs counter to conventional wisdom about pastoral families, that is, a picture of large, uneducated households with huge herds but not much income, and points to the difference that education is already starting to make in this area relatively close to the city. It suggests that investments in education beyond primary school have potentially high payoffs in this and other pastoral areas and would not automatically signal the end of pastoralism.

Sales from milk provide roughly a third of household income in a good rainfall year. Income from milk is controlled by women, with most spent at the household level presenting a window of financial flexibility for Maasai women. This simple fact has a huge policy implication. Interventions and policies that assist women in improving their earnings from milk have potentially large poverty impacts at the household level. For example, marketing of milk is currently very disorganized, so training and technical assistance in milk handling, marketing and management skills, for example, through women's groups could be very beneficial.

Diversification through cropping still appears a quite precarious option, with many households not getting a harvest even in a year considered to be a 'good rainfall year' (Kristjanson et al., 2002). While very few households are yet receiving wildlife conservation-related income, for those that are, it is a more lucrative option than the current yields from cropping from which very few are earning positive returns and which is the main driving force for fencing land among resident communities. The potential income from the lease program is large, if it was extended to all landowners in the area. On average, a family owning 137 acres would earn at least Ksh 39,000 (US $600) annually if all their land was under the lease program (less than 7 acres under settlement and cropping). To date, however, while providing significant benefits to households that are signed up, the waiting list to join this program remains large.

Wildlife conservation efforts in Kitengela are now being locally driven, which will be key to their sustainability. Unique within Kenya is a new pastoral community-led land-planning process underway that explicitly recognizes the risk that if wildlife conservation efforts fail, the local benefits from wildlife-based tourism will disappear. Besides the economic incentives, there is a fairly widespread view in the study area that the open space is good not just for the wildlife but also for the livestock, and hence the local livelihoods and a less complicated future for the Maasai. There is a feeling that the rate at which the outsiders have increased in the area will continue to be detrimental to the interests of the local people. Local people are increasingly supporting these efforts as they now recognize that wildlife conservation benefits can be quite lucrative relative to other options (Nkedianye, 2004). The

view is also tied with the local people's future expectations, to promote open space for the livestock that form the backbone of their economy.

There is an emerging recognition throughout Kitengela of the need to pay joint attention to livestock and wildlife in order to enhance tourism potential and returns from wildlife conservation efforts. The KILA and other landowners' groups, FoNNaP, Kenya Wildlife Service (KWS), National Environmental Management Authority (NEMA) and the local Olkejuado County Council have been jointly developing a land-use plan with the local community and the Ministry of Lands (called the Greater Kitengela Master Plan). This plan will designate grazing areas where wildlife and livestock can interact, limit the sprawl and density of settlements, protect riverine vegetation, set rules limiting land sales and limit development on critical wildlife migration routes. Researchers have played a key role in facilitating mapping of resources and fences in the area (key to the land-use planning discussions) and training community members so that they can update these maps themselves. A challenge remains, however, in engaging absentee landowners who have erected fences in the negotiations to keep wildlife routes open. Community-led interactions with policymakers and researchers will undoubtedly result in valuable lessons and insights for other pastoral communities facing similar challenges.

Pastoral communities such as those found in Kitengela are rapidly adjusting their livelihood strategies to cope with vast changes in their environment. Providing information to help them understand, adapt and cope is something important that researchers and others can do, as it is the communities themselves that must negotiate the new and more evidence-based land, agricultural, wildlife conservation and other policies that will improve their levels of well being sustainably over the long run.

This kind of information has been, and will continue to be, shared with community members and local and national policymakers, as it can contribute to a better understanding of the huge trade-offs that these households are facing, and the information they require as they struggle to adjust their livelihood strategies to cope with widespread and rapid socioeconomic changes. A recent study of information needs of local to national policymakers in Maasai areas shows that a wide range of desired information on agriculture, natural resource management, wildlife and livestock issues is simply not reaching them (Herrero et al., 2003), so making the kind of information generated in this study accessible and available to these policymakers will be important.

Ideally, we would have had time series data to examine drivers of household income and well being instead of a few cross-sectional studies over a relatively short time period. During this short period, however, these communities have been, and continue to be, faced with huge and rapid socioeconomic and political changes, and more and better information regarding livelihood options and trade-offs will assist them in dealing with these changes. When we started out, we were not really sure what the incorporation of spatial variables would add to the traditional analysis that focuses on household-level factors (and concludes, for example, that education is important), so this has been a learning process, and one upon which we can continue to build so that future analyses will have access to such time series data.

Appendix

Table A1 Description of the variables used in the regression analysis

Variable	Variable description	*N*	Mean	SD	Min	Max
Dependent variables						
Table 4.3Annual gross income	Derived as an aggregate value annual income from livestock, crops and off-farm	177	3,205	2,743	237	19,169
Natural log of annual gross income	Natural log of annual gross income	177	7.8	0.8	5.5	9.9
Annual gross crop income	Aggregate annual value of crops consumed within the household and crops sold by the household ($ per year) and includes mainly maize, beans, onions and tomatoes	177	140	252	0	1,568
Log of annual gross crop income	Natural log of annual gross crop income	177	2.6	2.6	0	7.4
Annual gross livestock income	Aggregate annual value of livestock and all the livestock by-products (milk, manure, hides and skin) sold and consumed by the household as well as the value the value of livestock gifts received by the household and revenues from traction and any other livestock or their products	177	1,934	2,140	0	19,169
Log of annual gross livestock income	Natural log of annual gross livestock income	177	7.1	1.2	0	9.9
Annual off-farm income	Aggregate value of annual household income from wage, business and petty trade, and income from wildlife (see Table A.1 for details)	177	1,131	1,218	0	6,056
Log of annual off-farm income	Natural log of annual off-farm income	177	5.9	2.4	0	8.7
Age	The age of the household head in years	176	–	–	–	–
Years of education	Number of years of formal schooling up to the highest level of education attained by the household head	177	6.1	5.2	0	16.0
Leadership	Leadership in terms of influencing decision making or access to resources, where 0 – no influence and 1 – influence)	177	–	–	–	–
Cluster	The different livelihood strategies households are pursuing in Kitengela derived from the cluster analysis in Sect. 4.1. We grouped these into four livelihood strategies in Kitengela and each household belongs to one of these groups	177	–	–	–	–

(continued)

Table A1 (continued)

Variable	Variable description	*N*	Mean	SD	Min	Max
NDVI average	The Normalized Difference Vegetation Index (NDVI) provides a measure of the amount and vigour of vegetation on the land surface. The magnitude of NDVI is related to the level of photosynthetic activity in the observed vegetation. Higher values of NDVI indicate greater vigour and amounts of vegetation. The calculation of the average NDVI variables (mean, standard deviation and coefficient of variation) for each household was derived using the spatial analysis facilities in WinDisp, using the Global Positioning System (GPS) coordinates for each household. We used the average NDVI data from 1984 to 2004	176	0.4	0.0	0.3	0.4
NDVI coefficient of variation (%)		176	13.0	1.6	7.4	16.8
Distance to road (km)	Refers to the nearest distance to all-weather road in kilometre. The major roads used for Kitengela were Nairobi-Namanga road, Isinya-Kiserian-Ngong road, and Magadi-Ngong road. Using a buffer map developed in ArcGIS and later overlay point map and the buffer in ERDAS. Using the GPS coordinates, the nearest distance of each household to the road was calculated. The modelling was performed in ArcGIS	176	9.4	6.1	0	27.1
Distance to primary school (km)	The distance to the nearest primary school was based on the data collected by ILRI–SNV project in 2002. We used all the primary schools in Kajiado District. We used the NEAR function with the option points	176	3.6	2.0	0.2	8.3
Distance to water (km)	Distance to the nearest permanent water source in kilometre	176	2.4	1.9	0.1	9.6
Distance to park (km)	Distance to the Nairobi National Park (NNP), the NEAR function was used to calculate the distance of household to the NNP.	176	19.7	11.6	0.4	43.0

Distance to town (km)	The shortest distance to major towns were based on a number of major towns; Ngong, Kiserian, Ongata Rongai, Kitengela, Isinya, and Kajiado. We used the function NEAR with options point to calculate the nearest distance to towns from the household	176	12.6	6.4	2.1	30.4
Years of residence	The number of years a household has been living within the Kitengela study area	176	24	14	1	79
Acres under crop cultivation	Land under crop agriculture/cultivation in acres	177	1.4	1.4	0	5.0
No. of workers	Derived as the total number of adults and children over 5 years of age living within a household	177	6.9	3.7	2	34.0
No. of off-land activities	Total number of off-land income-earning activities a household is pursuing, for example, trading in livestock, wage employment and retail shops	177	1.4	0.9	0	5.0
Total livestock TLU	The tropical livestock units (TLU) were arrived at using the herd and flock characteristics described by Bekure et al (1991) for Maasai livestock in Kajiado District. These were derived by multiplying the total cattle numbers per household by 0.72 and total small stock numbers by 0.17 (Grandin et al, 1988)	177	41	51	0	309
Log of TLU	Natural log of TLU	177	3.2	1.1	0	5.7
TLU per adult unit	Derived as the total of TLU divided by the total number of adult unit (AU). The definition of AU is based on human nutritional requirements for different age/sex classes as described by Little (1980) as adult male = 1, adult female = 0.86, children 0–5 = 0.52, children 6–10 = 0.85, male child 11–15 = 0.96, female child 11–15 = 0.86	177	7.1	8.9	0	51.7
Log of TLU per adult unit	Natural log of TLU per adult equivalent	177	1.7	0.8	0	4.0
Land size	Total amount of land owned by the household in acres within the Kitengela wildlife dispersal area	176	137	137	2	870
Log of land size	Natural log of land size	176	4.5	1.1	0.7	6.8

Table A2 Diagnostics for spatial dependence

	Gross income		Other income		Livestock wealth	
Dependent variables	Statistic	*p*-value	Statistic	*p*-value	Statistic	*p*-value
Spatial error						
Moran's *I*	−0.311	1.245	2.030	0.042	2.201	0.028
Lagrange multiplier	0.918	0.338	1.589	0.207	2.086	0.149
Robust Lagrange multiplier	0.062	0.803	0.365	0.546	5.606	0.018
Spatial lag						
Lagrange multiplier	1.386	0.239	1.231	0.267	4.625	0.032
Robust Lagrange multiplier	0.530	0.467	0.007	0.934	8.145	0.004

Table A3 Results of the multinomial logistic regression

Livelihood group	Coef.	SE	$p > \|z\|$	Odds ratio
Diversified agropastoralists				
Intercept	8.48	5.94	0.154	4,827
Household factors				
Age	−0.00	0.02	0.861	0.996
Years of education	−0.00	0.06	0.994	1.000
Leadership	0.87	0.74	0.239	2.380
No. of workers	−0.22	0.09	0.010	0.801
Log of land size	0.14	0.25	0.568	1.154
Log of TLU	−0.03	0.25	0.911	0.973
No. of off-land activities	0.03	0.28	0.918	1.030
Acres under crop cultivation	0.89	0.22	0.000	2.432
Spatial factors				
Distance to primary school	−0.23	0.16	0.146	0.792
Distance to town (km)	−0.08	0.05	0.125	0.927
Distance to water	0.26	0.16	0.108	1.296
Distance to park (km)	0.02	0.03	0.426	1.023
NDVI average	−21.79	15.26	0.153	0.000
Marginal agropastoralists				
Intercept	4.92	5.17	0.341	137
Household factors				
Age	0.01	0.02	0.767	1.007
Years of education	−0.04	0.07	0.584	0.965
Leadership	0.30	0.80	0.712	1.345
No. of workers	0.04	0.08	0.596	1.046
Log of land size	−0.13	0.27	0.638	0.880
Log of TLU	−0.41	0.28	0.145	0.663
No. of off-land activities	−0.52	0.33	0.113	0.592
Acres under crop cultivation	−0.09	0.27	0.744	0.914
Spatial factors				
Distance to primary school	−0.51	0.17	0.003	0.601
Distance to town (km)	0.06	0.06	0.303	1.062
Distance to water	0.43	0.17	0.012	1.538
Distance to park (km)	0.02	0.04	0.518	1.023
NDVI average	−9.90	13.29	0.456	0.000
Wage-earning agropastoralists				
Intercept	12.21	6.25	0.051	200,406
Household factors				

(continued)

Table A3 (continued)

Livelihood group	Coef.	SE	$p > \|z\|$	Odds ratio
Age	−0.00	0.02	0.987	1.000
Years of education	0.01	0.06	0.833	1.013
Leadership	0.79	0.76	0.300	2.204
No. of workers	0.00	0.07	0.964	1.003
Log of land size	−0.29	0.27	0.276	0.746
Log of TLU	−0.57	0.28	0.046	0.567
No. of off-land activities	−0.63	0.32	0.046	0.532
Acres under crop cultivation	0.85	0.23	0.000	2.338
Spatial factors				
Distance to primary school	−0.22	0.17	0.200	0.801
Distance to town (km)	−0.05	0.05	0.346	0.952
Distance to water	0.15	0.17	0.383	1.162
Distance to park (km)	0.05	0.03	0.104	1.053
NDVI average	−27.18	16.00	0.089	0.000
Observations	173			
Pseudo R^2	0.20			
Log likelihood	−188.90			
LR χ^2 (39)	94.73			
Prob > χ^2	0.000			

Table A4 Determinants of annual gross income

	Ln annual gross income OLS model		
Dependent variable	Coef.	SE	$p > \|t\|$
Intercept	7.42	0.81	0.000
Household factors			
Age	−0.00	0.00	0.748
Years of education	0.03	0.01	0.002
Leadership	−0.13	0.11	0.235
No. of workers	0.01	0.01	0.301
Log of land size	0.04	0.04	0.293
Log of TLU	0.50	0.04	0.000
No. of off-land activities	0.15	0.04	0.000
Acres under crop cultivation	0.01	0.03	0.626
Spatial factors			
Distance to primary school	0.01	0.02	0.553
Distance to livestock market	0.02	0.01	0.015
Distance to water	−0.01	0.02	0.521
Distance to park	0.00	0.00	0.678
NDVI average	−5.99	2.08	0.005
Observations	173		
R^2	0.68		
Adjusted R^2	0.65		

Table A5 Determinants of other income (crop and off-farm income) and livestock wealth

	Other income (gross annual crop and off-farm income) spatial error model			Ln value of livestock assets spatial lag model		
Dependent variable	Coef.	SE	$p > \|t\|$	Coef.	SE	$p > \|t\|$
Intercept	−280.60	1,830.70	0.878	4.05	2.16	0.060
Household factors						
Age	0.92	6.39	0.885	0.00	0.01	0.529
Years of education	77.21	18.50	0.000	0.06	0.02	0.005
Leadership	−12.87	237.81	0.957	−0.12	0.28	0.681
No. of workers	31.25	23.35	0.181	0.07	0.03	0.010
Log of land size	−26.41	80.77	0.744	0.24	0.09	0.011
Log of TLU	339.44	81.77	0.000			
No. of off-land activities	495.21	88.84	0.000	0.13	0.10	0.208
Acres under crop cultivation	61.17	56.99	0.283	−0.01	0.07	0.829
Spatial factors						
Distance to primary school	−61.62	52.28	0.239	0.00	0.06	0.978
Distance to livestock market	34.26	17.42	0.049	−0.03	0.02	0.056
Distance to road						
Distance to water	48.50	51.27	0.344	0.01	0.05	0.813
Distance to park	−7.32	10.26	0.476	0.02	0.01	0.038
NDVI average	−3,174.78	4,808.22	0.509	1.69	5.18	0.744
Observations	174			174		
Adj R^2 (OLS)						
Variance ratio[a] (spatial error/lag)	0.41			0.21		
Lambda (spatial error)	0.15	0.11	0.189			
Rho (spatial lag)				0.19	0.10	0.042

[a]The variance ratio is equal to Var($\hat{Y}$)/Var(Y), where Var($\hat{Y}$) denotes the variance of the predicted values of the dependent variable, and Var(Y) denotes the variance of the observed values of the dependent variable (Anselin, 1992). The squared correlation is another pseudo R^2 statistic equal to the squared correlation between the predicted and the observed values of the dependent variable (Anselin, 1992). Sigma is the maximum likelihood root MSE.W

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Family Portraits – Amboseli[1]

Sairiamu Ole Parsae, Saragi Ole Noomeek and Katatei Ole Ntirraba are heads of households in Olgulului/Lolarashi Group Ranch, one of the four ranches surrounding Amboseli National Park. Their stories illustrate the mix of opportunities and challenges currently facing Maasai pastoralists in this region. Circumstances are pushing and pulling these households to engage in activities outside of livestock production, specifically wage labour, businesses and agriculture. Remittances from household members living beyond Amboseli also play an important supporting role. However, even as these households diversify, their livestock remain critical, both as a foundation to satisfy basic needs and as a form of savings and investment. Consequently, livestock mobility, breeding and veterinary concerns remain important in their minds – particularly with the possibility of land subdivision looming on the horizon. In each story, a combination of circumstances, including social connectedness, geographic location, wealth status and climatic conditions, which themselves fluctuate through time, determine the specific livelihood strategy pursued by each household, as well as how well they are doing.

Sairiamu Ole Parsae

Sairiamu Ole Parsae is 47, the second born in a family of ten children. He has two wives and has ten children – four boys and six girls between the ages of 2 and 17. Sairiamu considers his family to be relatively small for a man of his age group. Most of his age mates of similar wealth status have more wives. Apart from his own dependents, he lives with the two wives of his brothers Kisham and Lemukeku, and a friend

[1] Adapted from Cochrane, K., D. Nkedianye, E. Partoip, S. Sumare, S. Kiruswa, D. Kaelo, L. Onetu, M. Nessele, M. Said, K. Homewood, P. Trench, R. S. Reid, and M. Herrero. 2005. Family Portraits report - Family fortunes: Analysis of changing livelihoods in Maasailand. These portraits were compiled on the basis of discussions with Sairiamu Ole Parsae, Saragi Ole Noomeek and Katatei Ole Ntirraba and their families. These abridged versions are published here with their express permission.

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who keeps livestock in his boma. His brothers are working at the coast in the tourism industry.

Sairiamu was born in Lenkisim in Eselenkei Group Ranch. In 1959 his family moved to Leremit, where they stayed until 1979 when they moved to *Namelok*, on Olgulului Group Ranch. In 1994 they settled in Inkiito on Olgulului Group Ranch where they remain today. Sairiamu recalls that drought and disease incidence were important reasons for moving the household. Namelok was wetter than Inkiito, and while this had advantages, worm loads and tick-borne diseases such as East Coast Fever were a problem there. The flowing water was not considered to be as good for the cattle as standing water from pans, dams and salt licks.

Membership in the *Ilkishumu* age group and *Odomong'i* clan is the basis for Sairiamu's status and leadership in the area. The family has also maintained earlier status gained from Sairiamu's father, who was a respected leader. Sairiamu has a close friend who is in politics as a councillor and has some other key friends in leadership positions. His stepbrother is on the group ranch committee, which has made it easier for Sairiamu to register himself as a member, and he is well informed about group ranch decisions regarding current and future plans. As a result, he has been able to register his wife Noolaisi, and son Lekatoo, for plots of 10 acres in a high-altitude area near Kilimanjaro that the GR committee plans to subdivide.

Sairiamu is considered to be relatively wealthy in his community. Livestock are the most important source of the family's livelihood, although they engage in agriculture and receive occasional remittances from other members of the family living elsewhere. The family's herd includes animals owned by Sairiamu and three of his brothers. Together they own 168 cattle, of which 105 are cows and heifers, and 50 are calves. They have 50 goats, 200 sheep and 10 donkeys. Sairiamu does most of the herding together with two of his nephews from his elder brother and a hired herder. Like every male Maasai child, Sairiamu was given livestock by his father and again when he was married in 1983. He started trading as a moran, and his skill in livestock trading means that he can cater for the needs of the family without selling many livestock from his core herd.

Sairiamu's livestock graze on the pasture around Inkiito for most of the year. Towards the end of the dry season (September–October) they move to Inkaron, a dry season grazing area reserved by the community. The decision to move to these grazing reserves is made communally, and livestock stay there with the herders until the rains come. More severe drought has forced the family to move much farther four times in the last 10 years. In 1994 and 1995 Sairiamu moved his animals 40 km north of Inkiito to Imbirikani, leaving his wives and children behind. Both times they stayed for 3 months. The first time they moved with all their animals, the second time they took only their cattle. In 1996 and again in 2000, the droughts were severe and Sairiamu moved the whole family and belongings across the park to Olmoti in the south of Olgulului. Olmoti is at the foot of Mount Kilimanjaro where pastures are better watered.

When the family has to move long distances, there are hardships for all family members. Cash needs are higher as almost everything has to be purchased, market prices for livestock plummet and prices for foodstuffs rise. Animals are emaciated,

which lowers their market value. It is especially difficult to arrange for the school children, who are sometimes left behind with relatives. In 1996 the drought was so prolonged that they were forced to stay in *Olmoti* for an entire year.

Sairiamu hand sprays his cattle three times a month to control for tick-borne diseases. The family would like to dip the animals more frequently, but this is limited by the reduced availability of water in the dry season. The herd is also vaccinated, but only when veterinary officers visit the area during outbreaks of foot and mouth disease. Sairiamu recently bought an improved ram, a cross between the Dorper and the Red Maasai breeds, and he is eager to see whether the number and quality of his sheep herd will improve. For information on herd management, including crossbreeding and vaccinations, Sairiamu depends on community meetings and social gatherings. The veterinary officer at Kimana market gives advice on new drugs and notifies people about outbreaks of disease in the area, but Sairiamu would like more information on treating livestock disease more effectively.

For Sairiamu livestock represent a savings bank. He sells livestock when they need cash and buys more when the family has extra money. Sairiamu tries to avoid selling cattle – when possible he covers costs by selling sheep and goats. In a year when needs are high, he sells up to 20 shoats and 8 heads of cattle. A range of complex factors informs the decision about how many animals to sell in a given year. The well-being of the herd depends on the rains and incidence of disease. This dictates how much extra food must be purchased, and there are both expected and unexpected cash needs that the family has to cover. There is no market for selling milk, but the women of the household sell hides. In the catastrophic droughts of 1984/1985, when the family lost 100 cattle, selling the hides helped the family to survive.

Sairiamu's family started cultivating in Namelok swamp following the drought of 1984. The area around Namelok is well-suited to agriculture as there are perennial springs and swamp areas suitable for irrigated agriculture. When the area was subdivided in 2002, Sairiamu received 5 acres as a group ranch member. The family experimented with growing onions and tomatoes for sale, but the complexities of selling to the market and technical skills required for commercial farming meant high costs in time and money, and they reverted to growing rainfed staple crops for consumption. Sairiamu tried sharecropping, but this also proved difficult and they now lease the land for Ksh 10,000 a year. His eldest brother, Nkao, still lives in Namelok and grows subsistence crops with the help of hired labourers. In drought periods, Nkao helps Sairiamu's family with food, while Sairiamu takes care of Nkao's cattle.

Sairiamu's two brothers working on the coast periodically send money to supplement the needs of the family, such as buying drugs for livestock and food. One brother works in Mombasa as a watchman and especially assists the family during the dry season, when conditions are hard for both livestock and human beings. Sairiamu estimates that while remittances only account for around 10% of his overall livelihood, they are useful to offset cash needs.

Olgulului Group Ranch borders Amboseli National Park. The park, gazetted in 1974, represents a cost to this family. Predation of livestock by lions, hyena,

cheetah and leopard has been common in Olgulului Group Ranch, particularly in the dry season when livestock use the park's watering points and salt licks. A few years ago, Sairiamu's family lost eight goats to hyenas, and this year, they lost one sheep to a hyena. In the wet seasons wildebeest and zebra disperse out from the park and compete for grazing resources on community land. Migrating wildlife also carry ticks that transmit diseases. Wildebeest-calving areas are a major origin of malignant catarrhal fever (MCF), which is a major killer of cattle. Finally, fear of wildlife attacks on people means people sometimes have difficulty continuing with livestock herding, and collecting water and firewood. In Inkiito a lion almost took the lives of a moran and a schoolteacher.

Relations between the community and the Kenya Wildlife Service (KWS), who manage the park and wildlife, are often strained. The Elephant Trust compensates a family if elephants kill cattle, but the amounts given are less than the market value, and Sairiamu feels that the money is given to stop people from retaliating against the elephants rather than to truly compensate them. The water tank near Inkiito, installed and managed by the KWS to reduce the community's dependence on the park's water sources, provides water only intermittently and it seems to be getting worse. However, it is important to Sairiamu that the park stays open, since they depend on the area for water and pastures for their livestock. The park is also important to the community as they get some wildlife-related income, although Sairiamu's family does not benefit directly. The group ranch gets Ksh 1,200,000 from the park annually, and of these resources, Ksh 5,000 is allocated yearly to group ranch secondary students. Sairiamu thinks that this is not a fair way of sharing benefits, as it alienates younger families without older children.

The family would like the group ranch to subdivide and give them secure title to individual parcels. They fear that otherwise land could be taken away from them in the same way they lost land when Amboseli National Park was created. The group ranch committee in Olgulului is blamed for selling prime pieces of land and access to ranch resources, such as quarries and sand mines, without sharing the proceeds with community members. If these abuses were not occurring Sairiamu would prefer the land to remain communal, since there will be drawbacks if subdivision occurs, including restricted mobility and limited access to water. However, he sees subdivision as the only way of getting a fair deal in land ownership. Subdivision may also enhance development in the area, as people may develop their plots and those with no livestock will lease out their parcels to those with livestock, and use the money to rebuild their own herd. Finally, subdivision should occur before the population explodes, as this would lead to people receiving smaller parcels of land.

Sairiamu has no schooling. He is unhappy that he cannot read the prescribed dosage for veterinary drugs himself and has to rely on others to help. To Sairiamu, education is important because it enhances one's ability to make informed decisions and earn money. It may also empower people politically – families with an educated member seem to be doing better than those without. Families with members in government offices were able to help their families survive in bad times. Such people had also bought many cattle and were seen to be a good example within the

community. Currently, three of Sairiamu's children are in school, but while the church that runs the school covers most of the direct costs, Sairiamu has had to hire a herder to look after the livestock to make up for the loss of labour.

Saragi Ole Noomeek

Saragi Ole Noomeek is 57. He lives in Inkiito within Olgulului/Lolarashi Group Ranch with his five wives, Moinan, Telek, Nooseuri, Noolosho and Nooltetiain. They have 31 children, 19 sons and 12 daughters, between 2 and 34 years of age. While the family has started to disperse, the links between them are still strong. The eldest son is independent and has moved 50 km away to settle at Imbirikani Group Ranch, and the six eldest daughters are married and have their own families in the neighbouring communities. Saragi's second son works in Mombasa during the main tourist season, but returns home from April to July to look after family and to help with the herding. Two other sons have also left the homestead; the elder working as a security guard in Mombasa and returning home once a year to help herd and support his father's family, and the younger trekking livestock between local markets. One of Saragi's younger sons (5 years) lives in Entepessi where he helps his aunt as a shepherd boy, while one of his granddaughters, also 5, from Saragi's eldest married daughter, stays with Saragi. Finally, Saragi's mother lives with him, and he also hosts the primary school teacher.

While they are seeing considerable in-migration to the area, Saragi still considers Namelok to be doing better because of the access to better social services and markets there. Saragi is an important and influential member of the community and considered to be wealthy within his community. He is the treasurer of Inkiito community and a member of the community committee that works with the management of Amboseli National Park under KWS. His stepbrother is a secretary in the group ranch committee, and this has facilitated the flow of information about what is going on at the group ranch level. The family also mentions relatives in Kimana who hold positions of influence – although they are unsure of the nature of the positions held.

Saragi was born in 1947 in Enkong' Narok, a village that was in 1974 incorporated into Amboseli National Park. In 1968 the family moved to Eselenkei in search of better grass for their livestock. Then in 1970 they moved to Naripi in order to be closer to reliable water sources. An outbreak of East Coast fever (ECF) in 1975 forced the family to move to Injakita, and then in 1983 the family settled in Inkiito, a drier area with fewer ticks. A year later the devastating drought in 1984 forced the family to move to Engare Nanyokie in northern Tanzania, but the family returned to Inkiito after the drought and has stayed there since. The family compound is located 4 km away from Amboseli National Park in an area of Inkiito that they consider to be well endowed with resources. Water is sometimes available in the tanks at the boundary of the park, and the salt licks and swamps inside the park are still important resources for their livestock.

The family moves less now compared to the past, in part to be closer to social services such as school and water points, and in part due to the issue of impending land subdivision. They have no plans to move again, and the impending subdivision has introduced an element of uncertainty over the family's tenure in the area. A neighbouring group ranch attempted to block access to land after subdivision, but the family is also concerned that if subdivision does not take place, the land will be "grabbed" by others. This uncertainty emphasizes the importance of relationships that the family has maintained with relatives and friends in other sections of the group ranch and in other group ranches.

Livestock is the major source of the family's livelihood. Livestock, and particularly milk, serve as a source of food security, and hides provide a source of cash for general household needs. They also serve social needs during ceremonies and as dowries. Loans of livestock help friends and relatives in times of need and strengthen social relationships. Saragi and his son Nkuito manage their herds together. Between them they own 200 sheep, 65 goats, 65 calves, 86 cows, 7 steers and 3 breeding bulls. The bulls are improved: one is a pure Boran and the other two are Boran–Zebu crosses. Saragi takes active responsibility for herd management and works closely with his brothers who live nearby, sharing labour for herding and watering livestock. Nkuito uses the income he earns in Mombasa to buy most of the veterinary products for the combined herd. While the livestock are managed together, Saragi and Nkuito retain rights over their own animals, including which to sell and when.

The women are allocated their own cows and have full rights over the milk from those cows. Saragi's first wife has 12 cows in milk, while his fifth and youngest wife has only 3. The others have between six and ten cows allocated to them. The women are responsible for tending sick animals nearby, while the rest of the herd are herded farther away. Saragi's neighbourhood has divided itself into two groups, one of seven bomas and one of eight bomas, and each group waters cattle and small stock on alternate days. This arrangement reduces pressure on water points and grazing lands.

When it is very dry they are forced to divide the herd – which requires additional labour. During bad times the family moves eastward to graze in the Chyulu hills in Taita District, north towards Merueshi group ranch (in Kaputiei Maasai section) or Eselenkei group ranch. If things get very bad they take animals across the park to Endonet, but this is problematic because of ECF and expanding cultivation there. These movements carry additional costs including exposure to new diseases, food insecurity, stress and fatigue. At such times, children are removed from school and women have to herd as well carry out their usual work. However, Saragi would rather move than sell livestock, since he must keep his cattle to reconstitute the herd, and they always live in hope that the rains will return before animals die. That is not to say that Saragi does not trade in livestock. He was able to build his herd in the 1960s and 1970s through cattle trading and meets household needs through selling a number of cattle every year, primarily steers and older cows.

While Saragi manages the herd, his sons are more engaged in other activities such as earning wages, running businesses, and selling or buying at markets. Napi has started trekking livestock to markets. Since 2000, Nkuito has sold crafts and

provided entertainment for tourists in Mombasa, and Loonkushu has worked in salaried employment as a security guard in Mombasa, since 2003. While Loonkushu's salary is small, it ranks as more important to the family than remittances from the other two sons because it is regular and is distributed among the whole family. Also, since 2000, women have engaged in small-scale business, selling sugar, tea leaves, salt, beans and wheat flour out of the boma, although this is mainly during the dry season when milk is in short supply.

The decision to diversify income sources was made individually by each person rather than as a family. Because Saragi's sons earn cash from these other activities, the household has been able to reduce the number of livestock they sell annually, buy more cattle to build up the herd, spend more on veterinary drugs, pay school fees and meet other household needs. On the other hand, Nkuito, Loonkushu and Napi are away working for much of the year which puts more pressure on Saragi to manage the livestock on a daily basis.

Currently the family does not own any land, but they have registered three people as members of the group ranch. This means when the arable land on the slopes of Mount Kilimanjaro is subdivided, they will receive 10 acre parcels of rainfed agricultural land per member. They intend to clear the land and grow beans for sale using hired labour. They have seen that people already farming beans get two harvests annually and are doing well. They also see it as a potential grazing area when they are not cultivating.

Saragi knows of the money remitted to the group ranch from the national park and conservation areas, as well as from nearby hotels and sand/gravel sales. However, Saragi's family feels that few members of the group ranch are benefiting, and there is not accountability in how the money is spent. In contrast, the whole community bears the costs of being next to the park, including livestock predation, animal mortality from MCF and loss of access to grazing, salt licks and water sources. The park used to be a drought refuge area; however, restrictions posed by KWS mean that accessing the swamps for grazing is illegal, although Saragi is sometimes forced to take his cattle into the park to graze.

Relations between the KWS and the community are not good at the moment. KWS does not compensate for livestock killed by wildlife, and chases livestock and people using planes before informing the community. Children herding livestock often flee into dangerous areas inside the park. In 2001 they set up a community wildlife protection committee to communicate with local people and to provide information to KWS about wildlife outside the park. Saragi has been a member since 2002, although the committee meets only once a year. He feels that they have a big role to play but are not valued and their time is not compensated for. At the last meeting they stated that they are no longer willing to work without receiving compensation, although another meeting was planned. In contrast, relations with the Elephant research project are good. The leader of the project is Maasai and works in partnership with the community. They employ community members as game scouts and the community receives compensation for livestock killed by elephants. Saragi is aware that some members of the community are employed because of the park, even though no one from their family has benefited directly.

Ten of Saragi's children are at school (including two girls). Of the remaining 11, only 3 are old enough to help with the livestock. Saragi still has misgivings about sending more children to school as he suffers from a lack of labour for herding and sees how modern education can erode Maasai cultural values.

Katatei Ole Ntirraba

Katatei Ole Ntirraba is 70 and belongs to the Iseuri age group. Katatei lives in Namelok swamp, with his first wife, Hannah and his youngest daughter. His second wife, Noolkeriai, left the family home in 1997 when their cows died. She stayed in Namelok centre for a year, making local beer, until she got membership in the cultural society. Noolkeriai is now staying with her youngest child Mulele in a cultural boma near Amboseli National Park, and she owns a stall at Serena Lodge where she sells beadwork. Katatei occasionally visits her there. Of his 11 children, 9 have married and live away from the family home, although Joseph (28) and Kisham (15) still spend time at home between jobs. Katatei shares his boma with his brother-in-law, Olouma, and his family.

Katatei was born in Longido, Tanzania. He moved with his immediate family to Olgulului, leaving much of the family in Tanzania, before moving to Lenkisim. It was in Lenkisim that Katatei was circumcised and spent his moran years before being married and then becoming an elder. Pastures were plentiful and the family stayed there until 1984. When drought struck in 1984 the family moved to Narok Lukuny in search of greener pasture and then to Namelok, but they still lost most of their 100 cattle. The herd continued to shrink and after the El Nino rains in 1997, the remaining ten cattle were decimated by rinderpest.

Katatei's family is poor and there is no one with any leadership status or influence. Of Katatei's three brothers, only one is doing well and he does not help Katatei or his family. Katatei believes this lack of leadership status is why during subdivision of agricultural land at Namelok, they lost the plot they had long cultivated and were allocated instead a plot of land where water for irrigation is not reliable.

Katatei has suffered from tuberculosis for more than 20 years, which has made him inactive and dependent on other members of his family. Katatei's eldest son, Joseph Kesire, left school early for financial reasons and has pursued a series of wage jobs over the last 6 years, first at Amboseli lodge, then in Limuru and finally, since 2002, as a watchman at Ong'ata Rongai, near Nairobi. The improved Ayrshire cow he bought while working at Amboseli was sold for his brother's wedding and he is just now starting to build up his own herd again. Katatei's second son, Kikanai, is 20 and works in Mombasa as a watchman. In the 3 years that he has been working, he has managed to buy 20 small stock and 2 cows. Kisham, 15, works as a casual herder in Namelok. After working for a period of 1 year he was given two shoats as payment. He is now expecting another heifer as payment for his work in 2004.

Today, Katatei and his sons own 7 cattle and 15 sheep and goats. He also manages three cattle and ten sheep for Olouma. Katatei manages the herd, but he is highly

dependent on Olouma's sons for herding. Since Kikanai owns most of the herd, he must be called in Mombasa before selling an animal to meet the family's needs. Katatei sees livestock as the principal source of cash for school fees, medical bills, payment of bridewealth and other debts, as well as regular expenditures (food and clothing). However, he sold no cattle or shoats in the last year, mainly because his son Kikanai has been supporting them. Olouma also brings home food, cash or livestock from his job as a Game Scout with the Kenya Wildlife Service in Amboseli. Remittances are thus a critical component of the household economy, allowing the family herd to recover slowly. In addition to remittances from his sons, Katatei and Hannah receive occasional gifts of salt, sugar and maize flour from friends and neighbours, and during drought their daughters may also send gifts of food. Left with no cattle, in 1997 Hannah ventured into the local beer-brewing business, but was persuaded to stop by her son Joseph, who was influenced by the church.

Cultivation became mandatory for Katatei's family in 1984 when they lost their cattle and moved to Namelok. Hannah initially cultivated a plot and harvested 2.5 bags of maize. They gradually diversified into irrigated agriculture, learning to grow tomatoes, onions and cabbages through watching others. But water has dwindled over the years as more and more people started to irrigate. Since subdivision, the family's land is further from the source spring and has only irregular water. The family initially reverted to rainfed agriculture as easier and less costly, but in 2001 they stopped cultivating altogether.

While Katatei and Hannah still look to livestock as their main source of livelihood and status, the younger generation sees cultivation as the most important *potential* source of livelihood. Cultivation brings more immediate returns than livestock breeding, but as population increases in sedentary farming areas around Namelok, there will be less pasture available. Thus, animals must be herded further, which will affect their ability to send their children to school. Subdivision is likely to make future access to pastures even worse. For the moment, however, cultivation has been abandoned and off-farm income and livestock are the main sources of livelihood for Katatei's family.

Katatei and his wives have no formal education. All his children, except for three daughters, have been to school and are literate. However, none have completed primary due to lack of resources to buy school uniforms and books, and the KWS supports only those pupils who are in class 7 and 8 and secondary school. The family is hopeful that a World Vision Programme that supported two other daughters may also help fourth-year Tayit, since the project recently came and took her photograph. Katatei is the only member of the family who does not regularly attend church, being concerned at the time it take him away from his cattle, as "school, church and jobs are disastrous to the cattle".

In the 15 years following the 1984 drought, Katatei's family has been reduced from relatively wealthy to very poor. In Hannah's opinion, poverty may be taken to be synonymous to loneliness. "Whenever one is rich, there are many people around, but when the property diminishes, the people disappear". However, Hannah is optimistic for the future and sees her family doing well with the passage of time.

Chapter 5
Pathways of Continuity and Change: Maasai Livelihoods in Amboseli, Kajiado District, Kenya

S.B. BurnSilver

5.1 Introduction

The Greater Amboseli Ecosystem (GAE) extends ~8,400 km^2 north, east and west from the base of Mount Kilimanjaro, and includes the Amboseli basin, swamp wetlands along the base of the mountain, and neighbouring rangelands which act as seasonal dispersal areas for resident herbivore populations (Western, 1973). The ecological centre of this system is Amboseli National Park (NP); however, land use centers on the distinctive combination of transhumant pastoralism and wildlife habitat that has typically characterized a majority of East Africa's rangelands. Wildlife corridors, particularly for the area's substantial elephant populations, cross the Kenya–Tanzania border and link Amboseli ecologically with the Longido region to the south. This ecosystem is unique in many ways. It is a cultural and economic core area for Maasai pastoralism in southern Kenya, and the landscape was traditionally characterized by both high wildlife diversity and abundance (Western, 2001). The combination of these human–ecological characteristics has made Amboseli NP one of Kenya's most visited tourist destinations. However, current literature on pastoral environments globally (Galaty and Johnson, 1990; Blench, 2001) and in East Africa in particular (Desta and Coppock, 2004; Fratkin and Mearns, 2003), emphasizes that the challenges facing pastoral ecosystems are daunting. The Amboseli system is typical in this, as research points out that local pastoralists there are becoming poorer overall (Rutten, 1992; Campbell, 1999), wildlife corridors are threatened (Noe, 2003; Okello, 2005) and some wildlife populations are in decline (Worden et al., 2003; Western and Nightingale, 2003). Current challenges to Maasai pastoral livelihoods include an intensified recent cycle of drought in Eastern Africa (FEWS NET et al., 2005), changes in land tenure

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from flexible use of communal rangelands down to intensified use of small private parcels (Western and Nightingale, 2003; Mwangi, 2006; BurnSilver and Worden, 2008; BurnSilver et al., 2007), sedentarization of land use (Fratkin, 2001) and rising costs associated with greater involvement in the cash economy (Rutten, 1992; Campbell, 1999; Campbell et al., 2003). Livelihood expectations among pastoralists are also changing, and the question of what should a pastoralist do to survive – let alone thrive – is increasingly relevant. Constraints on Maasai land use are alternately pushing and pulling pastoralists to change what they do – and how they do it.

It is clear that pastoralists across many East African systems are currently trying a variety of strategies to adapt and cope with changes in their productive environment (Humphrey and Sneath, 1999; Zaal and Dietz, 1999; Little et al., 2001; Coast, 2002; Thompson, 2002; Homewood et al., 2006). The Maasai are diversifying their livelihood choices into agriculture, businesses and wage labour, activities that are well beyond the "traditional" raising of livestock for subsistence. So are livestock still important in spite of these moves to widen their livelihood base? Research has pointed out that Maasai may also be intensifying their livestock production strategies – essentially an effort to "get more" from the livestock they do have (Rutten, 1992; Rege and Bester, 1998). Additionally, given the close proximity of Amboseli NP and the presence of significant wildlife populations outside of park boundaries, community-based conservation has emerged as a development focus for the region. A growing number of conservation-oriented enterprises are now in place across the Amboseli ecosystem – all married more or less closely to the idea of improving pastoral well-being while simultaneously conserving wildlife populations over the long term. The question remains, however, in spite of substantial literature and resources linking conservation and improved livelihoods, does conservation-based income contribute directly to the well-being of Maasai households in Amboseli within the overall context of efforts by pastoralists to diversify and intensify their activities beyond subsistence pastoralism?

This chapter will focus on four themes: (1) describing patterns of diversification of pastoral livelihoods in the Amboseli system, both in terms of the combinations of activities households are pursuing and the relative value of those strategies, (2) identifying potential spatial and socio-economic determinants of why one strategy is chosen over another, (3) analyzing the relative importance of conservation-based income within household economic strategies of the Maasai and (4) describing trajectories of change and future land use in Maasailand – linking analyses of diversification dynamics through time and the parallel process of intensification of livestock production strategies. In the context of these themes, the livelihood choices being made by the Maasai of Amboseli will contribute to the ongoing effort to describe the newly emergent faces of pastoralism in East Africa.

5.1.1 Study Site Description

The focal area for this chapter is the southern portion of Kajiado District, Kenya (Fig. 5.1). Research took place in six study areas (Osilalei, Eselenkei, Lenkisim,

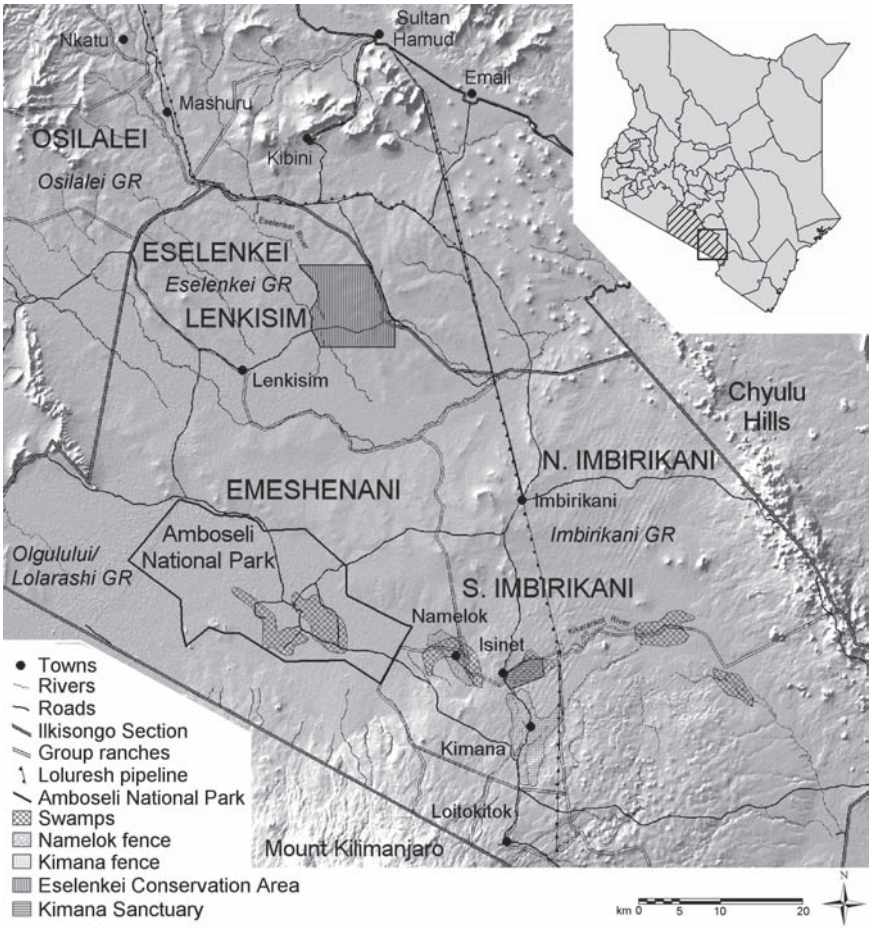

Fig. 5.1 Map of Kajiado study area

Emeshenani, North Imbirikani and South Imbirikani), on four Maasai group ranches; Eselenkei, Olgulului/Lolarashi, Imbirikani and Osilalei. Mount Kilimanjaro and the Tanzania border lie to the south, and the Chyulu Hills to the east and the Pelewa Hills to the north-west bracket the study area. A line of swamps fed by the forests on Mount Kilimanjaro extend east-west along the base of the mountain; the Enkong'o Narok and Longinye swamps are critical wildlife habitat inside Amboseli NP, while the Namelok and Kimana swamps lie outside the park, and are currently the centre of intensive agricultural activities for Maasai (and non-Maasai) settled there. Agriculture also takes place on the banks of the Kikaronkot River, which extends eastward out of the Kimana swamp. Namelok was fenced for agriculture in the early 1990s. The Kimana swamp remains unfenced to date, but because of intensive agriculture and its location

adjacent to the Kimana Wildlife Sanctuary, it is currently a major hotspot for human–wildlife conflicts.

The majority of southern Kajiado District is categorized as either arid or semi-arid lands (Katampoi et al., 1990), with only the Kilimanjaro foothills considered appropriate for rainfed agriculture. A rainfall gradient decreases north to south across the study area. Osilalei in the north receives 500–600 mm of annual rainfall, but Olgulului/Lolarashi – in the rainfall shadow of Mount Kilimanjaro – receives only 350 mm/year on average. Rainfall patterns are patchy and irregular with substantial variability both within and between years. Annual rainfall patterns are bimodal. The rainfall coefficient of variation for the area is a relatively high 27.8% (Boone and Wang, 2007). Dominant vegetation communities in the study region include grasslands, wooded grasslands and bushland, with acacia trees and shrubs (e.g. *Acacia drepanolobium*) and red oat grass, *Themeda triandra* as the dominant plant species. Underlying soil and topographic gradients create a mosaic of vegetation communities on the landscape, and combined with rainfall variability, the availability of forage varies both spatially and temporally, and in terms of quantity and quality. The resultant patchy nature of forage and water resources on the landscape was the major factor mandating mobility as a traditional coping strategy for pastoralists in this system.

Access to productive infrastructure in the Amboseli ecosystem overall is low but may be higher in comparison to nearby Longido in Tanzania (Chap. 6). A north-south all-season (dirt) road connects the large market towns of Emali and Oloitokitok, and links the region to the main Nairobi-Mombasa highway (Fig. 5.1). These towns offer major weekly markets, banking services and secondary schooling, and Emali is the region's largest livestock market. Smaller towns on or near this road (e.g. Kimana, Isinet, Namelok and Imbirikani) provide access to other basic services (e.g. primary schools, shops and health care). Kimana hosts a smaller weekly livestock market. The Lolturesh water pipeline parallels the main N-S road, providing access (both paid and illicit) to clean water for livestock, household consumption and local wildlife. Namelok and Kimana swamps straddle the main N-S road and provide water for wildlife, livestock and household use, although downstream water is highly contaminated with run-off from agricultural chemicals (Githaiga et al., 2003). Proximity to the main N-S road facilitates marketing of agricultural products from the swamps. Another all-weather road connects Kajiado town and the N-S Emali/Oloitokitok road, and passes along the northern boundary of Osilalei and Eselenkei group ranches. A secondary water pipeline off the Lolturesh pipeline parallels this road, and again provides paid (and illicit) access to water use for households.

Seasonally navigable roads connect the interior areas of Eselenkei and Olgulului/Lolarashi group ranches. Lenkisim town is the centre of Lenkisim study area, and is the location of a Catholic Mission whose development work has focused on offering health care, water provision, supporting local primary schools and building new nursery schools in the region. The interior study areas of Emeshenani, just to the north of Amboseli NP, and Lenkisim are challenged by lower accessibility to markets and less access to dependable dry season water sources.

5.1.2 Critical History in the Greater Amboseli Ecosystem

In addition to its high biological and cultural diversity, the Amboseli system is known as the birthplace of "community-based conservation", an approach that for the first time equally prioritized the dual goals of human development and natural resource conservation (Western, 1994). In the case of Amboseli, this approach crystallized in the mandate to make "wildlife pay its way", recognizing that while wildlife was the source of substantial tourism revenues, *living with wildlife* implied costs for Maasai pastoralists in the form of losses in territory and water resources, safety concerns, disease transmission and competition for grazing.

The creation of Amboseli NP in 1974 was dramatic, politically charged and controversial, and it challenged both local Maasai and conservation stakeholders to identify potential solutions to the conundrum of wildlife conservation over the long term and sharing of wildlife benefits with local communities. The agreements worked out in this early period called for a water distribution system to be set up to compensate Olgulului/Lolarashi group ranch herders for lost access to swamps inside the NP, and revenue sharing of park gate receipts with the six group ranches surrounding the park: Olgulului/Lolarashi, Imbirikani, Eselenkei, Kimana, Kuku and Rombo. The agreement reflected the ecological reality that while some Amboseli wildlife disperse in and out of the park area on a seasonal basis, Maasai lived with other species of wildlife on their traditional rangelands year-round. However, Osilalei group ranch was never a part of this revenue-sharing arrangement as the group ranch was considered to be outside the park's wildlife dispersal zone.

Since this time, gate receipts have flowed to these six group ranches and are used at the community level to subsidize secondary school fees for ranch members. The water distribution system is widely seen as a failure, and serious corruption and misuse of Kenya Wildlife Service (KWS) funds on the group ranches is an ongoing concern (personal observation; Boyd, 1999). In Imbirikani, bird shooting and game cropping are also sources of wildlife-based benefits. In Olgulului/Lolarashi, sales of gravel and sand to area lodges, fees from a public campsite and cultural boma visitation are additional sources of wildlife income. The Amboseli-Tsavo Game Scout Association employs and trains group members of the same six Maasai ranches (Roque de Pinho, 2004). Additional community-based conservation initiatives, wherein group ranches have partnered with or leased group ranch lands to private tourism operators to share tourism benefits, include Oldonyo Wuas, located in Chyulu Hills NP (N. Imbirikani study area), Eselenkei Community Conservation Area (Lenkisim study area), Elerai and Kitirua (on Olgulului/Lolarashi GR) and Kimana Wildlife Sanctuary (Kimana GR) (Elerai, Kitirua and Kimana are outside, but still close to, the study areas). These tourism operators lease group ranch lands, pay bed night conservation fees and employ group ranch members. Particularly in the cases of the Eselenkei Conservation area and Oldonyo Wuas enterprises, efforts were to be made by the operator to employ poorer community members.

All of these sources of revenue, game cropping, park gate receipts, lease payments and bed night fees, accrue at the community level and then are distributed outward (ideally), towards community development projects (i.e. school fees, construction of schools

and water points). Opportunities for individual households to access tourism-based revenue include salary and wage employment, and craft sales or involvement in other associated tourism-based businesses. However, whether the initial promise of community-based conservation to "make wildlife pay" has been realized, and the degree to which wildlife contributes widely and meaningfully to individual livelihoods is open to question. Many researchers have at this point questioned the initial assumptions and sustainability of community-based conservation – an approach alternately known in the literature as "integrated conservation development projects" (Barrett and Arcese, 1995; Agrawal and Gibson, 1999; Goldman, 2003; Berkes, 2004). Examining some of these assumptions will be a goal of this chapter.

Privatization of communal lands and sedentarization of pastoral households on particular areas of the landscape are two other critical trends affecting Maasai land use and livelihoods, as well as the sustainability of wildlife populations in the Amboseli system. These changes have cultural and ecological implications, as the pastoral system would transform from one characterized by flexible and extensive movements keyed in response to forage conditions, to one based on intensive use of individual parcels (BurnSilver et al., 2007; Reid et al., 2007; Worden, 2007). These changes also have implications for livelihood choice, as most pastoralists recognize that privatization will imply declines in the numbers of livestock that can be maintained on small individual parcels (BurnSilver, 2005), therefore pushing households to try other economic activities or substantially change the way they raise livestock. Subdivision implies fragmentation of the landscape into private parcels, while sedentarization describes a process of permanent settlement. However, these patterns are linked and self-reinforcing, as sedentarization may occur either before or as a direct effect of subdivision. Conversely, households may settle permanently out of economic choice or need, without subdivision being a deciding factor. Both patterns, however, imply a decline in the mobility of households (Fratkin et al., 1999; BurnSilver et al., 2007).

The precursors of the subdivision process lie in the widespread assumption held by policy makers and rangeland specialists that private property is a more rational and productive basis than communal land tenure to support the transition of a subsistence pastoral system to one based on intensified production of livestock for the marketplace (Galaty, 1992). This assumption was made concrete in the 1960s when the Kenyan government – supported by the World Bank – proposed the adjudication of communal rangelands into group ranches, whereby leasehold tenure was granted to groups of registered pastoral households (Hedlund, 1971; Oxby, 1982). Internal and external policy pressures have since the 1970s pushed the process to proceed further, and by the late 1990s 40 of 52 group ranches in Kajiado District were subdivided into private parcels (Kimani and Pickard, 1998). In spite of initial concerns over the economic and ecological viability of small parcels in arid lands, the Kenyan government now supports private property on a national basis as a foundation of economic development.

Currently in the Greater Amboseli Ecosystem, Osilalei group ranch is subdivided and extended households are now split and sedentarized onto their individual parcels. Members of Olgulului/Lolarashi and Imbirikani ranches have recently voted to proceed with subdivision in principle. Agricultural lands in Imbirikani (Kimana and

Namelok swamps) and Olgulului/Lolarashi (Namelok swamp and Emurutot on the slopes of Mount Kilimanjaro) have been subdivided, but core rangeland areas still remain intact. Pastoralists around Namelok and Kimana swamps who pursue agriculture are largely sedentary – linked to the permanency of their agricultural activities and the presence of other infrastructure services (e.g. schools), although herders still migrate with their animals in times of serious drought (BurnSilver, 2007). Settlement and mobility patterns in other areas of the Amboseli system are a combination of permanent settlements located near infrastructure services, and migration of a portion of the household to dry season grazing areas on a seasonal basis.

Current patterns of land use across the Amboseli system are therefore a manifestation of access to infrastructure, economic opportunities and needs, land tenure change and settlement history. A gradient of pastoral land use is represented across the landscape, extending from agropastoral land use in the swamps, to pastoralism on subdivided parcels, to extensive pastoralism in the interior, core rangeland areas. The livelihood decisions of pastoral households overlaid on top of these basic infrastructure and ecological characteristics of the system will be the focus of the balance of this chapter.

5.1.3 Methodology

Results presented here are based on field research on Maasai livelihoods in the Amboseli ecosystem, which took place from November 1999 to March 2001. This research was part of a larger PhD study (BurnSilver, 2007) that focused on identifying Maasai strategies of economic diversification and intensification taking place within a larger political–economic context of land tenure change and landscape fragmentation. Research took place in six study areas (Osilalei, Eselenkei, Lenkisim, Emeshenani, N. Imbirikani and S. Imbirikani), on four Maasai group ranches; Eselenkei, Olgulului/Lolarashi, Imbirikani and Osilalei. The year 1999 was considered "normal" by local Maasai, although 2000 was a year of serious drought.

Five of the six study areas are part of Ilkisongo Maasai section (Eselenkei, Lenkisim, Emeshenani, N. Imbirikani and S. Imbirikani), while Osilalei study area is part of Matapaato Maasai section. The six areas initially were chosen in an effort to represent a range of land tenure conditions (subdivided vs communal), land uses (extensive pastoralism vs sedentary agropastoralism) and degree of access to resources (e.g. irrigated swamps and services infrastructure) (Table 5.1). Agroecological potential across the study areas also differs, as the rainfall gradient declines from north to south. A sample of 184 total households was chosen using a proportional stratified random sampling strategy based on wealth and location. Two community informants from each study area used Grandin's wealth ranking technique (1988) to categorize all the households from each study area based on locally relevant wealth indicators. The criteria cited most often that identified wealthy versus poor households in this exercise were (in order of importance) (1) number of animals, (2) family size and (3) access to "new" sources of wealth (e.g. salaries, a vehicle or agriculture).

Table 5.1 Distribution of study sample by study area characteristics

	Study areas						
Study area characteristics	Osilalei	Eselenkei	Lenkisim	North Imbirikani	Emeshenani	South Imbirikani	Total
Land tenure	Divided	Communal	Communal	Communal	Communal	Communal	
Land use	Sedentary	Extensive	Extensive	Extensive	Extensive	Sedentary	
Infrastructure access	High	Medium	Low	Medium	Very low	High	
Agroecological potential	High	High	Medium	Medium	Low	Low	
Total no. of households	29	30	30	32	29	34	184

We defined a "household" as an *olmarei,* consisting of a herd owner, his wives and dependents. Male heads of households were interviewed except in one case where the head of the household was female. We used two survey strategies in working with households. A small subsample of households that were evenly spread across the six study areas (n = 38) was interviewed twice; once in the dry season and once in the wet season. A larger sample of households (n = 146) was interviewed once. The survey instruments consisted of specific household information and open-ended questions. Interview data consisted of household socio-demographics, herd composition, livestock numbers, livestock inputs, livestock productivity, agriculture inputs/outputs, household economic timelines, and off-farm household economic activities.

The diversification patterns of households were analyzed using two contrasting methods. Descriptive statistics were used to define the livestock-based, agricultural and off-land activities of each study area. Off-land activities were defined as either petty trade (e.g. micro-businesses), business (larger-scale business activities), wage and salary jobs or wildlife-based activities. Then households were re-categorized based on the ACEBIN binary clustering methodology in SAS, by which the 184 households were placed into groups according to the specific combinations of activities being pursued. All households were binary coded for presence/absence of particular activities, yielding groups of households with a narrower range of common activities. The economic returns to households based on combinations of strategies were also quantified across each method. A comparison of results between methods illuminates different aspects of diversification patterns and their associated returns.

Multinomial logistic regression (MLR) (SPSS Version 15) was then used to identify if spatial, demographic and productive variables explain livelihood cluster membership for groups of households. In other words, what factors predict livelihood choices? To address the question of "who is doing well within the GAE?", a backwards stepwise regression technique (Ordinary Least Squares (OLS) in SPSS Version 15) was run to identify factors that predict (1) gross household income, and (2) livestock holdings (represented as tropical livestock units (TLUs), where animal numbers are standardized according to their body mass in reference to a 250-kg female Zebu cow (Bekure et al., 1991)). The measure of gross household income incorporates the contributions of non-livestock income to household livelihoods, while the TLU measure only considers the size of a household herd within the context of livestock production efforts. Gross household income was calculated here as gross returns in US dollars from livestock (sold, received as gifts, slaughtered, milk and hides/skins sold), off-land activities (business, petty trade and wages/salaries), and agriculture (sold and consumed products). An exchange rate of Ksh 73.5 to US $1 was used throughout all analyses.

Discussion of future trajectories of change in the Amboseli system is based on data pulled from household surveys. Household heads described the lifecycle of their productive activities, listing all the activities they had engaged in, the years those activities were started and stopped, and why. Analyses of activities based on age of household heads and year paint a picture of the ebb and flow of specific

livelihood pathways in Amboseli from the 1950s to the current day. Households also quantified the degree of change occurring in their productive strategies, for example, hiring of herding labour, changes in livestock breeds, selling of livestock and use of banking and credit. These results are used to quantify the degree of intensification of livestock production strategies among Amboseli Maasai – a process occurring hand in hand with economic diversification.

5.2 Amboseli Livelihoods

The following two sections describe current combinations of Maasai livelihoods in Amboseli in alternate ways. We first present descriptive statistics quantifying the breadth and distribution of activities engaged in across the six study areas. These activities generally fall into three categories; livestock-based activities (livestock raising, milk and hides/skins), agriculture (sold and consumed) and off-farm activities (i.e. petty trade, business, salary/wage and wildlife-based activities). We then use cluster analyses to group households according to the specific combinations of activities they are pursuing. Diversification is clearly occurring, but are there particular trends emerging as pastoralists try new activities?

5.2.1 Study Area Analyses

5.2.1.1 Livestock Production

All study households own at least some livestock. All households own at least two cattle, and all but three own some smallstock (either sheep or goats). Ninety-eight per cent of households received at least some income from their livestock. Livestock income is defined as either cash or consumption value accruing from animals, milk or hides/skins sold, and animals slaughtered or received as gifts. Households draw 64% of their average gross income from livestock sources, but relative importance ranges from 45% to 84% depending on location. Livestock still generate greater than 50% of total gross income for 66.8% of households. However, the distribution of livestock across households is skewed. In terms of TLUs per adult unit (AU), 75.5% of sampled households have less than eight TLU per AU – the number of livestock considered necessary to support a purely pastoral lifestyle (Bekure et al., 1991). The top 10% of sampled households own 44.8% of all livestock TLUs counted, while the top 12.5% own 50.4% of all livestock TLUs within our sample of households. These figures provide some initial insight as to why households are diversifying beyond core livestock activities.

Mean values for livestock holdings per household, holdings per adult equivalent and household gross livestock income are presented in Table 5.2. Livestock holdings per household and per AU are generally greater in core rangeland areas (i.e. Emeshenani and N. Imbirikani), and lower in areas where households are sedentary

Table 5.2 Livestock holdings across the study areas

Study area	Mean TLU per household	SD	Mean TLU per AU	SD	Ratio cattle: smallstock	Gross livestock income ($)	SD ($)
Osilalei	40.5	36.9	5.4	4.0	0.5	977	958
Eselenkei	63.2	67.5	7.0	6.1	0.7	1004	906
Lenkisim	60.8	82.4	6.1	6.8	0.9	915	1125
North Imbirikani	76.2	98.1	6.8	4.8	1.1	1803	2111
Emeshenani	100.2	174.8	8.7	11.1	0.9	1415	1040
South Imbirikani	30.7	43.3	4.3	5.4	1.1	551	769
Total	61.3	95.8	6.3	6.7	0.9	1111	1294

TLU tropical livestock unit, *AU* adult unit, *SD* standard deviation

and/or settled on private holdings (Osilalei and S. Imbirikani). However, variability in livestock holdings within all study areas is high. Households located at the northern edge of the study zone (e.g. Osilalei and Eselenkei) have more smallstock than cattle, a trend possibly linked to greater demand for sheep and goat meat in the urban markets of Nairobi (Zaal, 1999). Gross income from livestock is statistically different across the study areas (ANOVA $F = 3.897$; df 5, 178; $p < 0.000$); it is highest in Emeshenani and N. Imbirikani, and lowest in S. Imbirikani. As would be expected, gross livestock income and TLUs per household are highly correlated (Spearman's rho (ρ), $r = 0.762$, $p < 0.001$).

By far most livestock income (65–91%) comes from sale of livestock across all study sites. Milk-based income contributes little to the overall value of livestock returns with the exception of S. Imbirikani where non-Maasai agricultural workers purchase milk and milk sales represent 14% of total livestock returns. The remainder is a combination of livestock slaughter, livestock gifted into the household, and hides and skins.

5.2.1.2 Agriculture

Overall 87 households (53%) were gaining at least some returns from agricultural activities. The mean number of households receiving returns from agriculture across the study areas ranged from a high of 94% in S. Imbirikani to a low of 17% in Lenkisim (Table 5.3). Agriculture represented greater than 25% of total gross income for 22.3% of households. However, only 8.2% of households received greater than 50% of their total gross income from agriculture. Gross returns are calculated based on the combined value of consumed crops and crops sold. Our results show that gross returns from agriculture are hugely variable across households, across study areas, and across agricultural types (Table 5.3).

Three types of agriculture are practiced in the Amboseli system and these strategies are linked to available resources and agroecological potential

Table 5.3 Agricultural activities by study area

Sites (*N*)	Lowland rainfed		Rainfed highland		Irrigated		% HH with AG income	Gross AG income ($)	SD
	Area (ha)	% HH	Area (ha)	% HH	Area (ha)	% HH			
Osilalei (29)	1.1	97	0	0	0	0	79	175	140
Eselenkei (30)	0.6	27	0	0	0	0	23	155	100
Lenkisim (30)	0.1	3	3.5	10	2.8	3	17	759	1167
North Imbirikani (32)	0	0	1.7	6	1.8	31	34	591	554
Emeshenani (29)	0.2	3	5.2	17	0.9	10	31	323	266
South Imbirikani (34)	0	0	1.1	18	1.1	91	94	488	528
Total (184)	0.9	21	2.9	9	1.2	24	47	390	496

The three types of agriculture are shaded seperately AG agriculture, HH house bold , SD standard deviation

Table 5.4 Comparison of returns per hectare and labour organization for agricultural types

Agricultural labour	Rainfed lowland		Rainfed highland		Irrigated	
	Mean return/ha ($)	%	Mean return/ha ($)	%	Mean return/ha ($)	%
With family	267	91	238	33	676	59
With partner	256[a]	9	224[a]	67	467[a]	41

[a]This figure reflects gross returns minus costs per cultivated crop, divided in half.

(Table 5.4). *Irrigated agriculture* based on cultivation of horticultural crops (i.e. primarily tomatoes and onions) and consumption-oriented production (i.e. corn and beans) occurs in the swamp areas (S. Imbirikani). *Highland rainfed* cultivation of primarily corn and beans is carried out on upland Kilimanjaro slopes by households who have purchased or accessed land there through marriage or kinship relationships (e.g. primarily N. Imbirikani, S. Imbirikani and Emeshenani households). Potential for *lowland rainfed* cultivation of corn and beans is limited to the northern and wetter regions of the study area, for example, Osilalei and northern Eselenkei, although crop failure is these areas is still common. Campbell et al. (2003) refer to lowland rainfed cultivation as "expeditionary agriculture", questioning its stability as a long-term source of benefits, but despite this evaluation most households in these areas still cultivated. Households plant crops on old livestock compound sites where manure has accumulated and soil fertility is relatively high. Gross returns in irrigated areas and highland rainfed zones are highest, but even these yields are still highly variable: they are plagued by drought, unreliability of irrigation water and salinization issues. Our results for irrigated yields per hectare (Table 5.4) are dramatically lower than those reported by Norton-Griffiths and Butt (in preparation), again emphasizing the inherent variability in returns for irrigated crops. There is also strong spatial flexibility in agricultural activities, as households in rangeland areas with only low-to-medium agroecological potential (i.e. N. Imbirikani, Lenkisim and Emeshenani) are still engaged in highland or irrigated agriculture. This is accomplished by splitting of households or forming agricultural partnerships. Thirty-one households (17%) spatially diversify their activities based on splitting households between settlements or travelling back and forth between livestock and agricultural activities.

A high proportion of households in irrigated swamp areas work with partners on their agricultural activities (Table 5.4). This arrangement becomes less frequent moving from irrigated and highland rainfed to rainfed lowland agriculture zones. Particularly in swamp and highland areas, partners are most often non-Maasai (e.g. usually of either Chagga or Kikuyu ethnicity). Plot owners commonly front the costs of all agricultural inputs under a partnership agreement, while the partner provides day-to-day labour. At harvest time, input costs are subtracted from gross profits and the remaining returns (either crops or cash) are split 50/50 between owner and partner. Interestingly, there is almost no difference in net returns per crop, per hectare in partner versus non-partner agriculture for either rainfed lowland or highland areas, suggesting that the additional labour available under partnership

arrangements may translate into greater productivity overall (Table 5.4). Even in irrigated zones where almost 41% of crops are cultivated in partnership, and while the gap between partner and non-partner returns does increase, returns per crop only drop by 31%. This is true even though returns are split in half, again indicating that there are benefits associated with partnership arrangements, particularly where labour is limited.

5.2.1.3 Off-Land Activities

Potential economic diversification options for Maasai households also include a variety of off-land activities, specifically businesses, salary and wage income, petty trade and wildlife-based activities. Wildlife-based activities are a combination of business and salary/wage jobs. Over 58% of households were receiving some household income from off-land activities. However, the relative value of these activities is again not generalized to the entire study sample, as non-livestock and non-agricultural activities represent greater than 25% of income for only 37% of households, and greater than 50% of gross income for only 20.1% of households. Significant differences in both proportion of income coming from off-land sources (ANOVA $F = 5.878$; df 5, 178; $p < 0.001$) and mean off-land income (ANOVA $F = 3.086$, df 5, 178; $p < 0.01$) exist between study areas, although variability in returns across households is clearly high (Table 5.5). This variability is particularly noticeable in terms of wildlife-based income.

In summary, there are clear differences in the activities that households engage in across the study sites. These differences appear linked to the specific agroclimatic conditions and potential existing around each site. Amboseli households seem to be opportunistic – adapting their production systems according to the options available to them. Our results also show significant variation in household production strategies within study areas, suggesting that other intra-household-specific resources (e.g. herd size and labour availability) also play a role in livelihood choices.

Table 5.5 Distribution of off-land activities by study area

Sites	HHs with off-land income (%)	Mean income ($)	SD ($)	HHs with wildlife-based income (%)	Mean income from wildlife activities ($)	SD ($)
Osilalei	66	468	776	0	0	NA
Eselenkei	57	815	557	0	0	NA
Lenkisim	70	536	389	13	642	644
North Imbirikani	66	829	857	22	786	793
Emeshenani	52	297	444	10	191	187
South Imbirikani	32	494	516	3	1730	NA
Total ($N = 184$)	57%	589	644	8%	691	706

HH household, *SD* standard deviation, *NA* not available

5.2.2 Cluster Analyses

Application of a cluster methodology to Amboseli households goes beyond general comparisons across study areas, grouping households together based strictly on similarities in their livelihood strategies. In doing so, it is possible to pose the question of whether clustering households based on "what they are doing" clarifies further the picture of diversification emerging in Amboseli. This method should allow identification of whether particular combinations of livelihood strategies predict "how well people are doing".

Application of the ACEBIN clustering method yielded eight clusters in the Amboseli region. Basic characteristics of these clusters are described in Table 5.6 using the original 12 clustering variables. Names assigned to each cluster are meant to be descriptive only of the activity combinations of households within each group. Some immediate patterns are clear. Two clusters (*Livestock intensive* and *Livestock consumers*) base their livelihoods only on livestock. The clusters are differentiated only by the livestock purchasing actions of *Livestock-intensive* households. Two other clusters combine livestock primarily with either salary and wage activities (*Livestock wage earners*) or with business and petty trade activities (*Livestock business*). Households in four clusters carry out some form of agriculture. The terms cultivator versus agropastoralist differentiate the role and importance of agriculture in these four clusters. *Agropastoralists* not only carry out substantial agricultural activities, but these activities also contribute substantially to their livelihoods. In contrast, *cultivator* households are engaged in lowland agriculture only, returns are low and these activities do not contribute greatly to their livelihood strategies. Thus, *Livestock lowland cultivator* households and *Diversified lowland cultivators* engage in lowland rainfed agriculture but are differentiated from each other by the addition of off-land activities to the livelihoods of the latter group. *Irrigated/upland agropastoralist* households combine either highland rainfed or irrigated agriculture with livestock production, while *Diversified agropastoralists* add additional off-land activities to their livelihood strategies.

5.2.2.1 Gross Returns from Activities Across Household Clusters

Figure 5.2 begins to describe the connection between the degree of diversification (i.e. households involved in more than only livestock activities), the kinds of activities they combine and gross household income. When mean gross incomes are compared, the richest households are those that are either the most diversified (*Diversified agropastoralists*) or those that combine livestock with wage labour activities (*Livestock wage earners*). A Levene's test identified that the assumption of homogeneity of variance in income does not hold across clusters ($F = 4.625$; df 7, 176; $p < 0.001$), therefore a Tamhane's test was used to compare gross household incomes across groups. The gross income for clusters of "Diversified agropastoralists" is significantly greater than that of "Livestock only intensive", "Livestock only

Table 5.6 Proportion of households (%) engaged in specific activities within clusters

Clustering variables	Livestock intensive (n = 17)	Livestock consumers (n = 22)	Livestock- lowland cultivators (n = 12)	Diversified low-land cultivators (n = 26)	Livestock and business (n = 34)	Livestock wage earners (n = 18)	Irrigated/upland agropastoralists (n = 23)	Diversified agropastoralists (n = 32)
TLUs	100	100	100	100	100	100	100	100
Livestock income	100	100	100	100	94	100	100	97
Livestock purchase	100		67	35	40	78	61	62
Livestock slaughter	94	70	13	69	61	89	26	66
Crops sold	[a]		8	11			91	87
Crops consumed			83	85			83	81
Petty trade				30	12	11		22
Business				54	97	18		59
Salary and wages				35		100		41
Irrigated agriculture							87	78
Highland rainfed agriculture							22	44
Lowland rainfed agriculture			100	100				

[a]All empty boxes correspond to zero values
TLU = tropical livestock unit

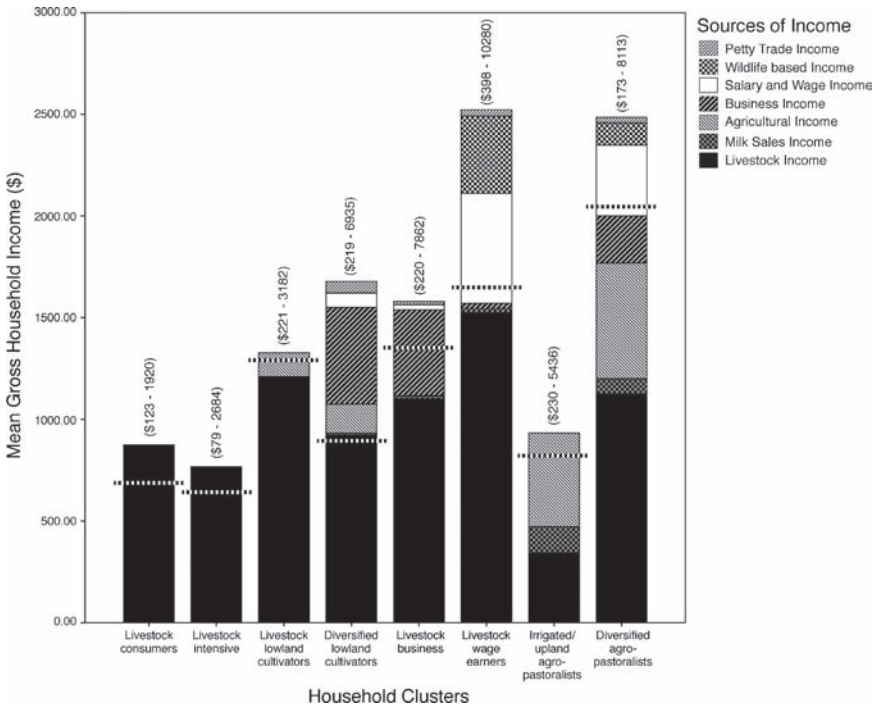

Fig. 5.2 Mean gross income from all activities by cluster. Dashed cross lines are median values for each cluster

consumers" and "Irrigated/upland agropastoralists" ($F = 4.509$; df 7, 176; $p < 0.001$). While the mean income value for the *Salary/Wage* group also looks high, the median value for this group is significantly lower, suggesting a few households are inflating the mean for this cluster, while the majority have incomes comparable to the other clusters. Median gross income values for all clusters are less than mean values (Fig. 5.2, *dashed cross lines*). This is particularly true for clusters that are the most diversified (i.e. *Livestock wage earners*, *Diversified lowland cultivators* and *Diversified agropastoralists*). This result highlights the fact that returns across activity types are highly variable. The implication is that diversification alone does not automatically imply greater household well-being.

The three poorest Amboseli clusters in terms of absolute gross income are the *livestock-only* clusters and *Irrigated/upland agropastoralists*. Comparison of mean livestock holdings (Fig. 5.3, *solid cross lines*) across the clusters indicates that livestock-only households have comparable numbers of livestock to other clusters, and comparison of median values (Fig. 5.3, *dashed cross lines*) highlights this even further. Median livestock numbers for livestock-only households are actually higher than those of the more diversified clusters, but the effect of outlier values for some livestock-rich households artificially elevates cluster means. Therefore, the stark differences in total gross incomes between clusters stem not from large differences in livestock holdings but instead from the addition of other off-farm

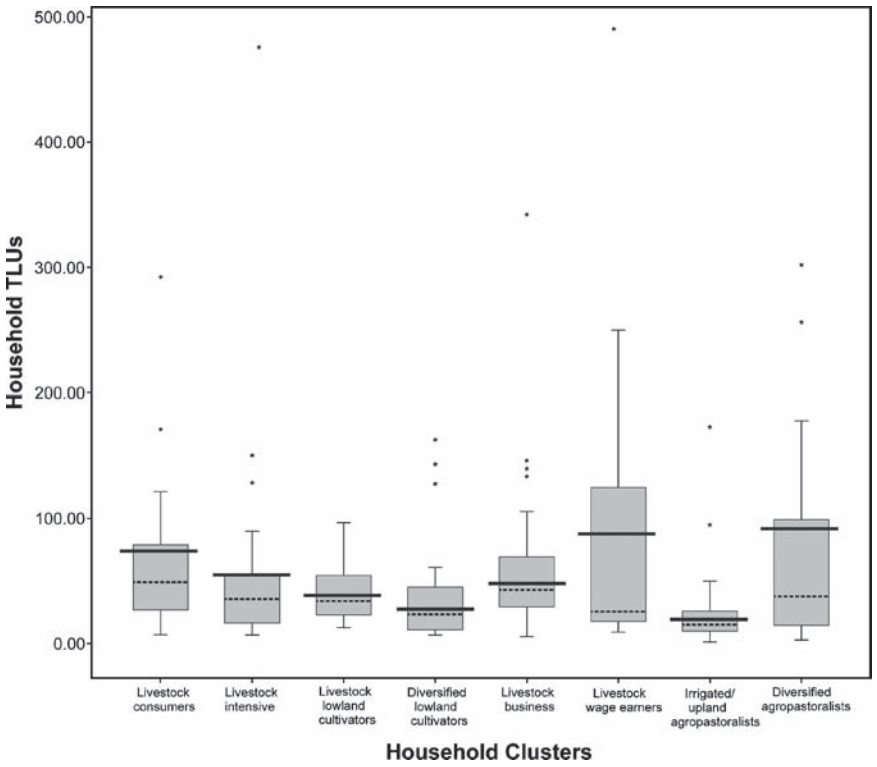

Fig. 5.3 Mean and median tropical livestock units (*TLUs*) per household by cluster. Mean values are solid lines. Median values are dotted black lines

activities. The exception here is *Irrigated agropastoralists,* who have relatively small household herds. However, once other livelihood activities are considered, the low economic status of pastoral-only households indicates that *not* diversifying livelihoods may also be unsustainable over the long term.

Despite comparable livestock holdings, total gross income derived from livestock is highest for the *Wage earners*, *Lowland cultivators*, *Livestock business* and *Diversified agropastoral* clusters. Greater livestock income stems from greater livestock selling for these groups ($1278, $986, $1092 and $1146, respectively) combined with greater slaughter and consumption values, particularly for *Lowland cultivators* ($209) and *Diversified agropastoralists* ($192). *Irrigated agropastoralists* have a significantly lower mean income from livestock sales ($274), and few households (26%) consuming livestock at very low levels on average ($37).

Whether households are reinvesting in livestock is an additional indicator of available resources. Those clusters with income from off-land sources are generally those reinvesting most heavily in livestock. For example, 77% of *Livestock wage earners*, 60% of *Livestock business*, and 62% of *Diversified agropastoralists* purchased livestock annually ($368, $314 and $351). Only 34% of *Diversified lowland cultivators* were purchasing livestock, but these households did it at a high

level ($422). In spite of low overall gross income, 60% of *Irrigated agropastoralists* purchased livestock ($352). Given their low rates of livestock selling, this was probably based on invested returns from agriculture. The exception to this pattern is the *Livestock-intensive* cluster, in which all households purchased livestock, albeit at a more moderate level ($282). More generally, most respondents spoke of the general practice of trying "to save some of your livestock" by reinvesting in a lower cost (e.g. smaller/younger) animal when an animal is sold (e.g. selling a cow, but simultaneously investing in a calf or small stock). However, number of livestock sold versus purchased was positively correlated ($p = 0.398$, $p < 0.05$) only for *Diversified lowland cultivators*, indicating that although preferred, this practice may not be tenable in the face of the increased need of most households to satisfy requirements for cash.

Agricultural returns are a component of gross income for four clusters, but contribute substantially to only two, the richest and poorest groups that are practicing upland or irrigated agriculture (Fig. 5.2). Households cultivating on lowland gained only marginal annual returns on average from their rainfed cultivation of corn and beans ($112 and $157, respectively). All households in the two lowland cultivator clusters cultivated, but the crops of 6 households failed entirely and only 4 of 32 households sold crops. In contrast, both agropastoralist clusters (both with households cultivating upland areas or irrigated swamp land) gained substantially from their agriculture ($512/year and $615/year, respectively). Seventy-one per cent (35 of 49) households were consuming some of what they grew, but *Irrigated agropastoralists* sold 5.2 times the value they consumed and *Diversified agropastoralists* sold 2.3 times the value they consumed. These differences stem from the richer *diversified agropastoralist* cluster having a higher proportion of households with upland rainfed agricultural parcels (5 vs. 10 households) and focus on growing corn and beans for consumption compared to irrigated land used primarily to grow horticultural crops for sale. These results highlight that all activities do not contribute to livelihoods to the same degree, as agricultural activities clearly make less of a contribution on average to gross income than do off-land activities. In other words, the type of diversification *matters.*

5.2.2.2 What Proportional Contribution do Activities Make to Gross Household Incomes?

Figure 5.4 breaks down the activities of households according to the proportional contribution they make to total household gross income. Income from milk sales is treated separately from livestock-based income in these analyses as this income stream emerges as important for specific household groups. Clear patterns differentiate the activities of households across clusters. As in the study area analyses, the base value of livestock activities across all clusters is high. Additional activities are critically important for certain clusters, but the value of agriculture and off-land incomes combined is greater than 50% on average for only four of eight clusters. So while a core message of this chapter is that diversification is important, diversification trends have caveats and should be carefully analyzed.

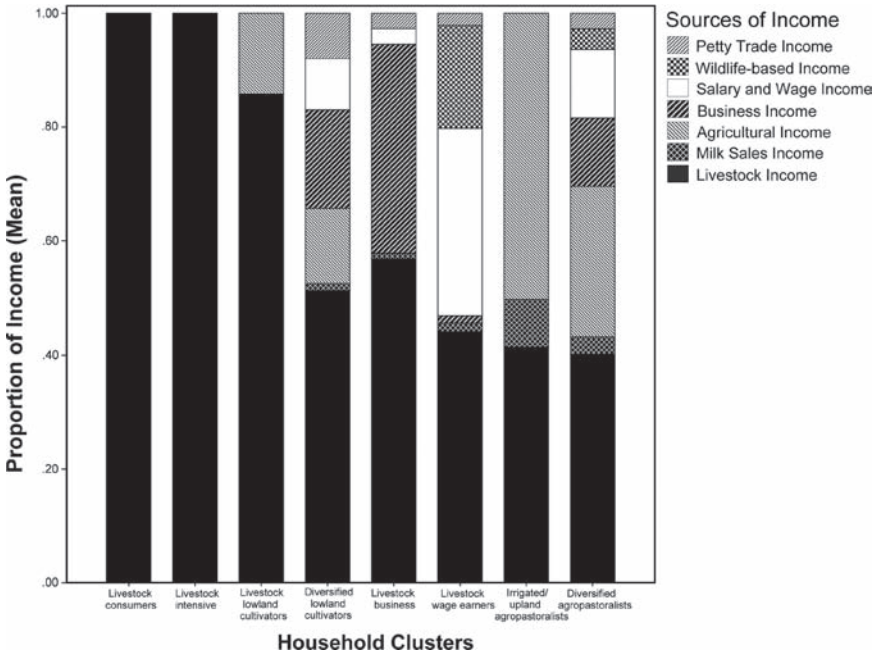

Fig. 5.4 Proportion of income from all activities by cluster

While households in four clusters do carry out agriculture, the differences in proportion of contribution to income between lowland rainfed agriculture and irrigated/upland rainfed agriculture, for example, low versus significantly higher, are clear. Poorer *Irrigated agropastoralists* depend proportionally to a much greater extent on agricultural returns relative to *Diversified agropastoral* households. *Irrigated agropastoralists* are livestock poor (Fig. 5.3) and engage in no off-farm activities, thus in spite of successful diversification into agriculture, this group remains extremely poor. The importance of milk-based income emerges in the two agropastoral clusters. Salary and wages make significant income contributions for *Livestock wage earners* and somewhat for *Diversified lowland cultivators* and *Diversified agropastoralists*. Highly diversified clusters (i.e. *Diversified lowland cultivators* and *Diversified agropastoralists*) display a pattern of more even dependence on a wider variety of household activities.

5.2.2.3 Returns from Off-land Activities

A significant difference between richer and poorer clusters is the presence of off-land income sources. Four clusters of eight have members engaged in either salary and wage, petty trade or business activities (wildlife-based activities are folded into these three categories for the following analysis). Livestock trade was the most commonly cited business activity (30% of all activities). There are important

qualitative differences between different types of activities that have been grouped into these three categories. For example, owning a hotel or a shop is more lucrative and provides more certain and regular income than selling water or beadcrafts; working as a teacher or tourist lodge employee demands higher skills and gets higher monetary returns than working as a watchman or herder. Livestock trading requires substantial experience but is associated with highly variable returns linked to drought conditions and cash flow.

To explore the significance of these differences further, the off-land activities for each activity type were grouped by the combined skill level (low to high) and predictability of returns associated with each activity (also low to high). According to this classification, activities categorized as "high skill" require some education or explicit "formalized" training. Trading of livestock was placed in a separate category, which recognizes skill and experience as being separate from formalized education.

There are interesting differences between the returns from specific activity types linked to associated skill levels and predictability (Fig. 5.5). Petty trade activities generally require only low-to-medium skill. Returns were usually unpredictable and had the lowest mean and median values of any activity type. Salary and wage activities were generally more predictable with higher mean and median returns than other activity types. However, salary activities were also split into two groups; those that required greater skill levels in terms of strong literacy, a diploma, a license or a training course (e.g. teacher, government employer or game scout),

Fig. 5.5 Income distribution of off-land activities by cluster, and by skill and predictability levels

and those that required only moderate-to-low levels of training (e.g. watchman or sweeping a church). Higher skill activities generally were better compensated (e.g. government or private sector employee), but this was not true in the case of teachers who made on average only $314/year. A stronger skill base is therefore linked to better returns, but it does not guarantee them. Business activities covered a wide range of predictability, skill levels and associated returns. Many businesses were low skill, but this did not equate necessarily with low returns – as low-to-medium skill activities may still be highly predictable or yield high returns (e.g. $2752/year for renting commercial land). Returns from livestock trading were widely variable across the sample, indicating simultaneous potential for both strong economic returns and great risk.

Analyzing these skill and predictability attributes across clusters highlights that the combinations of specific activities affect the returns accruing to households from off-land activities. Figure 5.5 breaks down the returns associated with individual activities by type and by cluster. *Livestock wage earners* and *Diversified agropastoralists* receive much higher mean returns from their off-land activities than do *Livestock business* and *Lowland cultivator* households (Fig. 5.5 – *inset box*), and these households also have the greatest involvement in wage labour activities that are higher skill and offer more predictable returns. These two clusters also have household members involved in petty trade activities, but these low value petty trade activities are not the primary source of their off-land income returns. In contrast, while *Livestock business* and *Livestock lowland cultivators* have a few households receiving high value and wage and business (i.e. predominately low skill) returns, these households also depend to a much greater extent on more variable returns from livestock trading and low value petty trade activities. Many households in all four clusters are engaged in more than one off-land activity (Fig. 5.5 – *inset box*). *Livestock wage earner* households are engaged in fewer total off-land activities, but they still receive the highest mean and median returns per off-land activity across all clusters. In contrast, a higher proportion of *Diversified agropastoralists* are engaged in multiple activities, but individual activities are of lower value overall, a fact borne out in the lower median return from off-land activities for this cluster.

In conclusion, although off-land activities play an increasingly important role in economic well-being for the households who are diversifying in this direction, not all off-land activities are the same in terms of value. The returns and opportunities for future investment associated with petty trade activities versus wage labour are vastly different. However, variability in returns across off-land activities is high even within richer clusters (Fig. 5.2), again highlighting the need to carefully examine the conditions under which economic diversification is a strong contributing factor to household well-being.

5.2.2.4 Returns from Wildlife

The level of wildlife-based returns in Amboseli is important within the context of ongoing debates over the potential of wildlife conservation to benefit local communities,

Table 5.7 Household-level returns from wildlife-based activities

Wildlife-based activities	Number of individuals	Range of returns/ year ($)	Mean returns/ year ($)
Tourist lodge employment	12	136–1,306	553
Craft sales	6	24–816	412
NGO/research	2	136–490	313
Private tourist guide	1	218	218
Game scout	1	816	816

maintain wildlife populations over the long term, and ideally, to "make local people into conservationists" (Barrett and Arcese, 1995; Roque de Pinho, 2004).

Households in Amboseli that receive income from wildlife-based off-land activities are only found in the two wealthiest clusters; *Livestock wage earners* (mean = 16% of households, median = 9%) and *Diversified agropastoralists* (mean = 4% of households, median = 0%). Wildlife-based results are disaggregated from other off-land activities in Table 5.7. Only 15 of 184 households (8.1%) are gaining direct economic returns based on a total of 22 individuals pursuing wildlife-based activities across these two clusters. Three extended households alone account for nine of these activities. The distribution of wildlife benefits across the general population is clearly uneven. The range in annual returns from wildlife-based activities is also wide, particularly for tourist lodge employment, where the respondents' wages were regularly paid, but activities ranged from low skill slaughtering of goats for the kitchen (lowest returns) to high skill management positions (highest returns). Craft sales ranged in both level of remuneration and predictability. The most highly paid individual engaged in craft sales was also a distributor of beads, but this activity was not dependable given the ebb and flow of tourist traffic in Amboseli. There was a range of wage levels for research jobs, but predictability was high during the course of the employment. The game scout job was both predictable and highly paid, but it was also rare within our household sample (n = 1 individual).

While the number of households benefiting economically from wildlife-based activities was low, wildlife benefits also accrue at the level of the group ranches – which then ideally are used for community-based development and support of group ranch students through secondary school. A partial distribution of benefits for Imbirikani and Olgulului/Lolarashi group ranches are described and quantified in Table 5.8. These data are not available for Eselenkei GR. Osilalei GR has no tourism-based activities, and was not a part of the original revenue sharing for Amboseli NP worked out with KWS.

These benefits look substantial at the level of the group ranch, and they have been the basis for funding of development projects, including school classrooms, teachers' salaries, livestock crushes, boreholes and water reservoirs, supporting community ceremonies and helping needy group ranch members with food and medical care (Roque de Pinho, 2004). However, if total revenues are divided by the number of registered group ranch members in Imbirikani and Olgulului/Lolarashi, the benefits from wildlife only range between $14and $15/member/year. Furthermore, recognizing that households are larger than the number of registered

Table 5.8 Group ranch-level returns from wildlife-based activities[a]

Return categories	Imbirikani GR ($)	Olgulului/Lolarashi GR ($)
KWS revenue sharing	11,564.50	16,326.50
Concession area lodge rent	9,524.00	20,408.00
Conservation levy/bed night fees (lodges)	26,912.00	
Game cropping	3,265.50	
Sand/gravel sales		408.00 (2002)
Bird shooting	8,377.00	
Camping fees	2,612.00 (2001)	
Public camp site revenue		~13,605.50 (2002)
Amboseli Tsavo Game Scout Association	12 members employed at 68.00–95.00 $/month	11 members employed
Total of all returns (employment excluded)	62,255.00	50,748.00
No. of group ranch members (2001)[b]	4,585	3,418
Calculated annual returns per member	14	15

[a]All data taken with permission from Roque de Pinho (2004). Unless noted otherwise figures are from 2001. Data from Eselenkei GR were unavailable.
[b]Number of group ranch members taken from Ntiati (2001)

members, these benefit figures would become even smaller on a per capita basis for both group ranches. The misuse of group ranch funds by members of the leadership is also a serious problem in the group ranches (personal observation). This issue is so problematic that frustration with the lack of transparency is contributing directly to the wish of some group ranch members to subdivide group ranch lands to better "control their own land" and potentially – to benefit more directly from wildlife – than is possible under the current group ranch system (BurnSilver, 2005).

5.2.2.5 Demographic Characteristics Across Household Clusters

No clear patterns emerge between clusters with respect to household demographics; AU per household, dependency ratio and number of workers in the household all vary around mean values of 9 AU/household, 0.4 and 7 workers/household, respectively. The average age of household heads was 41 years, with *Diversified lowland cultivators* having on average the youngest (35 years) and *Livestock lowland cultivators* the oldest (47 years), but these differences are not statistically significant. However, interesting differences do exist between clusters in terms of educational attainment of household heads and educational decisions for children (Fig. 5.6).

Heads of household from the two richest clusters have much greater educational experience both in terms of percentage of those who attended some school (50% of *Livestock wage earners* and 37% of *Diversified agropastoralists*) and average number of school years attended (9 years for both groups). Similarly, a higher proportion of children from these richer clusters are attending school (38% of *Livestock*

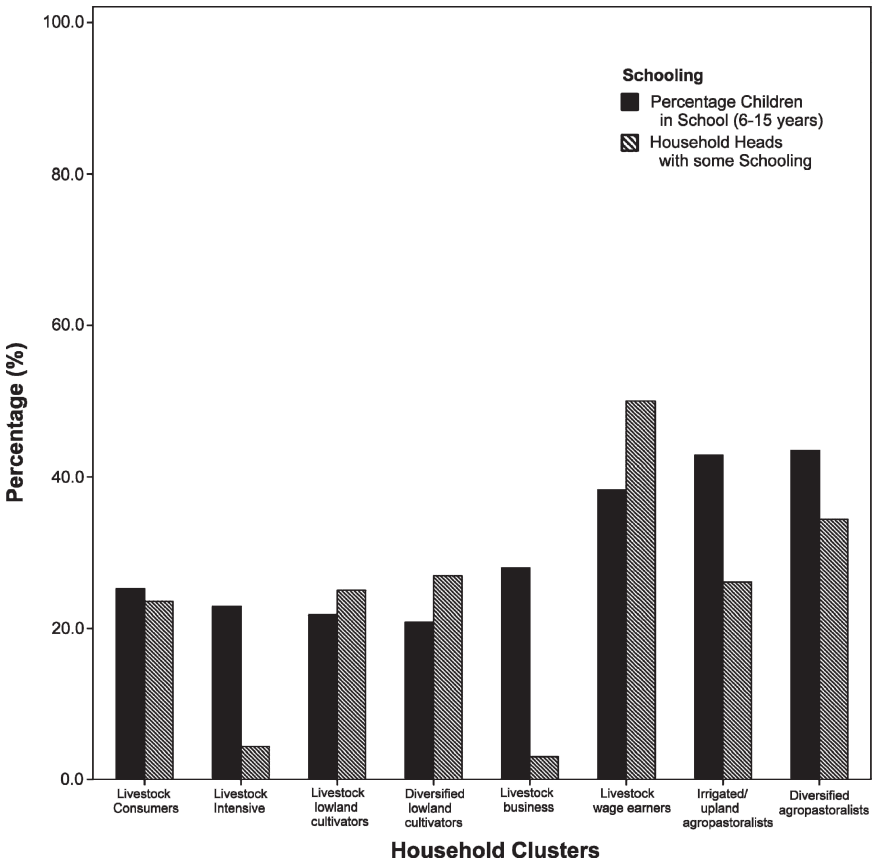

Fig. 5.6 Levels of education of household heads and children compared across household clusters

wage earners and 42% of *Diversified agropastoralists,* respectively). Higher educational attainment by household heads within these richer clusters may be contributing to greater household engagement in higher skill, off-land activities that yield better returns with greater predictability – a result that emerged for these groups in the previous section. That households in these clusters also seem to be investing in schooling their children may be both a reflection of greater resources to invest and first-hand experience with the benefits of education.

There is one additional caveat here, however. The cluster with the highest proportion of children in school is *Irrigated agropastoralists* (45%) – one of the poorest clusters. This is a pattern previously documented by Bekure et al. (1991), where poor households in Imbirikani invested their scarce resources in an effort to offer their children better options in the future – at rates higher even than richer households. Location may additionally contribute to this decision, as irrigated areas are also those located in infrastructure-rich zones (i.e. close to schools) within the study area.

5.2.2.6 Cluster Membership and Study Areas

So, how does cluster membership link to household-level activities occurring at the level of the six study areas considered initially? There are some clear connections between study area and agroecological potential and household clusters; however, cluster membership is not entirely straightforward (Fig. 5.7). Many households from the two livestock-only clusters do come from drier, more isolated rangeland areas (i.e. Emeshenani and Lenkisim); the vast majority of *Irrigated/upland agropastoralists* come from S. Imbirikani, located around the swamps and close to the road leading to the upland agricultural areas, Seventy-five per cent of *Livestock lowland cultivators* come from subdivided Osilalei and over 68% of *Livestock wage earner* households are drawn from N. Imbirikani and Lenkisim – also rangeland zones. The two clusters with substantial wildlife-based income (*Livestock wage earners and Diversified agropastoralists*) include households from study areas both in close proximity and far from conservation areas across the region; for example, southern

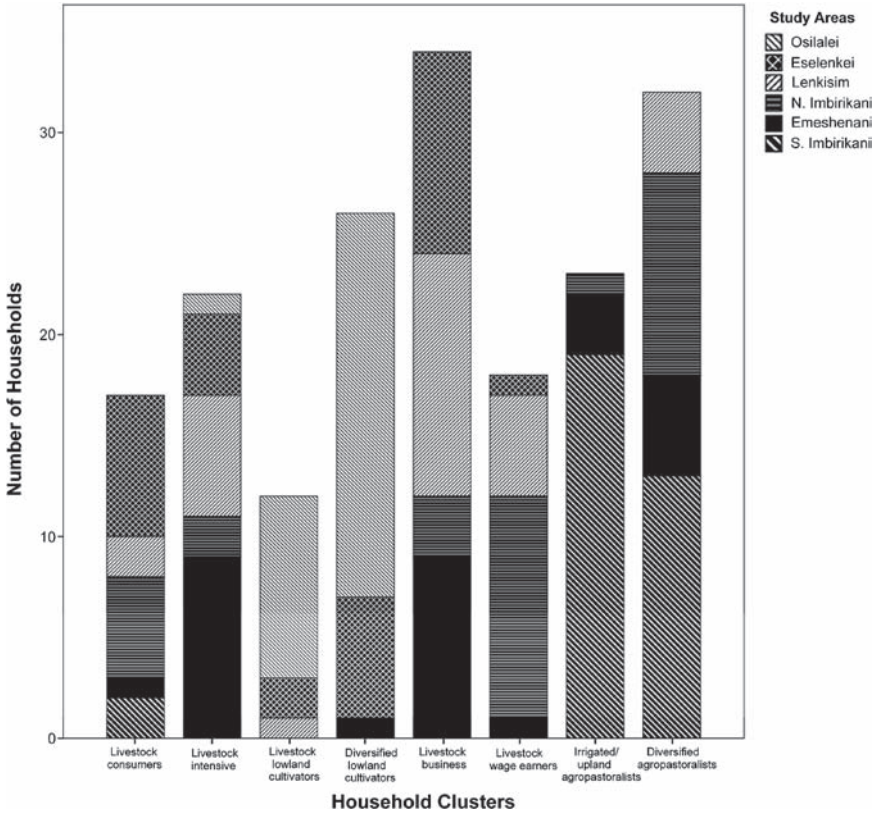

Fig. 5.7 Distribution of study area households overlaid onto household clusters

Imbirikani is adjacent to Kimana Wildlife Sanctuary, while N. Imbirikani, Lenkisim and Emeshenani are both near and far from multiple conservation areas (Fig. 5.1).

However, there are exceptions in all cases: livestock-only households actually occur in every study area; households in Eselenkei and Lenkisim are also cultivating lowland areas and some N. Imbirikani and Emeshenani households are also cultivating irrigated or upland areas, based on either mobility or splitting of households across pastoral and agricultural locations. These exceptions suggest that other factors beyond location may underlie household decisions to pursue different livelihood strategies, such as infrastructure access, and labour or wealth characteristics that are intrinsic to households.

5.3 Predicting Livelihood Strategies and Household Well-Being

So far livelihood patterns by study area and by cluster membership have been described. Now, livelihood clusters of households are examined – looking for patterns and characteristic within these livelihood groupings and the surrounding landscapes that could explain why one livelihood choice is made over another. Those factors that predict overall "how well people are doing" are then identified.

5.3.1 Modelling Cluster Membership

To what extent can the extent and type of diversification be predicted on the basis of geographical, demographic and socio-economic factors? Multinomial logistic regression (MLR) was used to model cluster membership. The reference cluster used as the basis for these regression analyses was *Diversified agropastoralists* – the most diversified group of households, one of the richest clusters, and one of the largest. A series of crosstabs identified categorical variables that were related to cluster membership and therefore should be included in the model. Table 5.9 identifies the resultant list of continuous and categorical variables that were used in the regression. All were significant to at least the $p < 0.05$ level. If two variables were related to cluster membership, but collinear with each other, only one of the pair was included in the regression. McFaddens Pseudo R-Square statistic suggests that the MLR model selected explains only 56% of the variation in cluster membership, but that the model is better at predicting the data than no model at all ($\chi^2 = 416.512$, df = 84, $p < 0.001$).

Significant parameter estimates for the regression are presented in Table 5.10. Parameters with significant *negative* coefficients (B) decrease the likelihood of that response category with respect to the reference category (*Diversified agropastoralists*). Likewise, parameters with significant *positive* coefficients increase the likelihood of the response category with respect to the reference category.

Table 5.9 Variables used in multinomial logistic regression analyses

Category	Variables included	Collinear with
Demographic	Age of household head	
	Schooling of household head[a]	
Spatial	Services distance (km)	
	Road distance (km)	
	Livestock market distance (km)	
	Dry season water distance	
	Mean NDVI	Coefficient of variation in NDVI
	Conservation area distance (km)	
	Proportion of pasture within 10 km^2	
Productive	Gross income	
	TLUs per household	TLU/AUs
	Mobility in drought year	

[a]Schooling of household head was categorized as 0 = no schooling, 1 = some schooling. All variables were significant predictors in the model to the level of $p < 0.05$ *TLU* tropical livestock unit, *AU* = adult unit

Geographic factors emerged as relatively strong predictors: Cluster membership in some cases seems to be predicated on whether households are located in core pastoral areas (far from services and roads) and are close to conservation areas. Areas within the study zones that have higher mean NDVI (normalized difference vegetation index – a measure of green biomass production), but a lower proportion of pasture within 10 km^2 are those near riparian areas or further to the north where tree cover is much greater (e.g. the Osilalei area which is predominately *Commiphora* woodland and the Eselenkei area where permanent settlement zones are near the Eselenkei River corridor). The assets of groups (TLUs and gross income) emerge as important for differentiating some clusters relative to rich *Diversified agropastoralists*, but definitely not all. Similarly age and education are defining features of only a few groups.

The only differences between *Diversified agropastoralists* and *Livestock wage earners* – by far the richest clusters – are that *wage earners* are further from livestock markets and conservation areas on average. This reflects that a large proportion of *Diversified agropastoralists* are settled adjacent to Kimana Wildlife Sanctuary, while wage earner households are located in more core rangeland zones that are between conservation areas, but not bordering them. However, wage earners are still one of the two clusters most heavily engaged in wildlife-based activities, so it does not seem that greater distance from conservation areas is constraining households from engaging in these strategies. Most wage earning households are also clearly further from irrigated and rainfed agricultural options (Fig. 5.7), but this factor was not considered in the final MLR model.

Irrigated/upland agropastoralists and the two livestock-only clusters (*Intensive* and *Consumers*) are the poorest clusters overall. All three clusters are differentiated from the reference cluster of *Diversified agropastoralists* as likely to have significantly lower gross incomes. The regression model differentiated well between livestock-only clusters, highlighting that the *Livestock-intensive* households have

Table 5.10 Significant parameter estimates

Clusters	Age of HH	Schooling	Services distance	Road distance	LS market distance	Water distance	Conservation distance	Mean NDVI	Pasture proportion	Gross income	Household TLUs	Drought year mobility
Livestock intensive			+	+			+	+		–	+	
Livestock consumers			+				+			–		
Livestock lowland cultivators	+*		+*			+	+	+	_			+
Diversified lowland cultivators			+		–*	+	+	+	–	+	–	+*
Livestock business		+		+			+	+	–			
Livestock wage earners					+		+					
Irrigated agro-pastoralists						+*	–			–		+
Diversified agropasto-ralists	Reference cluster											

All parameters significant at $p < 0.05$ unless noted with *. These parameters are significant at $p < 0.01$
HH = household, *TLUs* = tropical livestock units, *LS* = livestock

more TLUs and come from more agroecologically productive areas on average as compared to *Livestock consumer* households, but both clusters are more isolated from services and infrastructure than richer clusters. Another difference between the two groups is that *Livestock-intensive* households are more mobile in critical drought periods. The *Irrigated agropastoral* group is closer to conservation areas (although no households in this group are benefiting from wildlife-based income), and although these households are more sedentary they are still highly mobile in critical periods.

In conclusion, although the MLR results identified characteristics of particular clusters relative to the reference cluster, they were not particularly useful in identifying a cohesive set of factors that would predict why livelihood strategies are pursued by particular groups of households. Distance to services (roads, markets, schools) has been identified by previous researchers (de Wolff et al., 2000; Njenga and Davis, 2003) as conditions that contribute to economic opportunities and by association human well-being, but our analyses indicate that households at the crossroads of all these resources (i.e. agropastoralists) can be either rich or poor, perhaps dependent more on the baseline livestock resources they have available to them. Similarly, *Livestock wage earner* households are rich, but generally are located in core rangeland areas further from services. Therefore, these analyses provided some tantalizing clues linking household economic status, personal characteristics and resource access to activity choice but no generalizable or predictive relationships emerged.

5.3.2 Predictors of Economic Well-being in Amboseli

While it is clear that Amboseli households are diversifying, to what extent does this diversification as opposed to the wider household demographic and landscape characteristics predict household well-being? Traditional pastoral studies have focused almost exclusively on household herd size as an indicator of household wealth, and by association, human well-being. However, in the Amboseli system – where diversification is emerging as a defining characteristic of livelihoods – a wider definition of household well-being is needed. Consequently, household gross income also was examined as a more general indicator of economic status, since it is based on income from combined off-land, agricultural and livestock activities.

So are there particular demographic, production and spatial variables that contribute to the well-being of pastoral households, and which types of variables are most important? Table 5.11 presents the starting list of demographic, production and spatial variables that were regressed against gross income and household animal wealth (TLUs) in Amboseli (refer to Chap. 2 for the rationale used in choosing common variables across study regions). Gross income values for livestock, agriculture and off-land activities were added as independent predictors for the TLU regression, as in most cases they were more closely correlated than were

Table 5.11 Regression variables

Demographic variables	Spatial variables	Production variables
Household AUs (ln)	Km from livestock market	Acres lowland rainfed agriculture (ln)
Age of household head (ln)	Km from large town (ln)	Acres highland rainfed agriculture (ln)
Dependency ratio: No. unproductive, <5)/productive, 6+) workers (ln)	Km from road (power)	Acres irrigated agriculture (ln)
Proportion of children schooling 6–15-year-old (ln)	Km from services, primary school, health centre, weekly market) (power)	Mobility of cattle herd in 2000 (drought year) (ln)
Household head years schooling (ln)	Km from dry season water (ln)	Proportion of income from agriculture (ln)
	Km from conservation area (ln)	Gross income from agriculture + 0.01 (ln)
	Mean NDVI (10 km^2)	Proportion of income from livestock (ln)
	NDVI coefficient of variation (10 km^2)	Gross income from livestock + 0.01(ln)
	Proportion of pasture within 10 km^2	Proportion of income from off-land (ln)
		Gross income from off-land +0.01 (ln)
		Number of off-land activities + 0.01 (ln)
		TLUs per household (ln)
		Gross income + 0.01 (ln)

Ln log normal transformation of data values; *power* power transformation of data values. $N = 184$ for all variables, *TLUs* tropical livestock units

proportion of income from livestock, agriculture and off-land activities. Most variables were transformed to achieve either normal or near-normal distributions. Only variables with significant correlations ($p < 0.05$) with dependent variables were included in the regression analyses. In cases, when two independent variables were correlated with each other, the variable correlated most highly with the predictor variable was included in the regression.

Table 5.12 presents results from the most parsimonious OLS models with gross income and TLUs as dependent variables. The α values (standardized coefficients) indicate the magnitude and the size of the effect of each independent variable. Both models are significant at $p < 0.001$ level. The independent variables included in each model explained 54% of the variation in gross household income and 53% of the variability in TLUs across households.

5.3.2.1 Predicting Gross Income

The factor contributing by far the most to household gross income was livestock holdings per household (Table 5.12). This confirms that although Amboseli households are diversifying their activities, they still derive a majority of their livelihoods from livestock. Number of off-land income sources was also a strong determinant of gross income for households as Fig. 5.2 suggested previously. Proportion of income from off-land sources and number of sources of income per household were highly correlated (ρ; $r = 0.855$, $p < 0.001$), suggesting that the more business, salary/wage or petty trade income streams a household has the higher their off-land and gross income levels.

The proportion of income from agriculture was not a significant predictor of gross income, although the number of hectares of highland rainfed agriculture planted by households was. Therefore, the type of agriculture pursued by households may matter more than just general engagement in agriculture. Age was additionally a positive predictor of gross income; the process of household development takes time, so older householders would generally be further along in terms of capital and livestock accumulation.

Household size, schooling level of the household head and mobility in a drought year were positively correlated with gross income, but dropped out of the regression once other variables were included. Interestingly, the proportion of income from livestock was negatively (but insignificantly) correlated with gross income, illustrating that livestock still constitute the basis of household livelihoods for poorer households, but do not necessarily contribute into higher gross incomes. No spatial variables were correlated with gross income in spite of the spatial clustering in livelihood strategies seen across study areas, and consequently these were not included in the regression model.

5.3.2.2 Predicting Livestock Holdings

The strongest predictors of household TLU levels were livestock income and number of adult equivalents in the households (household size) (Table 5.12). TLUs also increase moderately with greater household mobility and greater distance from services (e.g. town centres with primary school and health facilities). In other words, households that are settled in more isolated core rangeland areas are larger and have greater livestock mobility – and have larger household herds. These characteristics are descriptive of more "traditional" pastoral households where large families provide herding labour and mobility is an integral component of pastoral production strategies. The off-land income variable was maintained in the final model, but dropped out ultimately as a non-significant predictor. Proportion of income from agriculture was negatively correlated with TLUs ($\rho = -0.257$, $p < 0.001$), but was not significant in the final OLS model.

Table 5.12 Results of multiple linear regression analyses predicting gross income and household TLUs[a]

Gross income	Unstandardized coefficients		Standardized coefficients			TLUs	Unstandardized coefficients		Standardized coefficients		
	B	SE	α	*t*	Sig.		*B*	SE	α	*t*	Sig.
(Constant)	–3845.151	1100.227		–3.495	0.001	(Constant)	1.139	0.300		3.791	0.000
Age (ln)	685.921	297.313	0.117	2.307	0.022	Household AU (ln)	0.688	0.107	0.350	6.446	0.000
TLUs (ln)	792.002	77.364	0.528	10.237	0.000	Mobility 2000 (ln)	0.246	0.048	0.275	5.169	0.000
Highland rainfed agriculture (ln ha)	109.950	56.851	0.100	1.934	0.055	Services distance, power)	0.008	0.003	0.164	3.111	0.002
No. off-land income sources (ln)	642.266	79.611	0.409	8.068	0.000	Gross livestock income (ln)	0.196	0.031	0.344	6.255	0.000
						Gross off-land income (ln)	0.019	0.011	0.093	1.796	0.074

[a]Predictors dropped from gross income model: Drought year mobility, household AUs, and schooling of household head. ANOVA, $F = 55.078$; df 4, 179; $p < 0.001$. Predictors dropped from TLU model: Mean NDVI, Km from large town, Km from livestock market, age of household head, proportion agricultural income, and hectare of irrigated/upland agriculture. ANOVA, $F = 41.527$; df 5, 178; $p < 0.001$ *TLUs* tropical livestock units, *AU* adult unit, *SE* standard error

5.4 System Trends

It is apparent that Maasai households in Amboseli are part of a trend towards diversification occurring across pastoral systems both regionally and globally. But, results also indicate that diversification does not mean that pastoral households leave livestock production behind as they engage in new activities. The process seems to be more a question of combining new strategies with livestock production, not abandoning livestock entirely. Similarly, the way that pastoral households raise their livestock is also changing. Pastoral *intensification* efforts are ongoing, as households try to gain more from the livestock they do have. Another question associated with diversification is relevant here – once an individual has diversified in new economic directions – are these livelihood choices permanent, or are diversification efforts dynamic through time? The following section focuses on these detailed questions regarding livestock intensification and livelihood trends in the Greater Amboseli Ecosystem.

5.4.1 Livestock Intensification

This discussion of livestock intensification is based on a definition taken from Galaty and Johnson (1990), where *intensification* refers to an increase in the units of livestock produced (e.g. meat, milk, hides) based on a given level of inputs (e.g. feed, water, veterinary drugs or labour). The model of intensified livestock production advocated for pastoral areas in Kenya by development specialists revolved around increasing off-take rates, better veterinary care, water provision and lowered rates of transhumance (Hedlund, 1971; Rutten, 1992). Some also advocated for private property as a mechanism for investment, whereby title deeds could be used to guarantee loans for infrastructure improvement (Oxby, 1982; Mwangi, 2003, 2006). In spite of concerted policy efforts and significant expenditures of resources, this "package" of intensification measures was never adopted in its entirety by Amboseli Maasai, but there are current indications that pastoral households are making efforts to raise the productivity of their herds. An additional component of livestock intensification emerging independently in Amboseli is the actions of herders to improve the breeds of their animals by crossing local zebu cattle and smallstock with improved breed animals (i.e. Sahiwal and Borana for cattle) (Rege and Tawah, 1999; BurnSilver et al., 2007).

Results presented below are based on households' responses to a series of questions on strategies associated with intensification of livestock production. Respondents ranked their perceptions on levels of change that had occurred vis à vis these strategies (from high levels of change to no change), and then enlarged upon their answers qualitatively. Results are presented in Table 5.13, categorized by study area and agroecological potential.

In response to the question: "How have the breeds of your animals changed", results show a strong differentiation across study areas in herders' efforts to hybridize

Table 5.13 Indicators of intensification by study area and agroecological potential

	Study areas							
Degree of change in production strategies	Osilalei (%)	Eselenkei (%)	Lenkisim (%)	North Imbirikani (%)	Emeshenani (%)	South Imbirikani (%)	Number of responses	% of total
Agroecological potential	High		Medium		Low			
Breed change								
High	24.1	76.7	17.2	25.0	0.0	21.2	50	27.3
Medium	31.0	13.3	34.5	21.9	10.0	9.1	36	19.7
Little	13.8	10.0	31.0	28.1	20.0	3.0	32	17.5
None	31.0	0.0	17.2	25.0	70.0	66.7	65	35.5
Total							183	100.0
Selling of animals								
High	20.7	83.3	70.4	64.5	75.0	42.3	97	58.8
Medium	27.6	16.7	14.8	12.9	7.1	11.5	25	13.7
Little	10.3	0.0	7.4	0.0	10.7	7.7	10	6.1
None	41.4	0.0	7.4	22.6	7.1	38.5	33	20.0
Total							165	100.0
Use of banking								
High	0.0	25.0	16.7	6.3	0.0	11.4	18	10.0
Medium	0.0	28.6	23.3	3.1	3.7	11.4	21	11.5
Little	3.6	32.1	43.3	6.3	0.0	5.7	27	15.0
None	96.4	14.3	16.7	84.4	96.3	71.4	114	63.3
Total							180	100.0
Use of credit								
High	3.7	7.7	3.4	3.4	0.0	9.1	8	4.7
Medium	0.0	19.2	13.8	0.0	0.0	6.1	11	6.0
Little	0.0	46.2	6.9	6.9	4.0	3.0	18	10.7
None	96.3	26.9	75.9	89.7	96.0	81.8	132	78.1
Total							169	100.0

Shading denotes areas of similar agroecological potential

local zebu cows with the larger Borana and Sahiwal cattle. A majority of households in areas with low-to-medium agroecological potential (Emeshenani and Lenkisim) and swamp areas (S. Imbirikani) indicated no or little change in the breeds of their cattle (only results for cattle are presented here). Stated reasons for the slow change were the much greater needs of hybrid or purebred Borana and Sahiwal animals for forage and water resources, and their inability to migrate long distances during drought. Or, in the words of one Maasai elder, "….these animals are valuable, but they are like "children", in need of much care". Response patterns shifted, however, in higher rainfall areas, with households in Osilalei, Eselenkei and even N. Imbirikani more evenly spread across a range of low-to-high perceptions of change. This suggests that individual households are weighing the trade-offs associated with moving towards dependence on hybridized animals in what remains a highly variable environment.

Households were asked "How has amount of animals that you sell changed"? Almost 60% of households replied that there was a high level of increase in the number of animals that they were selling now versus in the past, but there was some differentiation in responses by area. Osilalei and S. Imbirikani were zones where the largest proportion of households indicated few or no changes in selling behaviour. This makes some sense for S. Imbirikani given that households have more access to agricultural goods without selling animals, but the source of this difference in Osilalei is not clear. Are households selling fewer animals because they have larger hybrid livestock which yield more in the marketplace when sold? The reason given overwhelmingly for the general increase in selling behaviour was that peoples' needs for cash were much greater now than previously, for example, to purchase veterinary drugs, acaracides, school fees, food, clothing and consumer goods (e.g. bicycles, etc…).

Pastoral households were also asked to describe changes in their use of either banking or credit facilities. Given the often "boom and bust" cycles of animal populations because of recurrent drought (Desta and Coppock, 2004), an increase in the use of banking could be a sign of pastoral movement away from using animals as walking banks. But, a majority of households indicated no or little change in their use of these resources. The study areas where some households perceived increased use of these options were Eselenkei and Lenkisim, in the centre of the study region, and N. and S. Imbirikani. Eselenkei and Lenkisim are benefiting from banking options offered to households through the Catholic Mission in Lenkisim. Those N. and S. Imbirikani households using these resources mentioned their relatively easy access to banking facilities in Oloitokitok and Sultan Hamud, at either end of the main Emali-Oloitokitok all-season road. Use of banking facilities was low, but use of credit was even more rare, and those few households who had taken out formal loans had either well paying, very predictable jobs, or were using informal livestock associations with access credit.

Hiring of herding labour is another indication of intensification efforts. Thirty-four households (18.4%) had hired herding labour to watch after their animals. There was a relatively strong correlation between wealth as measured by gross

income and expenditures for hired herders (Pearson coefficient, $r = 0.552$, $p < 0.001$), indicating that wealthier herders may currently be making decisions to free up household labour for other activities. Households stated that one of these activities is schooling for their children. The results above highlight that not only are pastoralists diversifying, they are also changing aspects of how they raise, sell and manage their animals. Breeds of local animals are changing and more animals are being sold. Infrastructure access and agroecological potential seem to be important criteria in terms of use of credit and banking services and efforts to use crossbreed cattle herds. However, a perceived lack of available credit (or high risk associated with credit?) for households suggests that there may be a limit in how far households can push efforts to intensify livestock production in the future (Boone et al., 2006).

5.4.2 Diversification Pathways Through Time

The wealth of recent scholarship on diversification trends in pastoral societies has greatly contributed to recognition that pastoral livelihood strategies are changing, and that benefits accrue from diversifying (Little et al., 2001; Thompson, 2002; Thompson et al., 2002; McPeak and Little, 2005). However, there has also been a tendency for researchers to think about diversification strategies as unidirectional, implying that once it occurs, a household will remain diversified in perpetuity. The Amboseli data indicate that the situation on the ground is much more fluid, and specific to the situation and individual than this description implies.

Figure 5.8 presents diversification timelines for heads of households, as individuals moved in and out of eight categories of activities from the time they began independent economic life (i.e. when they received their livestock), to the present (2001). The same data are presented in two ways; first, according to year (Fig. 5.8a), and second, according to age (Fig. 5.8b) – when individuals began and stopped activities. Looking at the data by year highlights that some activities are situation-specific (i.e. linked to drought), while analyzing patterns by age illustrates that certain activities are more linked to the stage of an individual within their lifecycle.

Livestock holding, livestock trading and employment as a livestock herder are activities clearly linked to the age of an individual (Fig. 5.8b). However, while individuals kept their livestock once they had received it, the number of individuals engaged in livestock trading and herding activities declined significantly as they aged. The turnover rate for livestock trading was 69%, the highest of any activity. The primary reason for beginning to trade livestock was to build up an individual's herd, and the associated perception of potential economic gain (44%), although economic need was also a factor (19%). However, lack of capital, age and rising responsibilities were factors cited for ending the activity. This is not to say that all trading was unsuccessful (although it was for some), but a successful trader with a growing household also has greater calls on his time, and this was one form of pressure

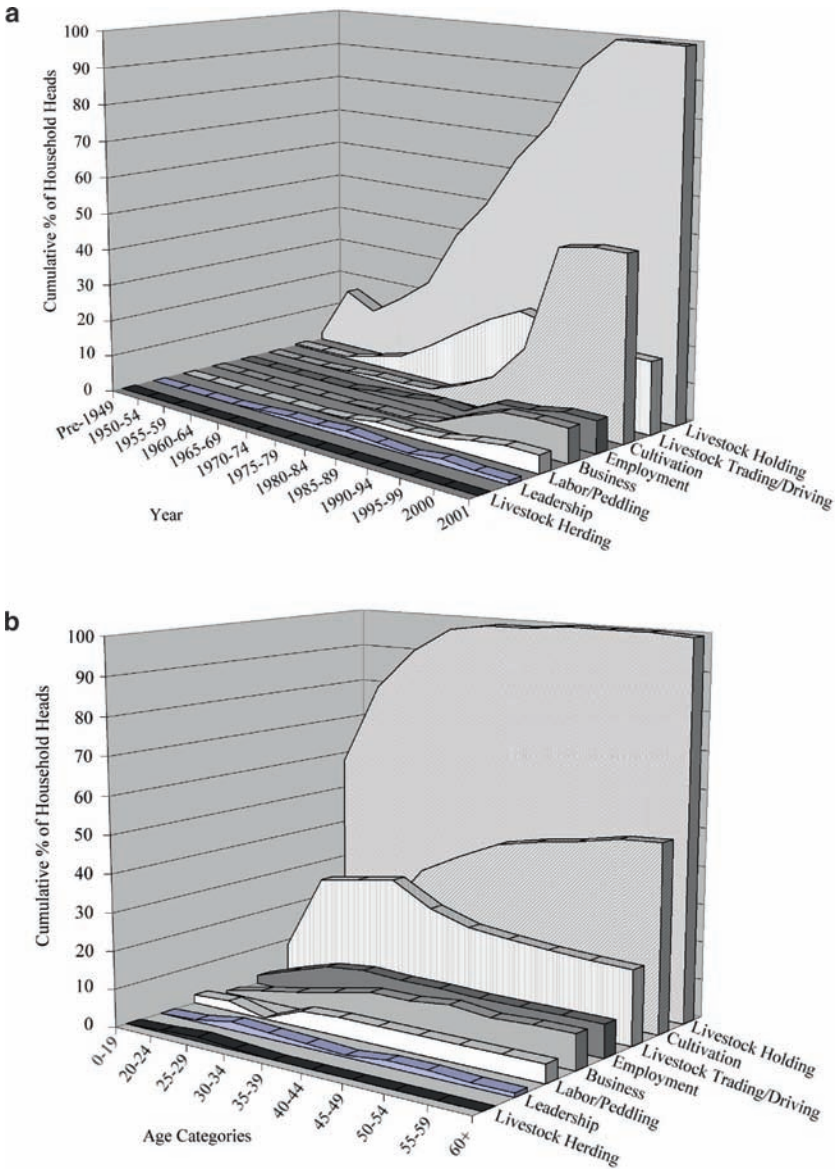

Fig. 5.8 Diversification timelines by (**a**) year and (**b**) by age categories

cited by individuals to stop trading and focus on their families and animals. This implies a form of diversification that is more short-term and is also more goal-specific.

In contrast to these age-linked activities, adoption of cultivation is inelastic to age (i.e. individuals begin cultivation at all ages), and the strong pickup of cultivation

seems to be more time- and situation-specific. Individuals rapidly diversified into cultivation during the period extending from the early to mid-1980s – a time of severe droughts – but cultivation has also continued to grow since then (Fig. 5.8a). Cultivation also seems to be an activity that once begun is rarely put aside, as only 12% of individuals who began agriculture then stopped. Also clear is that the reasons for engaging in agriculture were primarily negative. Individuals began cultivation out of economic need or in an effort to mitigate for livestock losses. A few people (16%) also indicated that they had a specific plan in mind to diversify their activities to minimize future losses from drought.

Business, wage and small-scale peddling (e.g. of goods and labour) activities seem to be sensitive to both time and age. There was a general period of strong pickup in these activities from 1985 to 1995, but there is also a trend for individuals to begin these activities at younger ages. There was by far less turnover in employment (30%) than in either business (48%) or small-scale peddling (44%) activities, but 30% turnover is still relatively high. Again, negative reasons for beginning these activities were cited most often ("economic need"), but a few stated reasons were also positive ("profit potential" or "increasing/saving the herd"). Small-scale peddling was also perceived as "cheaper to start" than other activities. However, when asked why they ended activities, individuals cited overwhelmingly negative reasons, whether linked to family needs, drought, money issues or instability of the work itself. The exception was two individuals who stopped one activity to pursue something "better" (e.g. to take a better job).

Two other activities, leadership and investment, demonstrate interesting diversification patterns. Leadership activities (e.g. group ranch committee membership) seem to be age-sensitive as there are two humps when individuals held offices (at around 30 and 55 years of age) (Fig. 5.8b). These activities are clearly of finite duration. This is an interesting illustration of the current pattern in Amboseli for leadership positions to be held on the one hand by respected elders, and on the other by younger, educated men. In contrast, the four individuals who purchased commercial and residential plots as rental properties were older, and had been successful at other activities (e.g. livestock trading) before investing their profits into property. One perception was that these properties would "help their livestock" as the income from investments decreased pressure to sell animals to satisfy family needs.

Our goal in this section was to expand the discussion of diversification beyond just identifying that (1) people are doing it and (2) diversification is economically important in the lives of pastoral households. Equally important is to "thicken" the understanding of under what circumstances individuals will diversify, and which activities may be time-specific and long-term (i.e. cultivation), versus the more short-term, and age- or goal-specific (i.e. livestock trading). People generally chose to diversify based on need or with high hopes of economic gain, but there was high turnover in business, wage employment and peddling activities, and not usually by choice – illustrating that while diversification activities are important to households, they are not necessarily *stable*. These analyses also suggest that households may link together some activities through

time, for example, reinvesting profits from one activity into investments or leaving one job for another, but more questions remain to be answered in this direction. However, it is clear that diversification in many cases is not unidirectional, rather the process is much more punctuated and fluid through time, linked to specific external causes, personal circumstances and life stages.

5.5 Maasai Livelihoods: Current and Future

The livelihood options embodied in an approach to conservation that is predicated on sharing of benefits with communities has been lauded in the literature since its 1980s inception –in Amboseli – as "community-based conservation". The approach has been viewed equally hopefully by the Maasai of this region. However, the household-level results presented here show that proportionally very few households are benefiting directly from tourism-related activities, although households do receive more household-level benefits currently than in Longido (Chap. 6). In contrast, group ranch-level benefits from the KWS and tourism operators are high in the GAE, but there remain significant problems with transparency and fair distribution. So the question remains, are the benefits that Maasai do receive from wildlife substantial enough to (1) contribute positively to their livelihoods and (2) sustain and generate positive conservation behaviours vis à vis their interactions with wildlife? Recent work by Barrett and Arcese (1995), Barrow et al. (2000), Goldman (2003) and Roque de Pinho (in preparation) suggests that the link between conservation benefits and local-level community development is still not strongly established in practice, and substantial institutional barriers exist which weaken the effectiveness of strategies on the ground. Despite community compensation programs now on the ground in Imbirikani group ranch, poaching and killing of problem wildlife is on the rise (McLennon, personal communication.). Similarly, Kenyan President Mwai Kibaki's unsuccessful recent effort to degazette Amboseli NP in advance of the 2005 Kenya Constitutional Referendum and give the park "back to the Maasai" illustrates that 30 years later, conservation in Amboseli still remains a highly charged political issue and a focus of conservation controversy.

So, it seems important at this stage to take a step back and contextualize wildlife-based livelihood strategies within broader trends of economic diversification and livelihood change occurring in Maasailand. It is clear that for the vast majority of pastoralists, household-level impacts of conservation are currently very small in comparison to returns accruing from general economic diversification. Economic diversification is well underway in southern Maasailand as it is in other pastoral areas of East Africa. But, it is also critical to identify the circumstances under which diversification is linked to improved economic well-being for pastoralists. Our results showed that the vast majority of Amboseli households still gain more than 50% of their livelihoods from livestock, so highlighting the benefits of economic diversification without equal attention paid to the efforts of pastoralists to intensify their livestock production may also be shortsighted in the long term.

Across all our analyses, it is clear that livestock production alone is not the most remunerative current livelihood pathway being pursued in the Amboseli region. Those pursuing livestock in combination with other activities are doing better on average. However, when the benefits accruing from different categories of activities were examined (i.e. agricultural and off-land), there were significant differences between benefits from different types of agriculture (i.e. higher valued irrigated and highland rainfed in comparison to low value lowland rainfed agriculture), as well as strong differences between returns from agriculture versus off-land activities. For example, the three poorest clusters of households were the two livestock-only clusters and then *Irrigated upland agropastoralists*, where households were pursuing cash crop agriculture in addition to livestock. But, in spite of adding high-value agriculture to their livelihood base, these households were still poor overall. On average *Irrigated agropastoralist* households were also livestock poor, and diversification into agriculture alone was not pushing them ahead of households pursuing only livestock, or others who were combining more livestock with additional off-land activities. The conclusion to be drawn from these analyses is that kind of diversification matters – just economic diversification alone does not predict straightforward improvements in economic well-being.

This qualification regarding the benefits of livelihood diversification is strengthened further based on results which broke down off-land activities by the economic returns associated with different predictability and skill levels. Predictable wage jobs requiring high levels of training offered the best levels of remuneration to households, and in contrast petty trade jobs with low predictability and training requirements had the lowest returns. There were exceptions to this rule; however, as some households with no formal education or training still engaged in highly remunerative activities (e.g. property investment and grain milling). The critical question remains, however – who has the capital to make the large capital or schooling investments required to tap into the most successful activities? Petty trade activities may have low levels of remuneration, but they also require less capital outlay to begin and sustain them. The results of the logistic regression analyses pointed out that both herd size (TLUs) and greater involvement in off-land activities predicted higher gross income levels for households. This result points to a divergence between investment and activity trajectories for those households with previous successful involvement in wage labour or business, or larger herd sizes, versus those without these foundations on which to diversify and invest. In other words, richer households have the tools to capitalize on their success in the direction of more skilled or highly predictable activities, while poorer households may be much more limited in their efforts to diversify into either predictable or high skill endeavours. This is a pattern identified by Barrett et al. (2001) working with agricultural groups, and suggests that greater income stratification between poorer and richer households could be an effect of future economic diversification in Maasailand. One additional caveat here is that households in the poorest cluster – *Irrigated agropastoralists* – were still schooling their children at rates higher than all the other clusters. Schooling in this sense

is a future investment in diversification, one which may pay off over the longer term for these households.

Quantifying the connection between specific livelihood choices and well-being was also a focus of this chapter. Results indicated that greater age, engagement in highland agriculture, larger herd size (TLUs) and more off-land income sources were predictors of higher gross incomes for households. Mobility during critical drought periods, larger households (AUs), *greater* distance from services, and greater income from livestock and off-land income sources were significant predictors of herd size. Greater mobility in critical drought periods was also a variable that differentiated membership between some clusters. Results show clearly that other sources of income such as agriculture, businesses and wage jobs do contribute significantly to livelihoods. However, greater age, larger households, maintaining many animals and the ability to be mobile are components of a more "traditional-pastoral lifestyle", suggesting that in spite of ongoing economic diversification into other activities, the characteristics that have always contributed to being a successful pastoralist are still critical today. It is interesting to note that there was no overlap between significant predictors of livestock wealth and gross income, although variables such as age and household size are correlated. This suggests the trajectories between greater herd size and higher gross incomes may not be necessarily mutually reinforcing for all households – particularly when comparing households in more isolated and extensive pastoral areas versus those in infrastructure-rich zones.

The importance of mobility in predicting herd size is also of interest given the currently strong pressures on pastoralists and group ranch committees to subdivide rangeland areas in Imbirikani, Eselenkei and Olgulului/Lolarashi group ranches – particularly for the proportion of households in Amboseli (21% in the household sample) who were dependent only on their herds. Other researchers have linked mobility with wealth (Fernandez-Gimenez, 2001) and risk alleviation in drought-prone environments (Niamir-Fuller, 1999; Adriensen and Nielsen, 2002). Even in already subdivided Osilalei group ranch, households were highly mobile in drought periods in spite of sedentary grazing patterns during normal years (BurnSilver and Mwangi, 2007). That mobility emerged as a significant predictor of herd size in spite of ongoing diversification efforts, strongly suggests that further sedentarization and subdivision of group ranch lands could have significant and negative effects on human well-being given the continued importance of livestock to the Maasai economy (Fratkin and Mearns, 2003).

Given these findings, results which begin to document the intensification of livestock production in Amboseli are also significant to a discussion of pathways of change and continuity in Maasailand. We described four emergent components of intensification trends in the region, and although results do not quantify the economic benefits of these strategies, there are clearly economic implications for households as these strategies mandate changes in how households raise, sell and manage their livestock. For example, there are potential benefits to households from bigger, more valuable livestock for sale in the marketplace (King et al., 1984; Bekure et al., 1991; Zaal, 1998; Scarpa et al., 2003). However, the risks associated

with raising hybrid animals in a highly drought-prone environment are also significant – a fact of which pastoralists themselves seem well aware (Boone et al., 2007). Qualitative results indicate that households perceive they are selling more livestock now than previously. Selling livestock to satisfy basic needs alone implies greater economic needs overall, but selling of livestock when timed to take advantage of good market prices is a potential positive for pastoral households. However, this a step which researchers have pointed out must be predicated on more numerous and more stable livestock marketing outlets for pastoralists (Zaal, 1998, 1999; Barrett et al., 2003; Osterloh et al., 2003). Similarly, access to credit and banking infrastructure is low in the Amboseli region, and yet credit availability is considered a foundation of economic growth for underdeveloped rural areas (Dercon and Krishnan, 1996; Barrett et al., 2003; Desta et al., 2004). The impetus to intensify production strategies comes from both external (e.g. national government) and internal sources (pastoralists themselves), but there is currently a lack of developed infrastructure and support to push this process forward in Amboseli.

The discussion of diversification pathways in Amboseli ended with another qualification – one which pointed out that the process of diversification is neither unidirectional nor static. Results show that movement of individual household heads in and out of activities throughout their economic lifetime is common. Some activities, such as agriculture, show less elasticity over time. Others, for example, livestock trading, are activities undertaken for shorter, defined time periods to satisfy particular goals. Results show overall that decisions to begin and end new economic activities were more likely to be made for negative reasons (e.g. economic need) than positive ones (e.g. responding to growth and success), pointing out that diversification is undertaken in many cases under conditions of economic duress. In this sense, diversification seems to be more a result of negative economic "pushes", than positive "pulls", although this was not true in all cases.

The goals of this chapter were to describe trajectories of livelihood change and diversification in pastoral strategies in the Amboseli system, in terms of "what people are doing", then quantify how well households are doing based on various combinations of strategies, and finally, to begin identifying the determinants of why one pattern is chosen over another. Research over the past decades has documented that pastoralists are poorer according to traditional metrics of pastoralism (Sutter, 1987; Bekure et al., 1991; Rutten, 1992), and research results for the study area certainly indicate that pastoral herders *feel* poorer overall (BurnSilver, 2007). Similarly, recent poverty mapping efforts in pastoral areas globally show that 25–35% of the population in Kajiado District, Kenya is below the international poverty line defined as subsisting on less than 1$/day (Thornton et al., 2003). Questions remain unanswered in terms of the potential of community-based conservation efforts to contribute more to pastoral livelihoods in Amboseli, a region that epitomizes for many the hope of successfully integrating Maasai culture, a vibrant pastoral economy and protected wildlife and ecology.

This research focused on households, both rich and poor, who remained engaged with pastoralism in Amboseli, but this approach probably missed those households who have lost their livestock and already dropped out of the system entirely – and

these households certainly represent another face of economic change and pastoral poverty in the region. Both economic diversification and livestock intensification are undeniably occurring rapidly in Maasailand. Hopefully, these results also begin to highlight some of the complexities and nuances implied by these processes. There are both potential benefits and costs associated with these trends for different groups within Maasailand and households who have different means available to them. For many reasons, the future of traditional, extensive pastoralism in Amboseli is unclear. Many aspects of Maasai livelihoods are changing, but this research points out that other components of Maasai culture and economy seem here to stay. Certainly, the faces of Masaai pastoralism to emerge over the next few years will be increasingly complex and multi-faceted.

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Family Portraits – Longido[1]

Saitoti Ole Nina, Kipara Lesidai and Meliyo Maanja live in Longido District with their families. All three families have diversified as a result of loss of livestock due to drought and disease and to meet their growing family needs. Saitoti and Kipara both cultivate to supplement their livestock, while Meliyo has taken up livestock trading to supplement livestock production. Saitoti comes from a highly respected family and has fallen on hard times, while Meliyo, who lost his father very young, has built up his reputation and is working hard to build a solid foundation for his small family. Kipara, who lives close to the thriving market centre at Mairowa, is the only household that has significantly diversified the household income beyond a reliance on natural resources.

Saitoti Ole Nina

Saitoti Ole Nina is 53. His first wife Naramatisho (40) has nine children and his second wife, Rhoda, 38 (separated), has five children. Between his two wives, Saitoti has fourteen children aged between 1 and 26, four of whom are married and live elsewhere. Saitoti also lives with his mother Kumolosho (66), his sister Noolosiyo with her seven children (aged 2–12) and his late brother's wife, Noorkishumu (37), who has 5 children (aged 2–24). The extended family members living with Saitoti are largely independent and provide for themselves.

Saitoti lives in Ilmolog village, 89 km east of Longido town on the western slopes of Mt. Kilimanjaro. In 1952, the year after Saitoti was born, his family moved from Longido to Sinya because of a severe drought. They stayed at Sinya

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for 2 years before moving to Ilmolog in 1954 because of a lack of access to a regular supply of water for domestic and livestock use, especially in the dry season. Since then, the family has moved twice due to the boma accumulating too much manure, each time between sub-villages within Ilmolog. Ilmolog is situated on high grounds that are favourable for cultivation of various crops such as maize, beans, wheat and potatoes. Kilimanjaro National Park is just 3 km away. The village is home to people from many different ethnic groups (Chagga, Meru and Pare as well as Maasai), attracted to the area by the high-farming potential offered by good climatic conditions and fertile soil. Several white settlers and business firms such as Tanzania Breweries Ltd. operate locally, carrying out large-scale commercial farming of wheat, flowers, beans and dairy cattle.

Saitoti comes from an important family in the community. His grandfather, Orguris, was made a great chief by the colonial government in the region, and was among the leaders used by the colonial powers to create the present border of Kenya and Tanzania along the Kilimanjaro and Arusha regions. His father was also an *Oloiboni*, a traditional and spiritual healer/diviner. Saitoti's father died suddenly in 1980 due to tuberculosis and Saitoti's brother died a year later. As a result the family had to postpone the ceremony which would have formally designted Saitoti as heir to his father's *Enkidong'* (a divining gourd used by *Oloiboni* in treating clients) and as a practicing diviner. However, Saitoti is still recognised within his community as a practicing *Olaibon*, and is given respect by the entire community.

Saitoti had more than 400 head of cattle when they moved from Longido to Sinya, and he remembers livestock mortality increasing in Ilmolog due to the prevalence of East Coast fever (ECF). In 1961, Saitoti's family lost nearly all of their cattle in a severe drought; pasture was poor and while grazing was better up the mountain, many cattle died due, he thinks, to water used for livestock being contaminated by toxic leaves falling from the treetops. They were only left with two cows – one bull and one female cow. The family received food aid from the government and people survived by hunting zebras and elands. Although nobody died in his family, Saitoti related that several people he knew died from starvation during the 1961 drought. A decade later, during the drought in 1973, Saitoti remembers his family stealing grazing from the NAFCO farms owned by the white settlers. The "merciless settlers" would shoot to kill livestock or shepherds trespassing on their farms, and Saitoti knows two families whose shepherds were shot dead by settlers during that drought.

Saitoti's family started cultivation in the year 1965 after Saitoti had learned farming skills in school and introduced them to his family. More learning came through interaction with non-Maasai immigrants. The decrease in livestock numbers due to droughts and disease forced the Maasai of Ilmolog to adopt farming as an alternative livelihood option. Saitoti's late father had 15 acres of land. Saitoti had seven brothers and half brothers in total, and the remaining sons of both of his father's wives will subdivide this piece of land any time they deem necessary, but at the moment each of them is just cultivating whatever they can manage. They do not perceive a shortage of land. The areas cultivated are small due to financial constraints. In Saitoti's case, the family cultivates 4 acres in which they grow maize and beans. In 2001 he also grew 1 acre of wheat.

Today, Saitoti's family is considered very poor within the community, although he still commands respect within the broader family and community and is regularly consulted. The family owns just two goats and depends primarily on farming and very limited income from firewood sales by his first wife on market days. Two sons also engage in some income-earning activities. Manu, who is a watchman in Nairobi, brings home some income at the end of the year when he comes home on holidays. Last year, he bought three goats in December, but Saitoti has already sold one in order to buy food for the family. Joseph, who is a local private mill attendant within Ilmolog village, brings home at least Tshs 15,000 every month which help to offset some of the family's financial needs. The family does not receive any direct income from the wildlife management projects and is not aware of any benefits.

Women in Saitoti's family have been given full responsibility over the plots of land allocated to them, but according to his first wife, the use of grain is controlled by the household head. He can sell the grain any time without their consent. Naramatisho owns 1 acre of which she is cultivating only half because the other half has been given to Saitoti's friend to cultivate. Saitoti himself is cultivating 1 acre, which used to belong to his second wife. The family plans to increase cultivation because they still have land that is not ploughed, but only if they get surplus grain from the next harvest that they can sell to get money to cultivate. Poor rains last year meant that they harvested little from their fields and wildlife also damage crops prior to harvest during June and July. Naramatisho supplements her harvest by selling one load of firewood 6 days a week. One load earns ~80 cents (US), enough to by two packets of maize flour to feed the family.

Most of Saitoti's children are either attending or have completed Standard 7 (the final year of primary school). However, none of his sons or daughters attained higher education. None of them performed well enough at the National exams to go on to state secondary school, and he is not able to afford to send any of them to private schools for further education. Saitoti plans to educate all his children, at least through primary school; to him this is "*maendeleo*" which he claims to be the "key to good life". However, Naramatisho is not very optimistic about a brighter future for their family. "We are not likely to advance because the size of our family is overwhelming for such a poor household as ours".

Meliyo Maanja

Meliyo Maanja is 42. His wife, Noonkipa, is 29 and they have five children, three boys and two girls. His eldest daughter, Nanetia (12), attends boarding school. His eldest son, Lekumok (9), stays at his grandfather's home where he helps look after the livestock and Ikanka (6) helps herd the family livestock at home. Meliyo was the first born in his family and has no formal education himself. His mother lives with him and he is responsible for taking care of her in her old age according to Maasai custom.

Meliyo was born in Sikirari in 1962, the year after the terrible drought of 1961 that came to be known as *Alari le endii*, after the yellow corn meal (*endii*) that was

brought from North America as relief food. “Our father moved us to Sikirari [from Sinya] in search of a better place to receive food for his children”. His parents told him that they lost almost all their numerous cattle during the drought, and were left with only six cows. However, a good number of their goats and sheep survived. His father died from alcohol poisoning in 1965 when Meliyo was 4 years old.

In 1966, his family moved back to Sinya, a small remote village 92 km east of Longido close to the slopes and plains of West Kilimanjaro, because the pastures there were better. There was no cultivation and so it was ideal for raising large livestock herds. Meliyo’s family have stayed in Sinya since. He currently lives in a sub-village, 10 km east of Sinya village centre not far away from Amboseli National Park in Kenya.

Unlike Saitoti, Meliyo did not inherit a leadership position in his community. However, in 1988 he was appointed representative (*Enkopiro*) and assistant of his age group’s overall leader (*Alaigwanan*) for East Longido in his Sinya community, and he will hold this position unless he commits a crime or becomes insane. From 1993 to 2002, Meliyo was also a democratically elected Chairman of his sub-village. He lost the seat during the 2002 election, but still holds leadership positions as member of the village government committee and of the natural resources conservation committee. His leadership position has linked him to the outside world, and during this time he and others visited different areas including Selous and Morogoro where they attended seminars and courses on leadership.

Meliyo comes from quite a wealthy family, but they were hit hard by the drought of 1984 that reduced their herd from 200 cattle to just 7. Five years later, Meliyo’s herd had grown enough for him and his mother to separate from the rest of his father’s family. Then in 1995, an outbreak of ECF reduced his herd again, since when he has opted to engage in cattle trade to support his family.

Today, Meliyo’s family depends on livestock and supplements this with cattle trading. Cattle and goats are kept as a source of food (milk and meat), bedding (skins) and cash whenever they have a need to sell. The family herd consist of two steers, three cows, one heifer, two calves and seven goats. A donkey is kept for carrying water and family belongings when migrating. All the family’s livestock are local breeds; they have not yet introduced any improved breeds of livestock. While there is no clear system in place to advise livestock keepers, such as himself, Meliyo does dip and inject animals to keep livestock ailments at bay. He gets advice on livestock drugs from a vet stationed at the market in Sinya village centre. In 2004, Meliyo spent ~US $13 on treatments on his small stock for a serious lung disease called *Orkipei.*

The area around Sinya is arid, the soils are saline and this together with an abundance of wildlife makes cultivation quite impractical. During good years, the herd stays close to the household. During bad years, Meliyo still relies on mobility and access to different pastures although at a much-reduced level. The incidence of ECF in the mountain slopes has restricted movement and increased cultivation has also eaten into traditional pastures. Since he does not have grown sons and is often away from home marketing livestock, Meliyo must rely on his neighbours for help during these periods.

There are no credit facilities available to support those who go into business, and so Meliyo must depend on his own small herd to generate the necessary capital. In the past year, Meliyo sold one bull and one heifer to raise capital to go to local markets to buy livestock for resale. The primary market from which Meliyo buys cattle for resale is Sinya market, which operates every Tuesday. Whenever he buys, he inquires from other traders about prices in secondary markets such as Engarenairobi, Naibilye, and Maiko in Kilimanjaro and Arusha regions, and Ilbisil and Emali in Kenya. His aim is to resell his livestock for as much profit as possible. Meliyo relies on the word of mouth from other livestock traders to get market information, and he knows that the best time of the year to buy cheaply and sell for profit is at the beginning of the short-rains season (Irkisirat). Buyers of Meliyo's cattle are numerous and include local cattle traders who take the animals to secondary markets themselves and outsiders who come to buy at the local market. If he fails to sell locally, Meliyo either hires someone or himself drives his livestock to one of the secondary markets where prices are more favourable, depending on the time of the year as well as on demand and supply.

In a week Meliyo might buy and re-sell a maximum of four cows and six goats. His small business is enough to help his family buy food, meet their basic health expenses and buy clothes and school supplies for his daughter in boarding school, although he says it is not adequate to meet some of their needs such as hospital bills. While he started cattle trading in 1989, he feels he has not moved beyond a subsistence level. However, he feels proud that his family has never lacked the basic needs or had to beg from neighbours to survive.

While there are no remittances accruing directly to Meliyo's family, the companies that operate a campsite and hunting in the area have contributed to the construction of additional dormitories to the boarding school. They have also contributed to other social amenities such as borehole maintenance and a motorbike for the village Chairman. Occasionally, tourists who come to Tembo camp at Sinya visit Maasai bomas. However, since the beginning of this year there has been one visit to Meliyo's boma from tourists. They paid a total of Tshs 15,000 to three families and another Tshs 10,000 for photographing his wife separately when they entered her house where she was nursing her newly born baby. Noonkipa and other women in neighbouring bomas hope to earn cash from selling beadwork to tourists, but recognise they need more secure markets if they are going to make any profit. They also have an idea to set up a small-scale business to sell items demanded by tourists and those who work in the tourist industry and hope some people will find direct employment in the camps. However, elephants have killed several people in recent years and the potential benefits of wildlife tourism are offset by these threats.

Meliyo and his family consider themselves traditional Maasai. However, they have decided that educating their children and adopting improved breeds of livestock will enhance their quality of life. Noonkipa supports the idea of educating all the children so that they can enter the job market and earn income that can help the family. Currently, the government pays for most of Nanetia's school needs, while Meliyo must cover the cost of basics like toiletries, uniform and stationeries. Boarding school has ensured that children remain in school throughout the year

even when the families move with the livestock in search of pastures and water. However, even with just one child in school Meliyo has noticed the shortage of labour for livestock – education does not come without a cost. Despite this, Meliyo, a young elder, remains optimistic and determined to do whatever he can to sustain his family on daily basis.

Kipara Lesidai

Kipara Lesidai Lembeka is 51. He has three wives, Norkishumu, Naserian and Naisula, and 20 children between the ages of 1 and 23. Kipara's eldest son is working away from home in Longido and two daughters are married and have moved away from their family home. Of the remaining 17 children, 4 are in elementary school, 4 are at nursery school, 4 have been kept home to help with the livestock and running the households and 5 are too young to go to school or contribute actively to the household.

Kipara has lived in Naripi sub-village all his life, about 4 km from the vibrant trading centre at Mairowa. His father moved to the area from Sikirari, near to Mt. Kilimanjaro, where he had been exposed to "a lot of *maendeleo* (development)". As a child, Kipara remembered the whole household moving from place to place, but always retaining two main homesteads, one in Nkoiseiya and one at Lekurruki. When his father died, Kipara was allocated 30 head of cattle and he set up his own household (*Olmarei*) close to his brother-in-law and started farming a plot of land inherited from his father.

By 1983, Kipara was wealthy enough to own a pick-up truck, but that year he was hit hard by an outbreak of Heartwater disease that killed all but one of his cattle. When his vehicle broke down he was not able to repair it because he had lost so many animals. Both of his wives at the time immediately started up small businesses selling beer and maize. Relations gave them some animals to survive and since then they have invested more in acaracide to control the ticks that cause Heartwater. Kipara was severely affected by his family's poverty and their subsequent temporary dispersal. Since then, the family have been increasing the amount of land they cultivate, although they are still committed to keeping livestock.

Today, Kipara is well respected in the area and was elected sub-village chairman for 10 years, between 1994 and 2004. He did not go to school, nor did he attend adult literacy classes started by the government of Tanzania in the 1970s, but Kipara has taught himself Kiswahili. He and his family are active in the local Baptist church. While his position as sub-village chairman was not salaried, it would certainly have helped him acquire new land allocated by the village. Kipara is considered among the top 25% of the community in terms of wealth. Kipara's herd (including livestock allocated to his three wives) number 27 cattle, 65 sheep and goats and 7 donkeys. In addition, he and his wives have 31 acres of which he farms 16 acres. While Kipara does not cultivate all of the land he has been allocated, he still wants to accumulate more so as to have enough to pass on to his sons.

Kipara feels that cultivation is his first priority, although he still wants to keep livestock. His father, Lesidai Lembeka, started cultivating land in Engarenaibor area in 1963 and was the first person in the area to use oxen in his fields, something he had learnt in Sikirari. Kipara feels that farming is less prone to diseases and more permanent than livestock. He perceives the non-Maasai (mainly Meru from Arusha) who moved to Naripi in the early 1970s and who cultivate have a more constant supply of food compared to those who rely only on cattle that grow lean and cease to provide milk during the drought seasons. He has divided up his farmland amongst his wives in the same way that Maasai do with cattle. His wives agree that having their own farms makes them take greater responsibility for farming. They have a certain degree of control over the management of cultivation on their land and over the use of the harvest; however, they have to inform Kipara of any sales or gifts to relatives. The wives share food, and cooperate in selling food and getting maize milled. Kipara owns four pairs of oxen and two ox-ploughs, which he uses to plough his land. The family also use hand hoes and occasionally hire a tractor to plough the land. Whenever possible they buy "improved seeds", but as these are expensive and only available in Arusha, most often they use seeds from their last harvest. According to Kipara, the main constraints to agriculture in the area are the unreliable rains that affect harvests almost every year, and damage by wildlife, particularly dikdik, zebra and eland.

While Kipara prioritises agriculture, livestock are invaluable as a source of cash to meet household needs and to pay dowry when his sons are ready to marry. The herd is growing, but not through livestock purchases; in the last year the only livestock brought into the herd were two goats received as gifts. In contrast, a steer was sold to purchase agricultural equipment. Kipara does invest in livestock health. He dips his livestock regularly to avoid tick-borne diseases and vaccinated four calves against ECF in 2002. He is also adopting improved breeds of livestock, crossing his Zebu with Boran bulls, to produce more milk and meat. He has also cross-bred his local goats with Galla goats which grow bigger and produce more milk.

Since villagisation in the 1970s, when agriculture and sedentarisation were promoted by the government, livestock have had to move further from the village to find water and pasture during the dry season and avoid damaging crops. Today the animals move away with the young moran, while the women and children stay in the homestead and look after the fields. Those left behind have to find alternative foods as their milk supply is cut off. There is still conflict among families when livestock grazing locally damage crops, but since all families have both livestock and farms they do not demand compensation.

In addition to agriculture and livestock, Kipara gets a regular income from renting out two properties that he owns in Mairowa. He uses some of this money for household expenses but saves as much as possible to pay for the building of a third room. In 1996–1997, Kipara had noticed how people were making money through small kiosks selling tea and foods to workers at the nearby ruby mines. He set up a kiosk that he ran for a year. He gave up because he wanted to focus on agriculture. However, during this time he made Tsh 30,000 a week. His two eldest sons are working, the first selling consumables at the market each week and the second

working in a café. The sons make contributions to their mothers and, occasionally, to their father, but mainly use the money to meet their own personal needs.

The family sees little direct benefit from wildlife and point out that they are not even allowed to hunt them for food. At community level they were allocated Tsh 6 million, used to build a community school. Their perception is that the number of elephants is increasing and they seem to be moving closer to the area, which is of concern to the family given the destruction that elephants cause on farmland. The family wants to maintain wildlife in the area because of the community benefit, but do not want them near their land, because of the damage done to farms, although wildlife comes only during the dry season whereas livestock are there all the time.

Kipara's family sees farming as their best opportunity for survival amid overwhelming changes. They are concerned at the loss of rangeland and look to their property investments in town as an important strategy for long-term income. The family would like to be able to send all their children to school, but do not see how they are able to do so while generating enough income to pay for replacement labour. The family acknowledges the risks of relying on natural resources that depend on unreliable rainfall. Above all the family hopes that the sons who are now in school will get jobs in the future.

Chapter 6
Still "People of Cattle"? Livelihoods, Diversification and Community Conservation in Longido District

Pippa Chenevix Trench, Steven Kiruswa, Fred Nelson, and Katherine Homewood

6.1 Introduction

Longido District in northeast Tanzania is arid, relatively undeveloped and historically un-remarked for agroecological resources, landscape or wildlife. Apart from the main road bisecting both the town and the district of Longido, all-weather roads within the area are few, with little or no public transport. Low levels of rainfall (300–600 mm) in most of the region restrict agricultural cultivation to a limited area of land, primarily on the higher western slopes of Kilimanjaro and along a few seasonal watercourses. The vast majority of the population in the low-lying areas is Ilkisongo Maasai. The more agriculturally productive lands on Kilimanjaro's western slopes have larger Waarusha populations, and there are a few Waarusha and non-Maasai immigrants around village centres.

The predominant activity in the area is extensive pastoral production, using herd mobility as the primary strategy to cope with and mitigate patchy and highly unpredictable rainfall, periodic drought and disease, especially tick-borne East Coast Fever (ECF) in the higher and wetter areas (Homewood et al., 2006). Livestock losses due to drought and disease have contributed, alongside government policies and in-migration from agricultural areas, to an increase in small-scale agricultural production in the area. Villagization in the 1970s established the basis for increased service provision by the government. More recently, the private sector has expanded in terms of providing some basic transport, animal health and other services. Local commerce has long centred on livestock, with proximity to the border creating price gradients profitable to traders. Longido has few industries or enterprises, other than a small mine for semi-precious stones and some associated artisanal mining.

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However, Longido is bounded by some of the best-known conservation areas of the Maasai ecosystem and East Africa: Ngorongoro Crater lies to its west, Kilimanjaro and Arusha National Parks border Longido to the east and south, and Amboseli National Reserve is just across the Kenyan border to the north (Fig. 6.1). These conservation areas each rely on the surrounding rangelands to sustain their ecological viability. As wildlife movements are progressively restricted by intensive cultivation in neighbouring areas, such as Kimana Swamp and Loitokitok in Kenya and the West Kilimanjaro slopes in Tanzania, the remaining corridors and dispersal areas in Longido have assumed a greater importance for conservation in this cross-border area. As a result, the district is coming to play an ever more important role in wildlife conservation and wildlife utilization, not so much driven by inherent conservation or tourism potential as by a pragmatic response to problems that are being created in adjacent higher-potential areas and higher biodiversity-potential sites. The political and economic fragility of village land tenure in northern Tanzanian rangelands makes it relatively cheap and easy for the state, supported by conservation agencies, to establish protected areas and set aside migratory routes there compared to Kenya (see Castree, 2003, for a discussion of such "environmental mitigation" processes). The area has also been subject to new approaches in community-based conservation that have

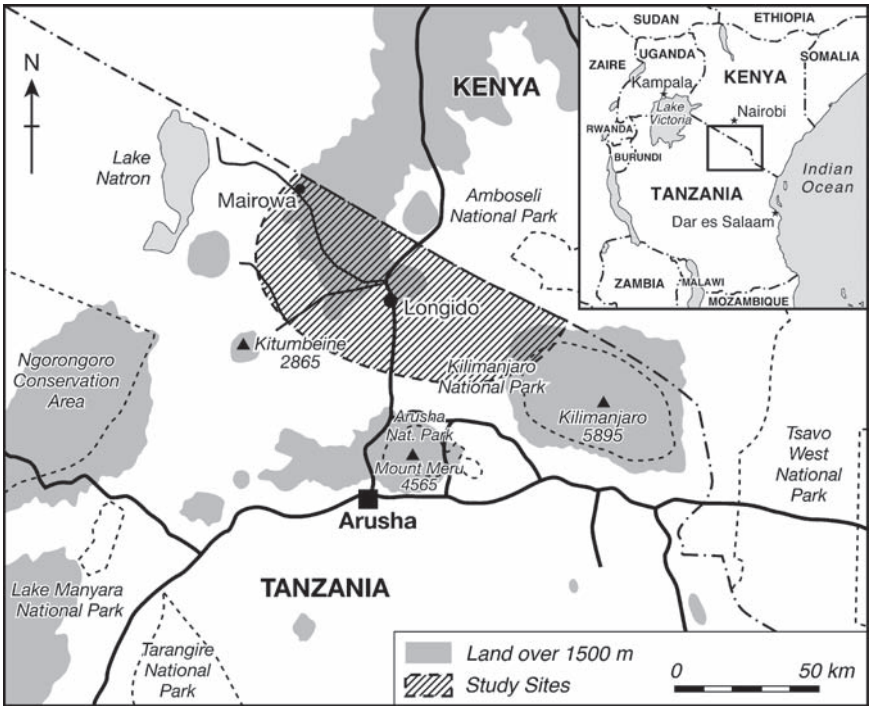

Fig. 6.1 Longido District and surrounding conservation areas

potential impacts on land use and has been the subject of conflicts over the revenues that wildlife generates.

6.1.1 Land Tenure Policies

As is the case for rangelands throughout northern Tanzania (Chap. 1), land tenure in Longido has been in a continual state of flux for over a century and has been subject to particularly intense local and national-level conflict for the past decade. The entire area in our study is demarcated as village lands under the Village Land Act of 1999. Village councils, accountable to village assemblies, are responsible for management of all village lands, according to the customary rights of occupancy vested in them. Under this Act, village land may be individual land (farms, homesteads, etc.) or communal land (forests, grazing pasture).

At the same time, nearly all of the district, like most areas of Tanzanian Maasailand, has historically been classified as a game-controlled area (GCA), with most of Longido East falling within the confines of the Longido GCA. Under the Wildlife Conservation Act of 1974, the designation of GCA bans all hunting of wildlife unless with a license, to be issued by the central Wildlife Division (WD). The designation does not confer any state control over land use and settlement, cutting of vegetation and grazing of livestock. However, the government retains the right to divide the area into hunting blocks for which hunting concessions can be issued by the central government to private hunting and safari companies. Some of the income earned from these concessions is returned to the district, which can choose whether or not to forward part of the revenue to individual villages. At the time that the household surveys presented in this chapter were underway, the Longido area, divided into two hunting blocks, contained two tourist hunting concessions leased out to private firms by the WD and was also used for resident hunting through licenses sold by the Monduli District Game Office. The jurisdictional overlap between central government, basing its authority on wildlife legislation, and village governments, empowered by land and local government laws, has been a source of tension and conflict between different actors in the Longido area for much of the past decade as wildlife’s market value has grown. The climate of insecurity and conflict over land tenure and control over resources that currently exists in Longido is exacerbated by the fact that the Land Act of 1999 includes “unused village land” within the category of “general land” and as such, under the authority of the ministry of lands. While seasonal pasture is not “unused”, it has been interpreted as such by governments across East and West Africa for decades. This interpretation opens up the potential for policymakers with appropriative interests to allocate land to outside investment, including wildlife conservation and/or hunting, ranching, and large-scale mechanized agriculture. In Tanzania, the only way for villages to mitigate this ambiguity is by demarcating their grazing land through Certificates of Village Land and land-use plans, that is, by obtaining a formal government document that shows that their pastures are within the boundaries of the village and are used by the community.

6.1.2 Wildlife Trends and Conservation Policies

Longido provides the southern dispersal area for Amboseli wildlife, which leave the reserve during the wet season, congregating on Longido's Ngasurai plains. Several villages in northeastern Longido District also provide the last remaining corridor for elephant movements between Amboseli and Mount Kilimanjaro. Elephants also travel through Longido to Arusha National Park to the south and to western parts of Longido around Mount Kitumbeine. As described above, many of these migration routes have become increasingly constricted by the spread of agriculture in the more fertile nearby areas, such as Kimana swamp and Loitokitok in Kenya, and the higher elevation parts of Longido. During the 1970s and 1980s, elephants were almost entirely eliminated from the area by poaching. In 1996 and 1997 a survey of elephants and other large mammals documented the on-going recovery of elephants in the West Kilimanjaro and Longido areas (Poole and Reuling, 1997). However, the survey also expressed concern about the high level of meat poaching for species like giraffe, zebra and many antelopes and gazelles (Poole and Reuling, 1997; see also Barnett, 2000). These surveys and subsequent planning workshops among government, conservation organizations, tourism operators and local community representatives highlighted the importance of village lands to the Longido area's wildlife populations, and the need for a community-based conservation approach in the area. Recommendations that local communities become more involved in wildlife management and benefit in a direct and significant manner from wildlife if management and conservation were to be more effective sat well with the principles of the Wildlife Policy of Tanzania (MNRT, 1998) being finalized at that time. As a result, the area was designated as a pilot site for a wildlife management area (WMA). WMAs are now a central element of Tanzania's new community-based conservation agenda (Goldman, 2003), conceived in response to donor pressure for community-based management of natural resources, as well as concern over the decline of wildlife outside protected areas.

Plans were outlined for the WMA in Longido in the eastern part of the district, in what is now Enduimet Division, as early as 1997, but it was not until formal WMA regulations were released in late 2002 that the WMA formation process began in earnest. In 2005, some 73,822 ha, made up of approximately half of Longido GCA, as well as land beyond the boundary of the GCA towards West Kilimanjaro became part of a pilot WMA called Enduimet WMA (Fig. 6.2). This area incorporated most of the land of eight villages. This ongoing pilot project is largely supported by the African Wildlife Foundation, an international conservation nongovernmental organization (NGO), as well as the Longido district government. The purpose of the WMA, as described in the Wildlife Policy, is to allow the revenues from wildlife to be shared with local communities, in line with green development policies. However, the implementation of WMAs in Tanzania (and of parallel enterprises in other African countries) has proved complex and has changed in many respects from the original WMA concept developed in the late 1990s (Goldman, 2003; Chap. 8, this volume). According to the WMA regulations, obtaining wildlife management and transferable user rights depends upon local communities establishing multi-village

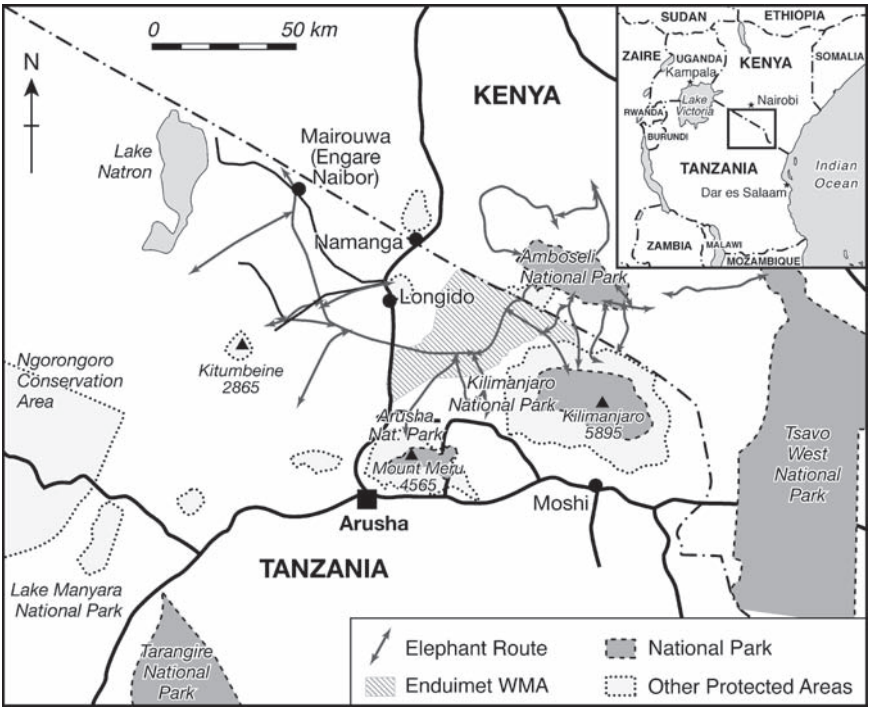

Fig. 6.2 Elephant migratory corridors, zones of main conservation interest and Enduimet wildlife management area (WMA) in Longido as first established

associations responsible for developing and implementing land-use plans, general management plans, environmental impact assessments and a range of other requirements. It is not clear that the central WD will relinquish control over hunting concessions and income, leaving open the question of exactly what benefits the WMA establishment will bring these communities. The degree to which the multi-village association land-use plans will require restrictions over grazing and agriculture in order to qualify as a WMA is also uncertain, representing a loss of control over land-use planning from household and village level to multi-village and state level. While this has happened elsewhere, the participation of the local community in defining the Resource Management Zone Plan (RMZP) should in principle allow for local communities to set their own rules in relation to access to pasture and water resources. However, the fact that the RMZP must be approved by the WD places the final decision in the hands of the WD.

In addition to the establishment of the WMA, community-based conservation in the Longido area has since the late 1990s emphasized training village game scouts and natural resource committees and generating wildlife benefits through a different model of community-based tourism ventures. In contrast to the centrally managed hunting concessions, arrangements for non-consumptive tourism activities were developed locally based on the villages’ status under the Local Government Act of 1982 as corporate bodies and their rights under the Village Land Act to

manage land on behalf of the community (Nshala, 2002). These ventures spread in the area during 1999–2001, and for the first time commercial opportunities from tourism made wildlife a resource that was economically valuable – or at least relevant – from the local perspective. However, these arrangements have been increasingly subject to conflicts between the hunting companies and the WD on one side and the villagers and safari companies on the other. These will be examined in more detail in the course of this chapter (Masara, 2000; Nelson, 2004, 2007).

6.1.3 Land Use and Livelihoods

The conflicts over wildlife management and changing status of land as a result of the WMA development thus have major implications for local resource use and livelihoods in Longido. Understanding how these conservation interventions will interact with and impact on development, particularly the livelihood trajectories of the local Maasai, is a major issue and central theme for this chapter. In order to understand the scale and impact of these changes, and their potentially negative as well as positive dimensions, the chapter sets out an analysis of the full range of Maasai livelihoods in Longido, putting conservation costs and benefits in perspective. It places this in the context of existing conflicts between different interest groups in wildlife conservation and development that act at international, national and local levels and have highly diverse agendas.

In this chapter, we describe current livelihood strategies among the Maasai of Longido. We look at the economic choices people make, constrained as they are by Longido's relatively limited opportunities in terms of resources, communications, infrastructure, services, marketing and wildlife tourism (alongside pressures from drought, disease and reduced land access broadly comparable to those experienced by their relatively resource-rich Maasai neighbours). We look at what households are doing and how well are they doing. We assess which factors are associated with particular livelihood strategies and with the success of households in terms of household income and livestock holdings. We examine the degree to which wildlife conservation contributes to, or affects local livelihoods, within the broader context of economic diversification, and look at how power struggles and tenure uncertainty have impacted on the ability of local communities to capture benefits from conservation. And we look at likely development trajectories in the context of changing land tenure status and conservation strategies, in particular the development of Enduimet WMA, critically examining the African Wildlife Foundation's maxim that "conservation and development are inter-linked, and that truly sustainable conservation must contribute to the needs of local people".

The chapter draws on a range of different data sources: qualitative knowledge from long-term residence and prior research in the area; quantitative household data from single-round surveys, financial records from village-level agreements with private tourism enterprises, environmental and land cover data extrapolated from satellite imagery; qualitative data collected through family portraits and informal

interviews and intimate involvement by two of the authors (Steven Kiruswa, Fred Nelson) in the development of the Enduimet WMA since 1998. Taken together, these findings allow us to examine pastoral livelihoods in terms of diversification and poverty, of the lasting importance of livestock, and of the contribution of conservation to livelihoods, and to analyze whether win/win solutions are emerging for environment and development, and if so, under what circumstances.

6.2 Study Sites, Methodology and Analysis

6.2.1 Study Sites

Longido District in Tanzania covers an area of 9,220 km^2 south of the Kenyan border and west of Mount Kilimanjaro, in whose rain shadow much of the district lies. The district headquarters, Longido town (population 8,510; URT, 2002), is located where the main tarmac highway between Nairobi and Arusha passes the base of Longido mountain. The slopes on the western side of Kilimanjaro, along with some other moderately high areas (>1,500 m asl), provide pockets of cultivable land, but the bulk of the district is low-lying, arid and predominantly pastoral. Mean annual rainfall varies between 300 mm and 600 mm and population density is low (8/km^2). Service provision is largely concentrated in Longido town. Although the town is central with respect to the district, its environs are so arid as to be hardly cultivable, so most of the population lives thinly scattered across outlying parts of the district.

The sites selected for this study reflect this variation across Longido District in accessibility, wildlife density, tourism activity and agro-climatic zone (see Fig. 6.1 and Table 6.1). The sites are established *ujamaa* villages and village

Table 6.1 Nature of cultivation in each study site, including percent households cultivating and mean area cultivated per household in different agroecological zones

	Upland		Lowland		Irrigated			
Site	Per cent hh	Area (ha)	Per cent hh	Area (ha)	Per cent hh	Area (ha)	Agro-climatic potential	Wildlife constraints to agriculture
Sinya	0	0	4	0.05	0	–	Too dry	very high
Elerai	81	1.90	0	0	0	–	Mostly arid lowland, with small area of high potential	Minimal
Ngereyani	0	0	43	0.68	0	–	Little irrigable land	High (elephant)
Olmolog	95	1.86	3	0.03	0	–	Good rainfed	Minimal
Tinga Tinga	5	0.04	65	2.17	5	–	Half and half	High
Mairowa	10	0.23	93	3.89	0	–	Good rainfed	During dry periods

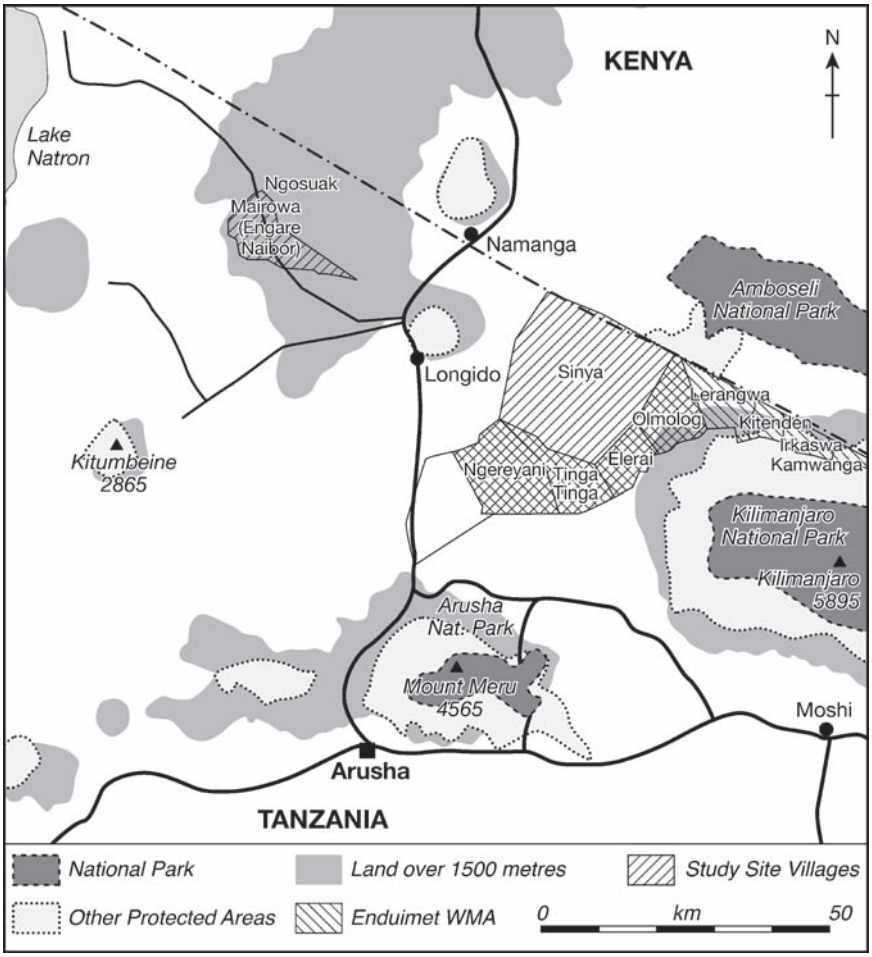

Fig. 6.3 Study villages within Longido District. Note Sinya is now no longer part of Enduimet WMA

lands have been demarcated for each (Fig. 6.3). The villages are all relatively small, with up to a few hundred households, and have minimal facilities (rudimentary primary school, dispensary, small shop(s) or kiosk(s) and borehole or piped water point). Only two out of the six sites are served by more-or-less all-weather roads. Most have a weekly market (not Olmolog or Ngereyani). The lands of these villages range from arid, with high wildlife densities (and hence tourist potential) and little or no possibility of cultivation (Sinya), through semi-arid, with cultivation (Tinga Tinga, Ngereyani), to higher areas on the slopes of Mount Kilimanjaro, with relatively good agro-ecological potential (Olmolog, Elerai). Sinya, Olmolog, Elerai and Ngereyani have (or had until recently) arrangements with game-viewing enterprises. Several of the villages are seriously affected by wildlife conflict from Tinga Tinga, where elephant movements have virtually destroyed the possibility of cultivation, through Olmolog and Elerai,

where wildlife damage to crops is a problem in drought. Of the five villages to the East of the district, four are affected by the new WMA, which covers ~90% of their land. Sinya, the most wildlife-rich village in the region, withdrew from the WMA for complex reasons described later in this chapter. Mairowa, which alone of all the study sites lies to the west of Longido town, is less affected by the current conservation-related land tenure changes. It is still situated within a hunting concession in a GCA and any wildlife revenues generated through hunting licenses are captured by the state. However, Mairowa is more remote from protected areas and wildlife migration routes, and hence conservation and tourism interest; it borders slightly higher-lying land with relatively good agro-ecological potential, and sits close to the Kenya border, with opportunities for (unofficial) cross-border trade. Despite the lower wildlife numbers, most Mairowa households perceive wildlife damage to crops as a major issue.

6.2.2 Study Schedule, Data Collection and Analysis

This chapter presents the results of a series of studies undertaken in the Longido area from 2002 to 2005. The bulk of the data from the sites to the east of Longido town were collected between February 2004 and April 2005. Data from Mairowa were collected as part of a separate, earlier study in 2002–2003 and supplemented with data collected in 2004 to ensure comparability with the other sites, both in terms of proportional representation of the full range of socioeconomic conditions and to add data where results would be highly seasonally dependent (e.g. harvest data, livestock sales and milk sales). The unit of quantitative analysis of livelihoods in this study is the household. Chapter 2 gives a definition of this term and a detailed description of methodology.

Wealth ranking in each study site allowed us to select a stratified random sample of households representing the range of socioeconomic circumstances in each village. Working with the local village chairman, study site households were listed. Representatives of the local community then allocated them to one of three or four categories ranging from poorest to wealthiest (Grandin, 1988). A proportional random sample from each category was chosen for interview. A total of 229 households were surveyed across the six different study sites.

Data were collected at the household level using questionnaires and interviews with the household head, including questions on household demographics and education as well as production systems and the household economy. The household questionnaires also provided data on the leadership status of household heads, specifically whether the household head held a position of influence over the allocation of land. Household head interviews were supplemented with questionnaires specifically asking women in the household about their own activities and income sources. In addition to these questionnaires, three households were selected by the communities to participate in more in-depth family portraits. Secondary data were also collected locally, and spatial data (topography, roads, water points, settlement centres) were extrapolated from satellite imagery.

In addition to understanding livelihood strategies of the Longido Maasai as they diversify in the face of change, and particularly in the face of new conservation initiatives, we wanted to understand what factors influence household decisions that impact on economic viability and success. We focused on who is faring well, who is not and why. This means understanding which factors play a part in shaping livelihoods decisions and their outcomes, whether internal to the household (such as household size and demographic structure, levels of education, position within society) or external (such as agro-climatic potential, access to infrastructure like schools and markets, or policy-related factors, as in land tenure and wildlife policies). We used the same general approach set out in the main methods Chap. 2, which entailed

- Establishing livelihoods strategies (combinations of activities) through cluster analysis of households on the basis of economic variables. The cluster analysis answers the question as to what people are doing in terms of patterns of activities.
- Multinomial regression to determine which demographic, social, spatial, agro-ecological and other factors have the strongest influence in shaping strategies (cluster membership). This answers the question as to why people adopt certain strategies.
- Multiple regression using general linear modelling to establish which factors most strongly influence total household income on the one hand and household wealth (in terms of livestock holdings) on the other.

Alongside quantitative analyses of livelihoods at the household level, our qualitative analysis of the emergence and implications of the WMA is carried out primarily at village, district and national level. This analysis is based primarily on data and information collected on during informal semi-structured discussions and formal village meetings with local community members, as well as informal discussions with other stakeholders, such as NGOs, private companies and researchers, over a period of 10 years. These discussions have also been informed by attending various planning workshops concerning the area over the years and review of many unpublished documents from village and district levels of government.

6.3 Longido Maasai Livelihoods

6.3.1 Pastoralism and Livestock Production

Livestock remain a mainstay for people across Longido, and the overwhelming majority (95%) of households own livestock. Herd size and composition varied widely and ownership is strongly skewed, with just 7% of study households owning 50% of all livestock, and 85% of households owning fewer than eight tropical livestock unit/adult unit (TLU/AU). Overall, livestock holdings per household average 51 TLU (SD = ± 99; range 0–830) with 4.2 TLU/AU (SD = ± 6; range 0–41 TLU/AU) although there are significant differences between study sites, from 2.4

TLU/AU in Elerai to 6.4 TLU/AU in Ngereyani. Livestock ownership is highly correlated with leadership status. Mean herd size for households whose head is in a gatekeeper position was 115 compared to just 40 for those not in leadership positions ($t = -2.2$, df = 30, $P < 0.05$ [equal variances not assumed]), although variation within each group is high.

Customary transhumance is still the norm. However, in areas of permanent settlement, lowland, disease-free, higher nutrient-value pastures are becoming harder to access; negotiations between households are becoming ever more important as population increases and land use extends towards village boundaries. During the study, a number of households had livestock in distant camps away from the study area. The proportion of households with cattle in camps differed significantly across sites, ranging from 3% to 29% (Pearson $\chi^2 = 18.7$, df = 3, $P < 0.01$). The higher the agricultural potential, the higher the proportion of households that take their livestock elsewhere for grazing. This strong correlation reflects the conflicts that already exist in the area between agriculture and grazing availability, as well as the potential for greater conflict as agriculture spreads, and as new WMA set-asides progressively restrict the use of prime grazing and water resources as well as cultivable land.

As well as produce consumed, livestock represent an important source of cash income for many households in Longido; 59% of all households sold livestock during the course of this study. Variance within each village is high and there are no significant differences between them. The income from sale of animals (mean = $723, SD = ±$1509) is by far the largest component of total cash income from livestock (mean = $753, SD = ±$1595); the value of income from livestock slaughtered or from the sale of milk and hides is minimal by comparison.

6.3.2 Agriculture

Over the last couple of decades, Longido Maasai have become increasingly involved in cultivation. Farming was initially encouraged by government policy in 1970s. Recurrent drought, a deteriorating national and local economy and the example of immigrants from agricultural communities have all led Longido Maasai to adopt farming as means of sustaining households and rebuilding herds. This is occurring in spite of the limited agro-ecological potential in the area: during the study period, 37% of lowland and 22% of upland farms in the sample failed to produce any harvest.

Levels of involvement in cultivation vary widely across the district. Overall 67% of all households cultivated land in 2002/2003, but this proportion varies significantly across our different study sites. Wildlife damage, as well as agro-climatic potential, plays an important role in determining investment in agriculture. Thus, no agriculture is possible in very arid Sinya – one Sinya household cultivated, but their field was located in Olmolog where they have a second homestead. In semi-arid Mairowa and Olmolog, where wildlife damage was only considered a problem in very dry years, more than 93% of households cultivated, whereas in Ngereyani only 43% cultivated, citing elephant damage as a major constraint.

The annual value of agricultural production across the different study sites, where gross income incorporates both the value of crops sold and crops consumed by the family, averages $175 ± $266 per household (excluding households that had no income from agriculture). The low returns to agricultural production in Elerai and Ngereyani reflect poorer agro-climatic potential and higher problems of wildlife damage, and explain the lower proportion of households investing in agriculture. In Tinga Tinga, very few households cultivated, due to wildlife damage, and the crops failed entirely due to drought. The elephant problem around Tinga Tinga has greatly increased during the past decade, at least in part due to the formation of Ndarakwai reserve in 1994/1995 next to Tinga Tinga on 10,000 acres held by Tanzania Breweries. The rapid increase in elephant activity in this area has been disastrous for Tinga Tinga farmers since the elephants stay in Ndarakwai and raid into Tinga Tinga at night.

Among the Longido Maasai who do cultivate, the area under cultivation is limited more by scarcity of labour than of land. Maasai in Longido commonly rely on *Empesi* – a system of cooperative work parties. Those households that rely on *Empesi*, however, must wait for their turn. The lower down the list, the later the household will be in land preparation and in weeding their crops and the greater the risk of a poor harvest. In 2003–2004, 10% of households used work parties for clearing and tilling land, 6% for planting and 48% for weeding.

In 2001 in Mairowa, 82% of households expected to cultivate more land in the next growing season, but only 47% actually did so. In 2003, across all villages, 37% of households planned to expand the area under cultivation, but significantly far fewer (11%) managed to do so (Pearson $\chi^2 = 20.9$, df = 2, $P < 0.001$), despite most (84%) already having access to more uncultivated land. Of the overall sample, 45% of the 74 households that could access more uncultivated land did not plan to expand the area under cultivation, citing costs and availability of labour, oxen or tractors as the main constraints.

In spite of the increase in agriculture in the area, yields are poor and unreliable. Expenditure data show a very high dependence on grain bought in to supplement household production across all households, with 93% of all households reporting expenditure on food for the household. The mean area of lowland cultivated by leader/gatekeepers was higher than that of non-gatekeepers, but not significantly so. However, access to higher-value farmland is strongly differentiated, as is access to land in sites where competition over cultivable land is higher (e.g. the upland village of Olmolog). The only two households cultivating irrigated land in the study were both gatekeeper households, and the area of upland cultivated by gatekeeper households was more than twice that of non-gatekeeper families (1.30 ha compared to 0.57 ha, $t = -3.4$, df = 94, $P < 0.001$).

6.3.3 Off-Farm Income and Remittances

Longido is relatively isolated and the potential for diversification away from natural resources-based livelihoods is limited compared with elsewhere in Maasailand.

Nonetheless, as is the case throughout the region, Maasai across Longido rely to various extents on alternative sources of income. Alternative income sources cited during these surveys included working as a watchman, government employee, teacher or casual labourer, rent from urban properties, livestock trading, sale of firewood or traditional craftwork and businesses, such as owning a small hotel or restaurant. In addition to these, almost all women were involved in petty trade of staple items such as tea, milk and sugar. Both household heads and women cited remittances as a source of income, with money being paid on a regular or intermittent, opportunistic basis from working children or family, either direct to the woman or direct to the household head. For our analyses, remittances were included as a separate category within “off-farm” income.

Overall, 50% of households received some income from off-farm sources, although variance was high within all study sites. The mean value of annual off-farm income ($351 ± $513) was less than half that of livestock production, but double that of agricultural production. This does not mean, however, that all households depend more on livestock production than off-farm income, as the analysis of livelihood strategies below makes clear. Off-farm income was higher for households with heads in gatekeeper positions, but not significantly so.

6.3.4 Income from Wildlife/Conservation-Related Sources

Wildlife tourism is still at a relatively low level in this area compared to other areas in both Tanzania and Kenya. Access is poor and there are other areas of higher wildlife density and with more tourist services nearby. In addition, however, a major constraint on the growth of tourism during the past decade has been recurrent jurisdictional conflicts between villages and central government over the rights of local people to develop tourism enterprises on village lands.

There are two possible layers of local wildlife revenues: first, collective village income from agreements with safari companies, where much of the revenue is captured at village level; second, households benefiting directly through employment of individuals or sale of their locally produced goods. Here we focus on household and livelihoods; wildlife income at the community level is discussed in more detail later in this chapter.

An overall average of 3% Longido sample households reported wildlife income. Households in only two villages reported income from wildlife, and in both cases this was a minimal amount restricted to a small proportion of households (11% Sinya households: mean annual value = $46.8 ± $39.9; 3% Elerai households [=1 household]: annual value = $31.5). No significant difference was found in conservation income for households with heads in gatekeeper positions and those without, though small samples and wide variation limit the use of statistics here. It is clear from these data that in terms of returns at the individual household level, income from wildlife in the area is non-existent for the vast majority of households.

Against the potential benefits at the household level, there are significant wildlife costs reported by the households in our surveys. Eighty-five per cent of those households that cultivated cited crop damage by wildlife as a problem. Interviews with pastoralists in Sinya and elsewhere confirmed that disease and predation are also a serious concern to livestock owners, although, unfortunately, these data are not available from our surveys.

6.4 Categorizing Livelihoods Strategies in Longido

The population of Longido is poor by any standards, with gross annual income averaging $809, for a mean household size of 8.9 adult equivalents (considerably less than the poverty datum line of $1/person/day), and livestock holdings averaging 4.2 TLU per adult equivalent. These figures mask an enormous amount of variation. Some of this variation is captured by the cluster analysis. Using ACEBIN in SAS to derive clusters on the basis of presence or absence of each one of a set of livelihood activities (see Chap. 2), eight clusters of livelihoods activities were identified, interpreted here as livelihood strategies. These clusters differ statistically from one another (unlike, for example, wealth ranking or other subjective classifications). The two poorest clusters were combined, as neither had any income other than some remittances. The seven resultant clusters are defined as follows:

- *Undiversified pastoralist* (21 households)
- *Diversified pastoralist* (29 households)
- *Well-off lowland agropastoralist* (46 households)
- *Poorer lowland agropastoralist* (25 households)
- *Upland agropastoralist* (70 households)
- *Wage earner* (29 households)
- *Poor* (8 households)

Cluster names reflect dominant activity and average economic outcome for each of these groupings (see Table 6.2 for percentage of households engaging in a specific activity in each cluster and Chap. 2 for definition of the full set of variables). The cluster characteristics and contrasts are summarized here with a brief introductory description.

Of the seven clusters, two are on average considerably better off than the others (though still well below international poverty datum lines). These are the *undiversified pastoralists* and the *well-off lowland agropastoralists* (Table 6.3). The *undiversified pastoralists*, as their name suggests, are all livestock owners and derive on average 95% of their income from their herds. Most have no involvement in farming, off-farm or wildlife activities. *Undiversified pastoralists* correspond most closely (in economic terms) to the popular perception of the traditional Maasai pastoralist. The *well-off lowland agropastoralists* average an even higher gross annual income, deriving more than half from livestock and the rest from off-farm activities as well as cultivation.

Table 6.2 Per cent of households involved in different income generating or subsistence activities, used to define cluster membership

	Undiversified pastoralist	Diversified pastoralist	Well-off lowland agropasto-ralist	Poorer lowland agropasto-ralist	Upland agropasto-ralist	Wage earner	Poor
TLU	100	100	100	96	91	86	88
Livestock income	95	97	100	36	44	0	0
Livestock purchases	67	10	7	12	34	38	0
Livestock slaughtered	100	0	100	0	3	0	0
Crop income	0	0	33	16	31	0	0
Crop consumed	5	0	87	36	81	10	0
Petty trade income	14	10	26	28	14	3	0
Conservation income	10	17	0	0	1	0	0
Business income	14	3	54	24	14	3	0
Wage income	5	31	26	16	17	76	0
Upland cultivated	0	3	11	0	89	0	0
Lowland cultivated	14	0	93	96	6	62	0

TLU tropical livestock unit

Table 6.3 Mean gross annual income per household

Cluster	Households with income (%)	Mean income (US $)	Median	Range
Undiversified pastoralist	100	1,413	682	16–5,146
Diversified pastoralist	100	413	246	6–2,275
Well-off lowland agropastoralist	100	1,978	1,032	157–13,180
Poor lowland agropastoralist	74	358	193	17–1,277
Upland agropastoralist	93	229	128	2–1,371
Wage earner	89	291	243	27–243
Very poor	22	22.5	22.5	18–27
Total	91	809	304	2–13,180

The other clusters all average much lower annual incomes, anywhere from less than a tenth to around one-quarter of those of the two better-off clusters. *Diversified pastoralists* earn over 75% of their annual income from livestock, but their livestock holdings and their average income are under one-quarter of those of *undiversified pastoralists*, and not surprisingly they seek off-farm work to make ends meet. The next three clusters (*poor lowland agropastoralists*, *upland agropastoralists* and *wage-earners*) are all characterized by incomes even lower than those of *diversified pastoralists*. *Poorer lowland agropastoralists* get most of their income from livestock, but also farm and work off-farm. *Upland agropastoralists* are defined by their spatial distribution, but also by their reliance on cultivation and off-farm work alongside

some livestock ownership. The *wage earners* get 93% of their income from off-farm work. Households from the poorest cluster have vanishingly little or no income, very few if any livestock, and subsist mainly on remittances and food aid.

Detailed analysis of clusters, using the quantitative data on returns to different livelihoods activities, explores the extent to which *how well* a household is doing is associated with *what* it is doing. Figure 6.4 shows livestock ownership by cluster. Figure 6.5 shows mean annual household income for households in each cluster, and its proportional composition, while Fig. 6.6 gives further detail on proportional contributions from livestock, agriculture, off-farm and wildlife to total income.

A small number of well-off households increased the mean values significantly in most analyses, resulting in considerable skew in the data, particularly with respect to income. As a result, median values represent the central tendency better than means, and are presented in all analyses as well as means. In all cases, the mean and median values exclude any households with no income from the specific activity in question. The mean values thus represent the actual returns to a particular activity to a household engaging in that activity, while the data on the percentage of households involved shows the relative importance of the activity in each cluster. Gross annual income is defined as the sum of all income to the household from livestock, crops, conservation-related and off-farm activities. It includes the value of crop and livestock products produced and consumed by the household, as well as cash or in kind payment, such as remittances (which are included under off-farm work by household members), but not other gifts into the household. Households which are listed as having no income by definition depend on food aid.

The high variance within each cluster and the non-normal distribution of the data, even excluding zero values, mean there are few significant differences between clusters. However, *well-off lowland agropastoralists* emerge as having a significantly higher gross income than all other clusters apart from *undiversified pastoralists* ($P < 0.05$, Tukey's (HSD) Honestly Significant Difference) Test. The low median values relative to the means show the degree to which a few very wealthy households skew the data, particularly for the wealthier clusters.

In spite of a wide range in livestock holdings in the *undiversified pastoralist* cluster, Fig. 6.4 shows how the two wealthier clusters are distinct from the other five clusters in terms of livestock holdings. The cluster analysis, based on binary variables,

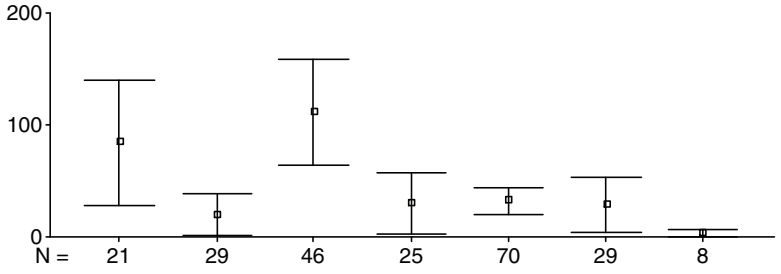

Fig. 6.4 Livestock ownership by cluster (showing 95% confidence intervals)

differentiates *undiversified* from *diversified pastoralists* in the proportion of households that bought (67% vs 10%) and slaughtered (100% vs 0%) livestock. Both activities suggest more "disposable income", although this is an oversimplification, as livestock are slaughtered for ceremonial reasons (such as at a birth or circumcision ceremony), and livestock purchases reflect complex investment decisions.

The wealthiest group, *well-off lowland agropastoralists*, had relatively few households making livestock purchases (7% households), although those that did spent the most ($861). Households in this cluster are already diversified and well placed to invest profits elsewhere. The majority of undiversified pastoralists bought livestock during the year (67%) and spent on average $323 per household (range: $6–$1,383). Investment in livestock purchases was relatively high among two of the poorest clusters: *wage earners* (38% of household) and *upland agropastoralists* (34% of household), with similar levels of investment value ($239 and $244, respectively). In contrast, few households in the two clusters *diversified pastoralist* (10%) and *poorer lowland agropastoralists* (12%) invested in livestock, and the mean value of those investments varied from $275 for the former to just $27 for the latter. Households with few livestock trying to rebuild their herds, and to re-establish themselves as pastoralists, need to invest in livestock but may lack the means to do so and may be prioritizing other activities.

Figure 6.5 shows the mean income per household from livestock, agricultural, off-farm sources and wildlife conservation/tourism sources. The figure suggests that the main factor differentiating income between the wealthiest two clusters and the other poorer clusters is largely income from livestock and livestock products. The off-farm income for the wealthiest *lowland agropastoralists*, however, is equivalent to or greater than the entire gross income for the other groups. High levels of variation in income values within the five poorer clusters are such that differences in the means are not significant.

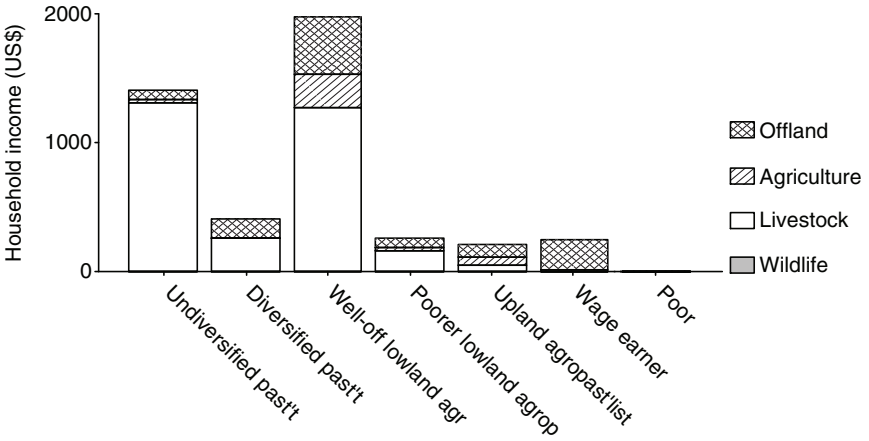

Fig. 6.5 Annual household income from livestock, agriculture, conservation and off-farm sources for each cluster

The cluster name reflects the presence or absence of particular activities rather than any absolute success in terms of income brought into the household through particular activities. Thus the absolute value of off-farm income for *wage earners* is at best equivalent to that of the other clusters. The *undiversified pastoralist* cluster consisting of households that rely almost exclusively on livestock income sources includes households with a wide range of absolute annual incomes, from just $16 to $5,146. The median income of $682 is still nearly three times higher than that of their diversified counterparts. Income from conservation is barely visible in Fig. 6.5, reflecting its negligible absolute contribution at household level.

Figure 6.6 compares the relative contributions of livestock, agricultural, off-farm and conservation income sources. There is a relatively high level of diversification of income sources in the wealthiest cluster, comprising *well-off lowland agropastoralists*. The largest clusters are all highly diversified, with significant income streams from livestock, agriculture and off-farm sources. The poorest clusters (*wage-earners* and *poor*) are in economic terms arguably no longer pastoralists at all, despite their reliance on the broader pastoral community for employment and remittances and their cultural identity. They have diversified away from pastoralism and rely on a limited number of activities suggesting continuing vulnerability. These data suggest that many pastoralists with smaller herds, who do not cultivate (the vast majority being located in more arid areas unsuitable for cultivation), have to look to off-farm and conservation-related activities to supplement their income. There are also many poor pastoralists within the undiversified cluster.

The proportion of income from conservation sources ranges from zero to negligible. Conservation income at household level in Longido is from crafts sold to tourists and employment at tourism camps, and is found among three of the five poorest clusters.

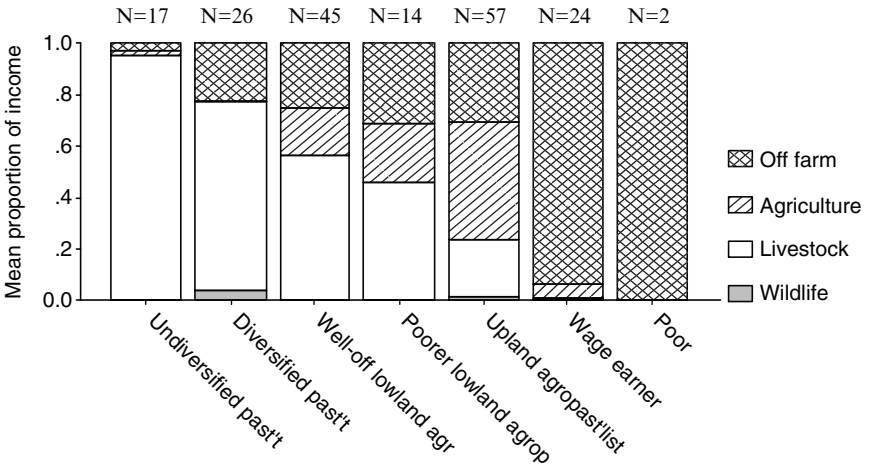

Fig. 6.6 Proportion of gross annual income from conservation, off-farm, agriculture and pastoralism

6.4.1 Household Demography and Livelihood Strategies

Overall, mean household size in the area was 9 AU per household, with a dependency ratio of 1.3. Under half of all school-age children (45%) were in education at the time of the survey, in spite of nominally free primary schooling in Tanzania. These results reflect the hidden costs, including the demands that pastoralism and agropastoralism place on household labour. Education is seen as key to *Maendeleo*, or development, by families throughout the area. While the government pays basic fees for primary education, families must pay for books, uniforms and cash contributions to school and staff maintenance. Sending children to school also represents a cost in terms of labour lost to the household, and educational provision and attainment are both of doubtful quality (Bishop, 2007). Comparing the proportion of children currently in education (45%) with the proportion of adults educated (26%), however, suggests an important upward trend in levels of education.

Table 6.4 describes household demographic and education characteristics for each cluster. *Well-off lowland agropastoralists* have significantly larger households ($F = 9.89$, df = 6, 22, $P < 0.001$), and more productive workers ($F = 9.54$, df = 6, 221, $P < 0.001$), than any other cluster. *Diversified pastoralists* have significantly fewer children in education than the three agropastoral clusters and the wage-earning cluster, but *undiversified pastoralists* and the *very poor* have even lower enrolment. A higher proportion of household heads among the *lowland agropastoralists* and the *upland agropastoralists* had received primary or secondary education than was the

Table 6.4 Household demographic data by livelihoods cluster

	Total AU per household		Adults (16 years+) with 1º and/or 2º education (%)		Children (6–15) in school (%)		Per cent of household heads with 1º and/or 2º education
	Mean	SD	Mean	SD	Mean	SD	
Undiversified pastoralist	9	4	18	20	31	30	10
Diversified pastoralist	6	5	31	29	27*	36	21
Well-off lowland agropastoralists	14**	7	19	30	45	30	30
Poor lowland agro-pastoralist	7	5	32	47	60	42	28
Upland agro-pastoralist	8	5	27	38	55	34	23
Wage earners	8	4	26	26	47	39	17
Very poor	8	5	23	16	19	23	11
Total	9	6	26	33	45	36	22

AU adult unit, *SD* standard deviation
1º and 2º = Primary and secondary
*difference significant at $p \leq 0.05$
**difference siginificant at $p \leq 0.01$

case among the pastoralists. There was no significant difference between clusters in age of household head (mean 49 years), dependency ratio (mean 1.3) or the proportion of adults with primary or secondary education (mean 26%); although in the latter the range between clusters was wider. The observed relations could be in part created by the difficulties of combining pastoralism (with its customary use of child labour) with education, which requires children to be in school and therefore unavailable for herding (Bishop, 2007). The exclusion of the poorest children from education is likely to be in part due to the need for regular payments (uniforms, books, school contributions) even in supposedly free primary education, and also due to the fact that children in the poorest families are likely to be working as herding labour for better-off households (Bishop, 2007). At a very crude level, these results are consistent with the widely held assumption of a positive relationship between the potential for households to increase income through diversification and the education of the household head. They are also consistent with the finding that poorer households, where they can afford to, see investment in education as a worthwhile strategy for the long-term well being of the household (Bishop, 2007).

6.4.2 *Qualifying Diversification*

Off-farm income was divided into three categories: wage/salary income, petty trade income and business income. Table 6.5 shows clear quantitative differences between clusters for income from these different sources. For example, among households with a wage/salary income, the mean annual value from this source ranges from $891 among well-off agropastoralists to $212 among poor lowland agropastoralists. These differences reflect the value of different types of jobs or businesses.

Table 6.5 Off-farm household income for each cluster

	Business income		Remittance income		Wildlife income		Petty trade income		Wage income	
	Per cent hh	Mean (US $)	Per cent hh	Mean (US $)	Per cent hh	Mean (US $)	Per cent hh	Mean (US $)	Per cent hh	Mean (US $)
Undiversified pastoralist	15	396	11	40	5	90	10	59	0	–
Diversified pastoralist	3	216	7	2	11	18	7	25	31	402
Well-off lowland agropastoralist	54	400	2	7	0	–	0	–	24	891
Poor lowland agropastoralist	22	81	0	–	0	–	10	17	20	212
Upland agropastoralist	13	191	7	27	1	32	12	44	21	255
Wage earners	0	–	7	171	4	90	0	–	86	273
Very poor	0	–	22	23	0	–	0	–	0	–
Total	19	314	6	44	3	44	6	40	28	399

hh household

Table 6.6 Distribution of different off-farm income sources across clusters

		Breakdown of households within each cluster involved in off-farm activity (%)				
	N	Casual labour	Watchman	Teacher	Government employee	Total
Undiversified pastoralist	–	–	–	–	–	–
Diversified pastoralist	10	0	80	10	10	100
Well-off lowland agropastoralist	11	0	55	27	18	100
Poor lowland agropastoralist	5	60	40	0	0	100
Upland agropastoralist	17	53	47	0	0	100
Wage earners	26	27	69	0	4	100
Very poor	–	–	–	–	–	–

Our data allow us to differentiate qualitatively between different types of wage/salary income. The principal sources of wage income in Longido households were as follows:

- Casual labour (highly irregular, mostly unskilled, poorly paid and unpredictable; $27–$162)
- Watchman positions (unskilled, low returns but regular; $108–$243)
- Teacher (skilled, regular and relatively well-paid; $648–$1,026)
- Government (skilled/unskilled, highly paid $378–$4,320)

Table 6.6 describes the distribution across the different clusters of these different types of salary or wage.

Casual labour and watchman positions, that is, low-paid, insecure and often irregular jobs, are the predominant source of wage or salary income across all clusters. However, it is clear that the more skilled, secure and higher-earning jobs (teacher and government employee) figure more frequently for the best-off cluster (well-off agropastoralists) than for the poorer ones.

While the cluster analysis was based entirely on binary data (e.g. Wage-earning yes/no) and did not differentiate between the different types of wage source, the above table shows how the variables selected for the cluster process were effective in differentiating between those households that had significant opportunities to diversify into higher-earning and reliable income sources, and those that were less well-off and were diversifying into activities that required little skill, and would bring back minimal income with limited scope for investment and wealth accumulation.

6.5 Determinants of Livelihood Strategies

The previous section shows the links that emerge between livelihood clusters in Longido and wealth and opportunity. To what extent can membership of any particular livelihood cluster (i.e. what households do) be predicted on the basis of demographic, agro-ecological, social or spatial factors?

Geographical factors to some extent determine what activities households are able to do, for example, through dependence on agro-climatic potential or distance to major towns for labour and other markets. The study sample was distributed across six villages, each of which was selected to represent the variation across the area, and unsurprisingly, the clusters or livelihood strategies are not evenly distributed across the different villages (Pearson $\chi^2 = 402$, df = 30, $P < 0.001$). Thus, upland agropastoralists are necessarily associated with areas where there is upland agriculture, in Olmolog and to a lesser extent in Elerai; the majority of lowland agropastoralists are in Tinga Tinga, Ngereyani and Mairowa; and pastoralists dominate in the more arid area around Sinya. However, Mairowa has most of the wealthy agropastoralists, while those in Tinga Tinga are much poorer.

Social and historical particularities underlie these contrasts. Mairowa has a long history of profitable cross border livestock trade, channelling cattle to the long-established Kenya livestock market of Bissil (Il Bissil), a 2-day walk from Mairowa. Mairowa was cited in the 1940s colonial archives as a centre of cross-border livestock trade and rustling (Waller, personal communication), and Tanzanian pastoralists with preferential access to Kenyan markets can still capitalize on livestock prices that are about 20–30% higher across the border for equivalent animals. This cross-border trade has underpinned the economic growth of Mairowa, with the emergence of a small number of extremely wealthy herd-owners and traders heading up a relatively prosperous population, as well as a long tail of poor and very poor households. Mairowa's position near slightly higher land with relatively favourable agro-ecological conditions has fostered the successful expansion of cultivation as national policy and local economic conditions encouraged Maasai adoption of farming. Mairowa's distance from conservation areas and lack of high local elephant densities means wildlife damage (though resented) is limited.

By contrast Tinga Tinga is less well placed to take advantage of the economic gradients the border sets up. It is constrained by the physical and administrative barriers presented by the protected areas and fenced, high-potential croplands of Amboseli and Kilimanjaro. Tinga Tinga crops have been repeatedly destroyed by wildlife, particularly by the growing Amboseli elephant population that regularly moves through the area and whose presence close to the village has increased dramatically during the past 10 years. Though Tinga Tinga borders on the slopes of Kilimanjaro, its higher, fertile lands have long been leased out by the central government to outside investors. Land to its east belongs to Tanzania Breweries Ltd. and is currently leased to a private tourism and wildlife reserve operation, which is linked to much of the increase in elephant damage to local crops. To the south lies the government-owned Tanzania Livestock Research Station and the vast parastatal West Kilimanjaro Ranch. It is perhaps unsurprising then that the majority of households in the wage-earning cluster, reliant primarily on off-farm income, are from Tinga Tinga.

Distances to livestock markets, to conservation areas, to all-weather roads and to major towns are all likely to play a part in determining what activities households are involved in, as are agro-ecological factors (summarized by the Normalized Difference Vegetation Index or NDVI, and its variability, represented by the coefficient of variation of NDVI or CV-NDVI). Other factors expected to play a role in determining

what households do include levels of education, household size and structure and the social status of the household head. Similarly, household assets (in this case land and livestock) are also likely to play a role.

Multinomial logistic regression was used to examine the relative importance of these different factors in influencing the allocation of households to membership of different clusters. The odds ratios generated show the relative likelihood of a household with a particular characteristic being allocated to a particular cluster as opposed to the reference cluster. The reference cluster in this case was taken as the "traditional" *undiversified pastoralists*. (The least diversified cluster, the very poor, was too small to be a valid reference cluster and for the same reason was excluded from the multinomial regression analysis).

Simple cross-tabulation ruled out those factors with no apparent relationship with cluster membership. The proportion of households with heads in a gatekeeper position was considerably (but non-significantly) higher for households in the well-off lowland agropastoralists (22%) than in other clusters (overall mean 13%). Distance to park and distance to livestock market were closely cross-correlated. As described above, the quality of the cross-border market used by residents at Mairowa overrides considerations of distance to the nearest market, and, therefore, distance to the national park (km) was selected for our analysis. Average NDVI and acreage farmed were collinear with, and dropped in favour of, the coefficient of variation of NDVI. Similarly, total household size was collinear with and dropped in favour of total productive workers in the household.

The variables included in the final model are shown in Table 6.7. McFadden's Pseudo R^2 suggests that the model explains around 65% of the variance found in the data, and the model is significantly better at predicting the data than no model at all ($\chi^2 = 482.0$, df = 85, $P < 0.001$). The role of geographical (spatial, agro-ecological) factors in explaining cluster membership is striking.

Systematic comparison with the *undiversified pastoralist* reference cluster differentiates livelihood strategies on the following dimensions at the significance level of $P < 0.05$ (Table 6.8).

Agro-ecological factors: Households associated with increasing variability in primary productivity (CV of NDVI) are significantly more likely to be from the *diversified pastoralist* cluster than *undiversified pastoralist*, and more likely to be *undiversified pastoralist* households than *upland agropastoralist* households. *Diversified pastoralist* households are more likely to be found closer to national parks than the reference cluster, and poorer *lowland agropastoralist* households further away. *Well-off agropastoralist* households are more likely to complain of wildlife damage than are *undiversified pastoralist* households.

Spatial factors: Compared to *undiversified pastoralist* households, *poor lowland agropastoralist* or *wage-earning* households are more likely to be close to a major town. *Upland agropastoralist*, *poorer lowland agropastoralist* and *wage-earning* households are more likely to live closer to dry season water. *Upland agropastoralist* households are more likely to be further from an all-weather road.

Sociodemographic factors: Compared to *undiversified pastoralist* households, those from the poorest clusters – *upland agropastoralist*, poorer *lowland agropastoralist*

or *wage earning* – are more likely to have a female household head. Households with lower livestock holdings per person are more likely to be from *upland agropastoralist*, *wage earner* or *diversified pastoralist clusters*. The proportion of adults with primary or secondary education was a significant determinant of cluster membership (Table 6.7), but there was no significant difference in this value between the reference cluster and other clusters. Table 6.4, however, suggests that the degree of diversification pursued by a household increases when there is one or more educated adult living in the household.

The only factor differentiating membership between the two relatively well-off clusters is the higher likelihood of a well-off agropastoral household reporting wildlife conflict. The main cause of wildlife conflict in the area is crop damage and so this result is not surprising.

Undiversified pastoralists are differentiated from diversified pastoralist households by the higher numbers of livestock they hold per person, their location in areas with lower variation in NDVI and their greater distance from the nearest national park.

The poorest clusters were more likely to be found closer to towns, closer to dry season water and are more likely to have female household heads, as

Table 6.7 Variables included in multinomial regression of livelihood cluster

Variable type	Variable	Statistical significance
Demographic/social	Dependency ratio	
	Number of productive workers (6 years+; not in school) (colinear with total household size [AU])	
	Age of household head	
	Gender of household head	
	Gatekeeper	
	Household head educated (yes/no)	
	Proportion of 6–15 years in school	
	Proportion of adults (16 years+) with primary or secondary education	$P < 0.01$; $\chi^2 = 16.7$, df = 5
Geographic/spatial	Coefficient of variation for NDVI (1984–2004) (colinear with: NDVI; area under cultivation)	$P < 0.001$; $\chi^2 = 45.5$, df = 5
	Distance to nearest town (km)	$P < 0.001$; $\chi^2 = 28.6$, df = 5
	Distance to nearest primary school (km)	
	Distance to nearest all weather road (km)	$P < 0.001$; $\chi^2 = 22.2$, df = 5
	Distance to dry season water source (km)	$P < 0.001$; $\chi^2 = 23.7$, df = 5
	Distance to national park (km) (colinear + distance to livestock market)	$P < 0.001$; $\chi^2 = 38.4$, df = 5
	Wildlife conflict (yes/no)	$P < 0.001$; $\chi^2 = 23.7$, df = 5
Assets	TLU/AU	$P < 0.01$; $\chi^2 = 15.7$, df = 5

TLU tropical livestock unit, *AU* adult unit, *NDVI* normalized difference vegetation index

Table 6.8 Parameter estimates for multinomial regression[a]

Cluster	Explanatory variable	Beta	Significance	Exp(*B*) (odds ratio)	More (+)/ less (-) likely as compared to reference group (undiversified pastoralists)
Diversified	*TLU/AU*	–0.42	0.01	–0.42	–
Pastoralist	*CV-NDVI*	0.83	0.02	0.83	+
	Distance to national park (km)	–0.40	0.05	–0.40	–
Well-off lowland	*Intercept*	29.25	0.00		
Agropastoralist	*No conflict with wildlife*	–3.21	0.04	–3.21	–
Poor lowland	*Intercept*	20.47	0.01		
Agropastoralist	*Distance to town (km)*	–0.67	0.02	0.51	–
	Distance to national park (km)	0.23	0.02	1.25	+
	Distance to dry season water (km)	–0.74	0.00	0.48	–
	No.of productive workers	–0.26	0.05	0.77	–
	Household head = man	–13.97	0.00	0.00	(+)
Upland	*Intercept*	36.80	0.00		
Agropastoralist	*CV-NDVI*	–1.64	0.01	0.19	–
	Distance to all weather road (km)	0.49	0.02	1.63	+
	Distance to dry season water (km)	–0.47	0.02	0.63	–
	TLU/AU	–0.27	0.03	0.77	–
	Household head = man	–15.82	0.00	0.00	(+)
Wage earners	*Intercept*	23.31	0.00	–	
	Distance to town (km)	–0.66	0.01	0.52	–
	Distance to dry season water (km)	–0.38	0.04	0.69	–
	TLU/AU	–0.22	0.05	0.80	–
	Household head = man	–17.02	0.00	0.00	(+)

[a]Reference cluster = undiversified pastoralist. Significant results only shown

TLU tropical livestock unit, *AU* adult unit, *NDVI* normalized difference vegetation index

would be expected from common patterns of diversification and urban drift seen elsewhere.

These results suggest that spatial, geographical and agro-ecological, rather than sociodemographic factors, are the main predictors of what people do, with the important exception of education. People move to locations that offer them opportunities; for example, poor people move closer to urban areas: it is not the existence of the urban area which makes them poor. However, apart from the poorest and wealthiest, spatial factors do not seem to be closely associated with how well they do.

6.6 Determinants of wealth

The cluster analysis and its associated multinomial regression have addressed our questions as to the nature of people's livelihood strategies in Longido, and as to what factors influence the choice of strategy. This section analyses two further research questions: *how well are people doing?* and *what factors affect how well people do?*

Longido Maasai are poor relative to their neighbours across the border in Kenya. The average gross annual income across all households in the study was just $809 (this figure includes the value of livestock and crops consumed within the household as well as those sold). This total is for a household of average size 8.9 AU, compared to an average gross annual income of $3,205 for an average household size of 4 in Kitengela (Chap. 4). Opportunities for diversification are limited, but households are diversifying; on average, just 43% of Longido household income came from livestock and livestock products, 22% came from agriculture, 34% from off-farm income-generating activities, and 1% came from wildlife or tourism-related activities.

Regression analysis shows the extent to which a range of factors might influence wealth, in terms both of gross annual household income and of livestock holdings. The number of cases in the analysis was reduced due to missing data in any one of the variables in the analysis. Values of gross income could not be estimated for 38 households, whose members were unable to recall with any confidence the amount they had received in one or more of their various sources of income over the course of the previous year.

6.6.1 Note on Method of Analysis

Given the relatively small sample size and the high potential number of independent and co-varying variables, an initial screening exercise identified those variables that had a significant correlation with income and livestock holdings. Once identified, these variables were correlated against each other, and where the bivariate correlation was greater than 0.7, one variable was deselected in favour of the other. In this way, we identified 11 explanatory variables for the regression analysis with livestock numbers, and 10 explanatory variables for the regression analysis with income. The variables screened are described in Table 6.9, with those selected for the analysis marked in bold. A number were log-transformed so as to improve the normality of the distribution.

To avoid multi-collinearity and instability in the model, area under cultivation (log-transformed) was included, and the CV of NDVI, average NDVI, and the proportion of land under agriculture (>60%) were excluded; the household size (AU) was included and the number of productive workers was excluded. Distance to major town was included and distance to park dropped for the regression with income as dependent variable, while distance to park was included in the regression with livestock holdings as dependent variable. Similarly, to avoid

Table 6.9 Variables used in linear regressions on factors influencing livestock holdings and income ($N = 191$)

Demographic variables	Mean	Spatial variables	Mean	Production variables	Mean
Total AU per hh	9.31	Average NDVI (1984–2004) (10 km^2)	.38	Gross income (ln + 1)	5.26
Age of household head	47.80	CV of NDVI (10 km^2)	13.64	Livestock holdings (TLU) (ln + 0.1)	2.68
Years resident in village	35.58	Distance to major town (km)	23.85	Area cultivated (ln [ha + 0.1])	.58
Total productive workers (6 year+, not student)	8.00	Distance to all weather road (1/km)	.04	Proportion of income from livestock (ln + 0.001)	−2.75
Dependency ratio (total household/residents > 5 years)	1.27	Distance to national park	37.76	Proportion of income from agriculture (ln + 0.001)	−4.44
Per cent of adults with 1º or 2º education	.32	Distance to school (ln) (km)	1.07	Proportion of income from off-farm (ln + 0.001)	−3.63
Per cent of 6–15 years in school (if no young, zero-value)	.45	Distance to dry season water (ln) (km)	1.07	Total number of off-farm activities	1.17
		Per cent rainfed crop cover (>60% cover)	10.33		

AU adult unit, *hh* household, *NDVI* normalized difference vegetation index, *TLU* tropical livestock unit

problems of singularity, the (log-transformed) proportion of income from off-farm activities was excluded from the regression against livestock holdings and the (log-transformed) proportion of income from agriculture was excluded from the regression against income.

6.6.2 *Factors Influencing Income and Livestock wealth*

The results of the regression analyses for gross annual income and livestock holdings are summarized in Table 6.10.

In summary, in both cases, livestock emerge as a major dimension of wealth. Proportion of total income derived from livestock is highly significant both as the near-main predictor of gross annual income and also as a strong predictor of livestock holdings. Beyond that the differences between the two measures of wealth are striking.

- Income is best predicted by the proportion of income from off-farm and livestock sources and by distance to town, with income increasing as distance increases.
- Herd size increases primarily with household size, and is also predicted by the proportion of income from livestock, by the household head being in a leadership position and by the area of land under cultivation.

Table 6.10 Determinants of two dimensions of wealth: gross annual income and livestock holdings

	Livestock holdings (log transformed)		Gross annual income (log transformed)	
	Spatial error model		OLS model controlled for heteroskedasticity	
Explanatory variables	Significance	Beta	Significance	Beta
Household size	*** (+)	0.489	ns	
Age of household head	ns		–	
Years resident in village	–		ns	
Household head = gatekeeper	* (+)	0.105	ns	
Per cent of children (6–15) in school	ns		–	
Acres cultivated (log transformed)	*** (+)	0.250	ns	
Livestock holdings (log transformed)			** (+)	0.191
Gross income (log transformed)	ns			
Per cent income from livestock (log transformed)	*** (+)	0.271	*** (+)	0.523
Per cent income from off-farm (log transformed)			*** (+)	0.600
Per cent income from crops (log transformed)	ns			
Total no. of off-farm income activities	ns		ns	
Distance to dry season water (log transformed) (km)	ns		ns	
Distance to national park	ns			
Distance to town	ns		*** (+)	0.169
Observations	191		191	
Adjusted r^2	0.52		0.58	
Model F value	21.83		30.1	
Model significance	***		***	

ns not significant, *OLS* ordinary least square
* significant at 0.05 level;
** significant at 0.01 level;
*** significant at 0.001 level

This suggests households wealthy in livestock maintain more members and dependents, but those wealthy in other ways may not necessarily do so. Labour availability may be a limiting factor in management of a large herd in ways that do not apply for other (especially off-farm) sources of income; conversely, it is possible that the large livestock-owning households operate a more traditional social group alongside a traditionally preferred livelihood, thus approaching a customary Maasai cultural ideal. Large, wealthy households are also likely to be those with enough flexibility in labour availability to cultivate larger areas or access cash to pay for cultivation. Leadership position predicts livestock holdings but not income, suggesting a possible two-way relationship between herd (and land) accumulation by those in a position of power. Household heads who have managed to accumulate and/or maintain large herds are perceived as reliable stewards of the community; community leaders and gatekeepers are likely to be presented with livestock by client families seeking assistance or marking their appreciation of support received.

This analysis again shows how important livestock are in household income and assets, although off-farm sources are also clearly important in supplementing incomes. Spatial variables do not emerge as significant predictors of wealth, in striking contrast to their role in shaping the analysis of livelihood clusters.

6.7 Costs and Benefits of Wildlife in Longido Livelihoods

The data presented above show the marginal importance of wildlife-related income *at a household level*, particularly when compared to income from other sources (livestock, agriculture and off-farm income). Only 8 households out of 229 in the study reported making any income from wildlife and conservation-related activities, and 7 of these were in Sinya (the other was in Elerai). In all cases, the income was from women selling beads and other crafts to tourists. While it is known that some young men, for example, in Sinya, have been able to find well-paid employment in the tourist camps, the fact that none of these households were found in the random sampling of households supports the finding of a limited impact of these employment opportunities to the majority of the population. The mean income from conservation-related activities, for those households in our sample that did earn income from conservation or tourism-related activities, ranged from $9 to $90 per year, with an average of $35 per year for the households involved.

However, these figures hide a far more complex story with regards to the way in which households benefit from and pay for the presence of wildlife in their village lands. Against the background of poverty and limited economic opportunities, the area is subject to conflicts between competing private interests seeking to control access to its valuable large mammal resource, set within the context of competing local and state claims to authority over land rights (see Nshala, 2002).

The wildlife management system in Tanzania, since the colonial era and increasingly during the past 30 years, has been highly centralized and has paid scant regard to local rights and livelihood concerns. The hunting concession agreements between hunting companies and the central government have also limited the development of community-based tourism enterprises comparable to those that have grown up across Maasailand in Kenya (Chaps. 3–5, this volume). In Tanzania, tourist hunting has been controlled by the state through central government leasing hunting blocks in GCAs and other areas overlapping with village lands. The return of revenues to villages where hunting takes place is at the discretion firstly of the WD and secondly of district governments. These two layers of government tend to be the main beneficiaries of any funds. The hunting concession system grants companies the right to hunt on village lands with no administrative consideration given to local land-use patterns or land rights. While the status of GCA in theory relates only to permission to hunt wildlife and should not impinge on any other land use, including non-consumptive use of wildlife such as wildlife viewing tourism, the reality has proved otherwise.

By the mid-1990s, tourism companies were beginning to explore the possibility of partnering with local villages in the Longido area to host campsites and walking

safaris (Nelson, 2004). This interest had emerged from the rapid national growth of the ecotourism industry in the country as a whole in the 1990s, and the possibility of developing alternative tourism products on community lands in a scenic and wildlife-rich area close to the tourism industry's home base of Arusha. Tanzania's tourism industry grew from a total value of about $65 million in 1990 to about $725 million by 2001, an increase of over 10% per annum during the 1990s (World Bank/MIGA, 2002). In 1995 the Dutch aid agency, SNV, began a Cultural Tourism Program in Longido village, and several high-end ecotourism companies began operating in Sinya village, with informal agreements with the community to pay about $20 per bed night for each guest who stayed on village land. Sinya, with its vast land area (~600 km^2) and proximity to Amboseli, was the centre of private sector interest in the area's tourism potential. It had a recovering elephant population and significant numbers of game species such as giraffe, zebra, wildebeest, impala, gerenuk and lesser kudu. By the late 1990s, several villages in Longido East were earning small amounts of money from tourism through these loosely structured agreements, with the hopes on both private and community sides for increased investment in the near future (Fig. 6.7). From 1999 to 2001, as tourism continued to grow in northern Tanzania, these agreements became increasingly formalized through village-operator contracts representing larger income flows to the village. By 2003, Sinya village was earning nearly $30,000 in direct tourism payments, making it one of the three top-earning communities from ecotourism in northern Tanzania. Mairowa, by contrast, received a total of $500 per year in 2002–2004 from tour operators. Since the hunting outfitters authorized by the WD to operate in the villages had no contractual obligation to pay the community anything, and were under no form of local control or management, community interests clearly lay in maintaining game-viewing tourism, and communities became aligned with the game-viewing tour operators rather than the hunting companies.

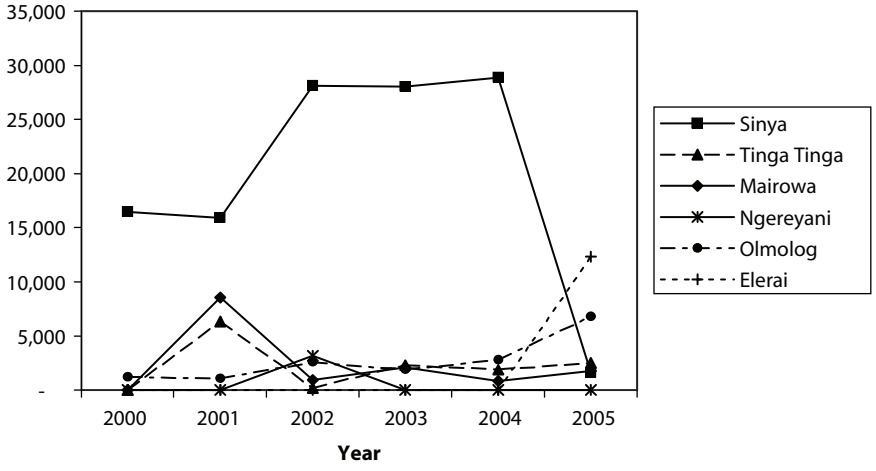

Fig. 6.7 Wildlife/conservation income at the community level

A major use of village tourism income in Sinya and the other villages was to pay for development projects that, in the absence of other income sources, would otherwise generally be funded through village-level “cesses” or local taxes levied on households. Most local projects, including those with outside funding support, almost always depend on village contributions to fund some component of the project. For example, Sinya spent many years constructing their primary school and dormitory. Most funding came from external charities and district council funds, but the village had to pay for the sand and cement and the diesel for pumping the water to make the bricks. To raise such funds, households each contribute a set amount; and in poor pastoralist areas this often requires selling stock periodically to get cash. When the village has income from tourism, these charges for village development projects come from village funds rather than from individual households. This can represent considerable savings for the household (not captured when considering only household income streams) even though the money itself never passes through the household. In most villages, cesses are means-related; the wealthiest would normally have had to pay the highest cesses, and so it is these households that will arguably benefit most from such community conservation revenue. In Ololosokwan village in Loliondo (see Chap. 8), with its very high tourism revenues, the forms of individual benefits from tourism are more diversified. The village pays university and secondary school bursaries for villagers (a major household cost saving) and also some health expenses borne by individuals. We do not have data on the extent to which poorer households were able to capture the help of the scholarship funds, but such schemes again historically bias towards the wealthier or more influential families.

An additional concern in Longido is that there is little or no monitoring, or record of how tourism revenues have been spent. Distribution of and accountability for conservation-related revenues from village-level agreements rested with the Village Finance and Planning Committee. This committee is also charged with the responsibility to compile and present before the village assembly the annual village incomes and expenditures, but we found that few of the villages keep written records. Figure 6.8 illustrates the proportion of village level income (in this case including contributions from the District Council) remaining unaccounted for during the period from 2000 to 2005. While these figures may in part be explained by income being received in kind, the data demonstrate a serious lack of transparency and accountability in the allocation of funds received at the village level.

In spite of the lack of transparency and concerns over elite capture of wildlife benefits, the development of ecotourism ventures through private operator deals with the communities was generally welcomed by the villages, as well as by a range of conservation and rural development NGOs active in the area. However, it soon created conflicts with the established trophy hunting concession holder in Longido GCA (see Masara, 2000; Jones, 2001; Nelson, 2004). In 2001 the tourism operator holding a contract with Sinya was charged with violating the Tourist Hunting Regulations of 2000. These regulations had been propagated by the government as a result of the growth of tourism in the 1990s and the WD’s desire to control or limit contractual agreements between tour operators and villages near where hunting

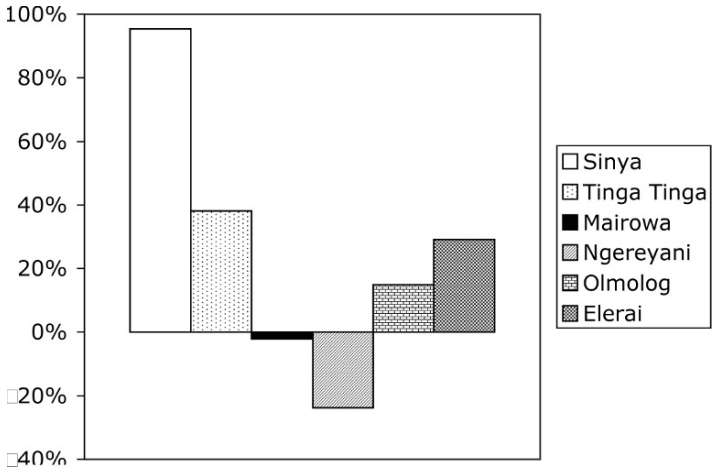

Fig. 6.8 Proportion of village level income (including wildlife related and district council contributions) remaining unspent/unaccounted

blocks were located. Similar conflicts emerged around this time throughout northern Tanzania, as tourism companies sought out new areas to operate in through agreements with communities, and trophy hunting concession holders sought to maintain their exclusive control over the wildlife in these areas. In Longido these conflicts centred on the important wildlife populations in Sinya village, although other villages were affected. In 2005, following continuing legal conflicts with the Northern Hunting Company that held the (centrally negotiated) hunting concession to the area, Tanganyika Wilderness Camps, an offshoot of Kibo Tours, pulled out of Sinya, causing a drastic drop of income (Fig. 6.7). Tanganyika Wilderness Camps moved its tourism camp to a neighbouring village, Elerai, where it continues to operate until the present time. Elerai has a more marginal wildlife resource in comparison to Sinya, which enabled the camp to relocate there without conflict with the tourist hunting company.

As these conflicts emerged, the process to designate the area as a WMA – which was supposed to place all forms of wildlife management, and especially trophy hunting, under local control – was delayed by the government's ponderous development of the requisite regulations. By 2003, when the regulations were finally released and the WMA formation process formally launched, they met with a mixed reception on the part of the villages. Sinya village at this time still had its own independent source of wildlife-based revenue through ecotourism activities, although the on-going legal and political battles between the private parties and the community and WD threatened their continuation. Sinya therefore baulked at the regulations' provisions for an increased level of government control over commercial investments in WMAs, for the weakening of community authority over hunting block allocation, and most importantly, the fact that the pilot WMA, drawn up in 1997–1998, joined nine villages together as a single "Enduimet" WMA. Sinya, with its large land area and rich wildlife population, would probably continue to generate

most of the wildlife-based revenue in this proposed WMA, but would now have to share this revenue with eight neighbouring communities. These villages practiced more agriculture and had much less land for wildlife, and Sinya villagers noted that it seemed unreasonable for them to share their wildlife revenue through the WMA structure when their neighbours did not share their agricultural production with them. The other villages, by contrast, had little existing tourism investment or wildlife-based revenue, and generally welcomed the WMA proposal as a possible avenue for increasing their economic opportunities. These villages, particularly Kamwanga and Irkaswa, contain large agricultural populations, with increasing numbers of immigrant Chagga farmers from Rombo and Hai Districts, and almost no wildlife or wildlife habitat. The apparent rationale for their inclusion is that it would potentially threaten the protection and monitoring of the WMA natural resources if one neighbour village in the same division were left out, although this is contested by other member villages.

No attempt was made by government and NGO facilitators (African Wildlife Foundation facilitates the Enduimet WMA in collaboration with the WD and Longido District government) to revisit the design of the WMA in West Kilimanjaro, despite its having been developed 5 years before the WMA regulations were released and despite the changes that had occurred in the area in the intervening years. The result was that Sinya withdrew from the Enduimet WMA, and the other eight villages attempted to proceed without the most wildlife-rich village in the region. While Sinya rejected the WMA, it eventually lost out in its political conflicts with the government and hunting outfitter in early 2005. This represented a loss to the village of a significant amount of tourism income, as well as employment and craft sales opportunities.

For the other villages that had supported the WMA process, it was not until 2007 that all the prerequisite requirements were fulfilled and the WMA was gazetted. The WMA now in place includes land from eight villages, although because of the differences in size between the upland and lowland villages, most of the land in the WMA comes from Ngereyani, Tinga Tinga, Elerai and Olmolog villages. The main initial change resulting from this designation is that the tourism investments which previously were based on operator-village contracts and administered by Village Councils will be renegotiated under the authority of the Enduimet “community-based organization”, an NGO set up by the communities to act as a supra-village structure to manage the WMA (see Chap. 8). Because the WD retains authority over hunting block allocation, there have not yet (as of late 2007) been any changes in hunting concessions in the area. The WMA regulations have also not yet clarified the key issue of what proportion of revenues from tourist hunting and other wildlife activities will be retained by the WD and what proportion will be captured by the communities. Although, after 10 years of community-based conservation in Longido East, a WMA has finally been legally constituted, it remains unclear whether this will result in a substantial redirection of revenues from wildlife to the local level.

At the time of writing, the situation has been further complicated by new “Non-consumptive tourism regulations”, released in September 2007 by the Ministry

for Natural Resources and Tourism (MNRT). MNRT states that the new regulations are intended to streamline and standardize revenues from non-consumptive wildlife tourism and other natural resource tourism through the same mechanisms as hunting revenues. The government has set prices for a range of items including entry per person, entry per motor vehicle, commercial photography/filming, campsites, walking safaris, night game drive, tour guiding, landing aircrafts and bed night fees. These fees will be collected centrally by MNRT through a mechanism similar to that by which the government collects sport hunting quota fees, with the client paying the fee directly to the government. A stipulated percentage of fees would then be transferred to the respective authority's bank account. This authority could be a WMA community-based organization, a village with an investment account or an individual who is selling wildlife resources for revenue. The WD has yet to inform the resource owners of the new system, coming into force at the start of the new financial year, July 1, 2008, and is relying heavily on international NGOs to disseminate information and provide guidelines on how to comply with the new regulations through workshops and meetings. It has also yet to define the revenue sharing mechanism, including stipulating percentages to be returned to the resource owners.

Until these issues are finalized, it is unclear how the new regulatory framework will impact revenue for the Maasai, although it is hard to see how it can possibly increase income when all fees due to WMA, village and even individuals have to pass first through Dar es Salaam. The new regulations have been vigorously contested by investors and conservation NGOs and it is highly likely that these regulations will remain the source of conflict and struggles over their implementation just as the notorious hunting regulations proved to be. More than a decade after community involvement in wildlife management was first set out as a policy objective and management option for the Longido area, relatively little has been achieved. The chief cause for this is that during most of this period the government's commitment to devolving management of wildlife to the local level as called for by the Wildlife Policy has been ambivalent at best and obstructive at worst, as the conflicts in Sinya and outcome of the WMA demonstrate. The curtailing of village game-viewing contracts, the WD's retention of hunting concession leasing procedures and revenues, and most recently, the announcement that it plans to take control of all non-consumptive income, have worked to reduce local income from wildlife and autonomy over resource use. Unlike other areas in the region such as Loliondo and Simanjiro (see Chap. 8), where strong local activism has maintained and even increased village tourism revenue, Sinya has *lost* a major source of individual and collective income. Furthermore, the lack of transparency and the insistence on multi-village associations to manage the WMAs is increasing the risk of elite capture of benefits at the local level. At present, the future of community involvement in wildlife management is unclear. While many local leaders at district and ward levels view the WMA gazettement in 2007 as the beginning of substantially greater local control over wildlife and its revenues, this optimism is moderated by the realities of the past decade, with the WMA process having achieved little thus far in terms of tangible changes. A centrally controlled hunting management system

remains in place, and tourism investment is being deterred by the area's recent history of conflict. Rather than increasing local control of wildlife resources and their share of benefits, WMAs could effectively serve to perpetuate a centrally controlled framework under the guise of community-based conservation.

6.8 Discussion

The Maasai in Longido District are poor in comparison to the Maasai from other study sites in this book, both in Tanzania (Chap. 7) and in Kenya (Chaps. 3, 4 and 5). Opportunities for diversification are limited due to poor infrastructure and roads, agro-ecological conditions and market opportunities. Where some of these constraints are less, as in the case of Mairowa, diversification and wealth levels rise noticeably.

Livestock are the mainstay of the economy in Longido for the majority of Maasai, in spite of government policies that actively promote agriculture at the expense of herd mobility. Economic opportunities from commercial livestock production in Tanzania, including for rural pastoralist communities, are strong and increasing. The government estimates that per capita meat consumption has increased from 5 kg/year in 1995 to 10.3 kg/year in 2003 and milk consumption from 20 L/year to 35 L/year over the same period (MWLD, 2005). A recent report examines the "*nyama choma*" (grilled meat) bar and restaurant market in Arusha municipality and conservatively extrapolates an estimated $22 million national economic value from the *nyama choma* market (Letara et al., 2006). This market, like most aspects of the livestock industry in Tanzania, is almost entirely (94%) dependent on smallholder pastoralist production, particularly in the northern part of the country.

In Longido, pastoralist producers are active livestock traders, using a range of markets including primary village markets, "secondary" markets in areas such as Longido and Oldoinyo Sambu, and export markets in Kenya (through informal cross-border livestock movement and sales). A recent survey in ten villages in Longido District estimated ~10% of individuals' cattle holdings and 2.5% of goat holdings are sold annually within villages in the districts (Ngigwana and Lendiy, 2004). Producers in the area are still facing key constraints, including poor infrastructure, particularly during the rainy season, excessive market fees and taxes, lack of financial support services or credit, lack of market information and lack of processing facilities (e.g. slaughterhouses) (Ngigwana and Lendiy, 2004). These constraints reflect the fundamental lack of policy support towards pastoralism and pastoralists outlined at the start of this chapter.

In Mairowa, options for diversification appear greater and opportunities for wealth creation are supported by a thriving cross-border livestock trade with Kenya. People there are investing in off-farm and agricultural activities as well as buying in animals to boost herd growth. Higher numbers of households from poorer clusters are investing in livestock, suggesting a desire on the part of those families

to move back into pastoralism if only they can accumulate enough resources to do so. Diversification is an important strategy for those with smaller herds, and our results show that in spite of relative isolation, off-farm income sources play if anything a greater role than agriculture in underpinning livelihoods in this arid and semi-arid area.

Agro-ecological conditions and the increasing presence of wildlife migrating through the area have limited the expansion of agriculture. In Mairowa, the community has also set limits to the area to be cultivated, so as to retain sufficient grazing. The villages in Longido East have done the same; these land-use zones overlap with the area set aside in the WMA, and while the WMA area excludes agriculture it is intended to be compatible with livestock grazing. Despite its vulnerable status in Tanzanian land law, access to pastoral land continues to be managed through a mixture of customary and village governance institutions and movement across boundaries remains relatively fluid. However, the formal gazettement of Enduimet WMA may increase the role of higher-level institutions – including the WMA's managing community-based organization, as well as district and central government actors – in the area's land and resource management decisions, potentially restricting pastoralist strategies.

Income from conservation at household level is negligible. This is an almost universally poor population by any standards, and one that relies heavily on pastoral production as well as to a lesser extent on cultivation and also on processing natural resources for sale, especially the poorest.

Our results show that sites east of Longido town have tourism potential but remain very impoverished, with average annual per capita income well below the international $1/day datum line, and efforts to diversify limited by geography and infrastructure as well as by agro-climatic conditions. But wildlife also impact on livelihood decisions, in terms of discouraging cultivation due to the threat of crop damage, and further limiting livestock access to pasture and water resources set aside for conservation by both public and private actors. If conservation interventions such as the creation of WMAs are not to restrict household livelihood options further, there must be ways of making cash benefits felt at the household level to make up for lost potential earnings. Community level benefits are subject to corrupt or inefficient practices and do not give the vulnerable food or livelihood security. There is no doubt that funding for health clinics, schools and other services is beneficial in the longer term for the communities as a whole, but the problem of poverty facing the people of Longido is here and now. With the Village Land Act of 1999, the Tanzanian Government ostensibly decentralized land allocation to be managed and approved at village level. However, while cultivated land is clearly ascribed to village control, ambiguity remains over the designation of grazing land under the Land Act of 1999, which allows for grazing land to be defined as "open" and thus available for the state to allocate as it deems fit.

As well as agro-climatic factors, spatial factors, including distance to town, to the nearest national park and to the nearest all-weather road, all play an important role in determining *what* households do. Within any given cluster or livelihoods strategy, variation in income and assets is high. Those households that rely entirely on non-pastoral

sources of income are (economically speaking) no longer pastoralists at all, and tend to be among the poorest. Apart from this very poor cluster, it is not possible to predict wealth simply on the basis of what a household is doing. The most economically successful cluster is dominated by households from one village, geographically and historically well placed to capitalize on cross-border trade and opportunities.

Whether measured in terms of livestock holdings or of annual gross income, wealth is by contrast not strongly predicated by spatial and geographical factors. Gross income increases with distance from town, but appears to be much more a function of livestock holdings. Income from livestock production is a good predictor of livestock holdings, but interestingly, gross income is not a good predictor of herd size. Though social and demographic factors do not predict gross annual income, the leadership position of the household head and the number of adults in the household are strong predictors of livestock holdings.

A number of major findings emerge from this study on the interaction of conservation and development in Longido in the wider context of rural livelihoods and their diversification. First, *the great majority of households are diversifying at some level.* At the same time, our data suggest that income from non-pastoralist/non-livestock activities makes up an increasing proportion of overall household income as the household gets poorer. So, although everyone is diversifying, *diversification away from livestock is more critical the poorer the household.*

The corollary is that *wealth is primarily associated with and expressed by livestock*. In Longido, livestock are not just culturally important but are also the central dimension of economic well-being. This is shown by our regression analyses, which show how strongly wealth is associated with the proportion of total income derived from livestock. There is a wide range of different factors underpinning this association. It is partly due to agro-ecological/biophysical characteristics of the area and the very limited nature of alternative opportunities, but it may also be partly due to the nature of resource and property tenure, namely, the fact that livestock are under individual control, and social institutions strongly support those rights, while other sorts of enterprise are less easily controlled by local rural people (Thompson and Homewood, 2002).

Finally, *conservation is performing poorly for development and poverty reduction*. In Longido, there is virtually no conservation income to households while conservation income at the village level is subject to low levels of accountability, and its uses are largely unknown and undocumented. Despite their apparent congruence with Tanzania's formal policy and administrative objectives, local initiatives, which use existing village institutions and achieve the twin goals of conserving land for wildlife and increasing local incomes, have not received sustained support from the state. Rather they have been openly challenged by the government and pressured to give way to formal WMAs.

The WMA framework has been rejected by one Longido village, Sinya, due to fears about loss of local authority and land rights linked to the way WMAs place power in the hands of central authorities, and the failure to fully adapt the framework to pastoralist land-use systems. The most recent regulations on non-consumptive wildlife and other natural resource tourism announced in September 2007, and due

to be enforced in 2008, serve to confirm these fears, at the same time extending government control beyond WMAs to all village land. Sinya village, not to mention individuals *within* the village, will now be subjected to the same loss of control of revenue as Enduimet WMA. *All* fees, from village level campsite and photography fees, to individual tour guiding fees, and other non-consumptive tourism activities, will be paid direct to the MNRT in Dar es Salaam. It is left at the discretion of the Director of Wildlife to return revenue to the local communities. In the case of Enduimet WMA, this revenue will be allocated at the level of a multi-village community-based organization, when issues of representation, legitimacy and accountability are hard enough at single, let alone multi-village level. The refusal on the part of state agents and conservation NGO's operating in these areas to adapt the wildlife policy's objectives to local land and resource-use practices and objectives, and their insistence on replacing existing locally supported ventures with an untested WMA management framework, is seemingly perverse. However, similar dynamics have been observed in other pastoralist areas (cf. Nelson and Ole Makko, 2005). Indeed, it is a widely observed outcome of supposedly decentralising, community-based changes across a wide range of natural resource management initiatives (Blaikie, 2006; Menzies, 2004; Ribot, 2004).

While this is far from the expressed intention, in the application of WMAs there is evidence that villages are losing control over resources without any clear benefits coming back to them in return. A cynical interpretation of WMAs in Longido is that they effectively represent a way of coercing greater investments in wildlife conservation from local communities to further the political and economic interests of central authorities and, symbiotically, international conservation NGOs. The long-awaited gazettement of the Enduimet WMA in 2007, although yet to have any significant impact on local wildlife benefits, represents an important test of the government's commitment towards increasing local control over wildlife and potentially its economic value. Whether this translates to a more meaningful devolution of wildlife management, and whether increases in local revenues are captured mainly by elites managing the WMAs or are shared more equitably, remains to be seen.

The policy messages that emerge on the back of these central findings are first that pastoralist diversification is much like diversification for the rest of rural Africa (Bryceson and Jamal, 1997; Ellis, 2000; Iliya and Swindell, 1997). For diversification to operate in positive ways in Longido, there is a serious need for better infrastructure, more investment and more effective education. Second, policymakers need to respect livestock in Maasailand as source and store of wealth and livelihoods. They need to protect pastoralist and agropastoralist activity; to recognize that it is environment- and conservation-friendly, and vital in limiting poverty. Current orthodox negative attitudes to pastoralism need careful review and revision (Hesse and MacGregor, 2006). Community-based conservation efforts need to build on the continued coexistence of livestock and wildlife in these areas, and recognize that wildlife management practices which do not adapt themselves to pastoralist land-use systems will not be acceptable or feasible in such settings. Finally, there is an urgent need to examine critically the way that initiatives such as WMAs may or may not lead to changes in access to resources and the equitable distribution of economic benefits from wildlife.

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Family Portraits – Tarangire[1]

Lengai Ole Mako exemplifies the 'Tanzanite dream'. From being a poor, barely literate *Landisi* from Simanjiro, he has become one of the wealthiest mining barons in Mererani. He owns expensive homes in Arusha, Mererani and Sukuro, fleets of personal vehicles and a variety of companies, and he associates with senior politicians in Tanzania and Kenya. His networks of political patronage and influence extend from village to district to national levels. Government administrators at all levels are also under his network of influence. Mohono Ole Sarika considers himself a traditional Maasai. Head of a large and relatively wealthy family, an outbreak of East Coast fever (ECF) followed by the drought of 1998–2000 marked a turning point in Mohono's livelihood strategies. In the last 10 years, he has diversified from pastoralism into cultivation and his sons send remittances from trading tanzanite in Mererani. The three activities support each other as well as the family. Cultivation provides additional food security in times of drought and reduces the need to sell livestock for food. Remittances from gemstone sales help to pay for the costs of cultivating as well as restocking their herd and providing drugs for their livestock.

Lengai Ole Mako

Lengai Ole Mako was born in the village of Kerere close to Mererani in 1968. As a boy, he was a herder, and when his father died, he moved to Sukuro village at the age of 16. Legend states that Mako was so poor that he started his career selling

[1] Adapted from Cochrane, K., D. Nkedianye, E. Partoip, S. Sumare, S. Kiruswa, D. Kaelo, L. Onetu, M. Nessele, M. Said, K. Homewood, P. Trench, R. S. Reid, and M. Herrero. 2005. Family Portraits report - Family fortunes: Analysis of changing livelihoods in Maasailand. This portrait of Mohono Ole Sarika was compiled on the basis of discussions with Ole Sarika and his family. The portrait of Lengai Ole Mako was compiled by H. Sachedina on the basis of interviews with Ole Mako, his employees and other members of the community. The abridged versions are published here with their express permission.

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ugali (maize meal) in the Sukuro market. Mako denies this, saying that he was a livestock broker and farmer in Sukuro. Facing a bleak economic outlook, he started farming in 1986 with oxen. By 1995, it became clear to him that he needed to diversify his livelihood strategy.

Mako moved to Mererani when he was 27. Maasai who worked with him claimed he started out as a *mwana-apolo* (miner) before venturing into brokerage, although Mako relegated this to myth. In 1998, Mako was granted an official broker license from the Government, which enabled him to start up commercial brokerage and a tanzanite dealership in Arusha in 2000. Embracing the socio-political framework in Tanzania, and shrewd manoeuvring, combined with luck, resulted in Mako Mining Ltd owning a multimillion dollar vertical operation from deep shaft tanzanite mines, a brokerage firm and cutting and polishing facilities in Arusha. At the age of 37, his estimated worth is US$ 10 million in liquid assets.

Although his most cherished activity remains livestock keeping, the heart of his pastoral identity, tanzanite profits provide the investment capital for diversification into tourism and agriculture. In addition to owning thousands of cattle, Mako runs a trucking company, farms commercially using modern tractors and owns a photographic and hunting tourism company. In Sukuro, he reportedly has the title to a plot of 100 acres and leases a 1,000 acre plot for bean farming. His attempt to obtain a 3,000 acre farm in Sukuro, however, was blocked by village leadership. He has also diversified into maize hedging: able to affect grain prices across the district by buying up the maize harvest surplus using his trucks (paying slightly better than market price), then reselling it back to the same villagers for a profit in the dry season. Although Mako decries the erratic nature of farming, he also acknowledges the profits he has made from it. The fluctuation of returns from farming also has similarities with tanzanite brokering.

Today, Mako spends the bulk of his time in Mererani and Arusha, but he considers Sukuro village as his primary residence. As may be expected for a man of his status, Mako is viewed with mixed emotions by the people of Simanjiro. By many, he is viewed with pride; a champion of Maasai rights. He has greater kudos than Emboreet's richest pastoralist, Ole Sigirr, who, while owning over 5,000 cattle, is now sneered at as a *tajiri mjinga* (ignorant rich person) who does not own a vehicle, illustrating the change in perceptions of Simanjiro Maasai identity: a wealthy pastoralist is less inspirational or respect-worthy than a mining baron. At Sukuro village, he is sub-village chairman, and self-described 'guardian of the village government'. He has founded schools and contributed money to water and health projects across the district at *harambee* (communal fundraising events).

However, while Mako publicly seeks recognition for social commitment and redistribution of wealth, two of his former miners (and clan mates) described conditions underground in his mines as abysmal – and claim that his mines support systems of social exploitation prevalent in Mererani. At election time, he reportedly used his influence to pressure voters to vote for him or his preferred candidates. Challenging Mako's claim for additional land for farming in Sukuro reportedly resulted in Mako replacing village leaders that turned his request down. Counter to these claims, he is also known to campaign against candidates guilty of gross fraud at a village level.

Mako also wields considerable political influence at a regional level. By allocating his wealth to support political fund-raising, political trips and individual handouts of strategic value to his political and business interests, he has cultivated allies among political and administrative leaders within all levels of government and has direct access to the Prime Minister, a Maa-speaking ally who called upon Mako regularly to support *harambee* in his constituency. He and his employees also claim regular presidential access. Mako summed up his approach towards politicians as

> … When you break the teeth of a lion, leaving its mouth defenceless, you're able to strangle it with your bare hands.

Aware of tanzanite's finiteness and the need to diversify his business empire further, Mako, himself a keen hunter, formed Mako Adventures Ltd in 2004, a tourism company to provide photographic and hunting safaris. In August 2004, Mako set up a tented camp on his land within the Simanjiro GCA, but in doing so ran into conflict with the safari company that has hunting rights to the block. At gunpoint, an anti-poaching team gave Mako 3 hours to dismantle the camp. In response, Mako claimed he was on his own farm, in his home village, owned a legally registered hunting company and was a Tanzanian. However, the hunting company won the case, arguing that they had been allocated the block by central government and any other tourism venture within their block was trespassing. While Mako in public declares that he has no interest in being leased a hunting block, in private he has expressed bitterness that a Tanzanian, and especially a Maasai, should not be entitled to benefit from tourism hunting in Maasailand.

The empowerment of wealth from tanzanite enabled Mako to contest wildlife management rights as a distinct commercial competitor and not as a victim. According to Mako, Tanzanite's major benefit to the Maasai has been 'to open people's eyes to be entrepreneurs'. He believes that engagement with the market economy will enhance political and economic opportunities for his people.

Mohono Ole Sarika

Mohono Ole Sarika, a Maasai elder, lives with his large family in Lenaitunyo sub-village of Emboreet village in Simanjiro district. He has 5 wives and 29 children. Eleven of his children are married and have left the boma. In addition to his immediate family, he takes care of his younger sister with her family of 10, and his late brother's family of 13. One of his daughters who left her matrimonial home also lives with Mohono with her two children. His second brother lives with his family a kilometre away. One of his sons is epileptic, and providing him with proper medical treatment places a high financial burden on the family. He recently had a leg amputated at a hospital in Arusha after falling into the fire and suffering severe burns on his lower abdomen.

When Mohono left his father's homestead to establish his own boma, he moved his family 13 times over the following 25 years, mainly within Simanjiro, each time in search of better water and pastures for their livestock. However, he has stayed at

their current location for the last 7 years and is not planning to move his family again now that the family is farming. The Moran can still take the livestock to other areas during a drought, leaving the rest of the family and smallstock behind. The family lives on land allocated to them by the village government, although they do not have a title deed for this land. In addition to Mohono himself, his 14 sons are registered for land allocation and each is entitled to 50 acres of land in different places in Emboreet.

The family of Mzee Mohono depends on three major livelihood activities for their survival: livestock, cultivation and remittances from gemstone trading.

Livestock provides food, in terms of milk, meat and blood, and cash from livestock sales for meeting other expenses. Women also sell hides and skins when animals are slaughtered or die. Livestock also have a cultural importance for the family, such as paying a dowry and providing gifts and social security for relatives and to friends to cement their relationship; in the last year, the family gave 10 cattle and 30 shoats as gifts.

The family's herd is currently composed of around 400 cattle, 90 sheep, 80 goats and 8 donkeys. They do not own any improved breeds because of concerns that they will be less resistant to the many livestock diseases in the area and the local climatic conditions. In addition to disease, predation is a problem in the area – last year 10 cattle and 10 sheep and goats were killed by hyenas, lions and snakes – and wildebeest and gazelle also transmit livestock diseases. Mohono's sons in Mererani provide drugs to treat the livestock. The only external support that the family relies on is when there is a contagious disease outbreak and the government sends veterinary officers to vaccinate the community livestock.

During the wet season, the livestock is mainly grazed nearby the boma. During the dry season, livestock are taken to Koitumet and on to Loibosiret, where pastures have been set aside by the village government according to a land use plan developed for pastoral lands. While Mohono's family are doing well, they have observed that livestock numbers appear to be decreasing while wildlife numbers are increasing, in particular buffaloes, elephants and zebras. The family attributes these trends to human population increase and a reduction in livestock mobility: disease and major droughts have led to a decrease in livestock, while wildlife are free to migrate to other places.

The family's livestock is owned by Mohono and his sons, but all decisions concerning the livestock, such as which animals to sell and when, rests with Mohono, regardless of who bought the animals. Maintaining control over livestock resources in the boma has kept Mohono's family closely bound together and allowed him to support extra dependants without too much financial strain.

Mohono's family decided to go into cultivation in 1999 following an ECF epidemic in 1998 and the drought of 1998–2000 when they lost 300 cattle. They had seen people doing well through cultivation in Arumeru district where they would buy grain at the end of the year. Farming was seen as the only way the family would be able to cater for the food needs of their big family without depleting their remaining herd. Last year, the family farmed 24 acres of maize and managed to harvest 93 bags. All of it has been stored to be used for family consumption or sold to pay for tilling the land in preparation for the next season. The family hires

tractors to till their land, costing TShs 14,000 per acre. Hired labourers, usually non-Maasai, are paid for weeding, guarding their fields at night to prevent wildlife damage and other tasks. The family did not plant beans as they do not do well in this area. Mohono's boma is situated in a wildlife corridor and wildlife conflicts appear to be escalating since the family started to cultivate.

According to Mzee Mohono, they would not have started farming if his family were not so big. Today, Mohono ranks cultivation higher than livestock keeping because he considers it more reliable in times of drought.

The other main source of livelihood for Mohono's family is the remittances they receive from their two sons involved in the gemstone business at Mererani. Olokera and Kasaine were motivated to start a gemstone business after seeing people who they considered very poor buying cattle and developing their homes with money earned from gemstone trading. Since going into the gemstone business themselves, Olokera and Kasaine have been able to buy 300 cows and 500 shoats, as well as marry more wives, get more friends and use the money for cultivation back at home. Olokera once earned TShs 10 million (about US$ 100,000) from gem sales, which he invested back to livestock. In spite of this, Mohono ranks these remittances third in importance to the household, after cultivation and livestock, because they are so unreliable and risky. At times, they can even lose money to con men who sell them poor quality or fake gemstones that are worthless when it comes to the time of reselling.

In addition to farming, livestock and mining, the family earns a small income from a honey harvesting business run by one of his relatives living in his boma. The honey extracted is sold to outsiders in return for livestock. However, the business is apparently not reliable. There are few trees in the area and opening fields have resulted in more tree cutting, so there is less honey these days.

Mohono's family consider themselves as traditional in the way they dress and interact with other communities. All the decisions in this family are made by Mohono himself or by his two elder sons in his absence. While changes are coming to the household slowly, Mohono's wives consider their husband too conservative and hope that their sons in Mererani will bring changes to the family. Mohono and his family see that people with an education have positions of leadership. However, he considers the cost of educating his children beyond primary level too high, and providing labour to care for his livestock has to come first. Among his 29 children, only 9 of his sons have attended primary school and of these only 1 made it through class 7. None of the girls from his family have been to school, on the basis that a boy returns the investment to the boma whereas a girl is expected to marry and leave home.

The family has also observed a notable change in the natural resource base in the area, which they attribute to an increase in human population and cultivation. Woodlands are decreasing as people clear them to cultivate; and conflicts are increasing as grazing routes have also been cleared for farming. The main drivers of the changes observed by Mohono and his family are drought and livestock diseases, the gemstone business in Mererani, and the influence of outsiders and the church bringing in new ideas such as cultivation and gemstone trading.

Chapter 7
Cattle and Crops, Tourism and Tanzanite: Poverty, Land-Use Change and Conservation in Simanjiro District, Tanzania

Hassan Sachedina and Pippa Chenevix Trench

7.1 Introduction

Uvumilivu wako uwe mwangaza wa mwongozo wako. (Your perseverance will be your guiding light.)

Graffiti by 'Bob Ally' on rocks next to the main track used by Tanzanite miners to access Block 'D' in the Mererani Controlled Area

When approaching the township of Mererani in Simanjiro district, Tanzania, one immediately becomes aware that this is no ordinary Tanzanian town. Large groups of graphite-stained miners mingle with Maasai dressed in shukas in this township dedicated almost entirely to the mining of the precious gemstone Tanzanite (*Zoisite)*. Multiple mobile phone towers are visible along streets heavily rutted by numerous trucks and buses; off-road motorcycles are common and pockets of wealth are clearly evident; ornate houses, walled hotel complexes, and bars bustling in the morning. The facilities were built by mining 'barons' – wealthy brokers or mine owners who are using their recent wealth to influence land use, politics and livelihoods throughout northern Tanzania. Mererani is the sole place on earth where Tanzanite is found. Because of its geographic restriction, Tanzanite is ranked at least a thousand times rarer than diamonds.[1] With its deep blue-purple hue, it is becoming a gem of choice with demand driven by Tiffany's of New York, the Hollywood jet-set and gemstone dealers in Thailand and India. It would be difficult for jewellery buyers in the air-conditioned, sanitized gemstone boutiques of the United States or even in nearby Arusha to imagine the hectic and unforgiving pace of the Tanzanite trade occurring in Mererani and the social transformation it is fuelling in northern Tanzania.

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[1] http://www.tanzaniteone.com/tanzaniteone-tanzanite-stone.asp

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Mererani is located at the heart of the Tarangire Ecosystem in the Maasai Steppe of northern Tanzania, home to a predominantly Maasai population. Quite apart from its new-found mineral wealth, the Maasai Steppe Ecosystem is a site of global biodiversity significance, internationally renowned for its wildlife and conservation value, in particular the large-scale seasonal migration of large grazing ungulates (Kahurananga, 1979, 1981; Lamprey, 1963, 1964). Lake Manyara and Tarangire National Parks (NPs) are keystones of northern Tanzania's rapidly growing tourism industry, being respectively the third and fourth highest revenue-generating parks in the Tanzanian national park system after Kilimanjaro and Serengeti NPs.

In spite of efforts to protect wildlife, many large mammal species are in decline in the Tarangire Ecosystem, and conservationists believe this is largely due to activities outside of the main protected areas, on the extensive Simanjiro Plains that fall under the jurisdiction of Maasai pastoral communities. Tarangire NP comprises only 2,850 km^2 of roughly 22,000 km^2 in the overall ecosystem. During the rains most large mammals move out of the park. The Simanjiro Plains provide vital grazing and calving areas, where thousands of wildebeest (*Connochaetes taurinus)* and zebra (*Equus burchelli*) congregate during the wet season. Conservation of the ecosystem's migratory wildlife populations largely depends on maintaining these unfenced and uncultivated rangelands on communally owned lands adjacent to the protected areas (Borner, 1985; Kahurananga, 1997; TCP, 1998). Traditionally associated with pastoralism, today the Simanjiro plains contain a mosaic of different land uses, including pastoral rangelands, rainfed agriculture and commercial agriculture. The progressive conversion of pastoral rangelands to large-scale farming and permanent subsistence agriculture has contributed to the increasing isolation of Tarangire NP (Borner, 1985) and this insularization is likely to lead to further wildlife declines in the ecosystem (TCP, 1998; Voeten, 1999).

While conservationists are concerned with wildlife declines, the region's pastoral communities are facing their own crises. Excision of land for conservation in the 1970s resulted in limitations on pastoral mobility and livestock production strategies. Evictions from Tarangire NP (Igoe and Brockington, 1999) and forced relocation due to Ujamaa (Shivji and Kapinga, 1998; Sachedina, 2006) disrupted Maasai livelihood strategies. A further fracture occurred in 1985 with the advent of structural adjustment policies. Land was alienated from pastoral use by commercial agricultural investments, mining and an expansion of wildlife conservation estate (Lama, 1998; Mwalyosi, 1991). Linked to structural adjustment policies, the state stopped providing livestock health services to pastoralists making cattle more prone to tick-borne diseases (TBDs). Combined with an increase in human populations, higher cattle mortality and increased cattle sales to meet cash needs have resulted in a decline in per capita herd size over the last 40 years (Muir, 1994).

Currently, the entrenched view within the Tanzanian Government is that pastoralism is an outdated and unproductive form of rangeland management; an argument started by the colonial government and perpetuated to this day (WWG, 2004). Contemporary livestock and rangeland management policies in Tanzania call for restrictions on pastoral mobility in spite of the fact that mobility is widely acknowledged as being critical to effective pastoral rangeland management strategies.

A 'National Anti-Livestock Operation' was recently implemented to dislodge herdsmen from game reserves, water catchment areas and other protected areas in the country. When Usangu Game Reserve in western Tanzania was annexed to Ruaha NP, hundreds of herders and an estimated 300,000 cattle were evicted from the Ihefu wetlands by a combined force of regular police, anti-poaching unit and game wardens in an 'unprecedented operation [that involved] heavy weaponry, ground and occasional air backup and patrol' (Albert, 2006).

It is in this context that community-based natural resource management interventions, implemented largely by international conservation agencies concerned with the Maasai Steppe Ecosystem, aim to increase the combined economic returns from wildlife and pastoral livestock production in order to reduce incentives for non-wildlife-compatible conversion of rangeland to agriculture. A central issue related to successful wildlife conservation is an understanding of the factors driving pastoral land use change, particularly the conversion of rangeland to agriculture.

7.2 Setting and Research Approach

This chapter considers the nature and extent of diversification of pastoral livelihoods among the Maasai in Simanjiro District. Agricultural expansion is considered one of the greatest threats to wildlife conservation in the region and we examine the role of agriculture in relation to other sources of income within Maasai households (HHs) and the broader incentives that lie behind its expansion, in particular the interface between agriculture, wildlife conservation and small-scale mining, and their relationships with power, politics and natural resource management. Alongside conservation-related income sources, Tanzanite represents a vast source of income for investment in the local economy and hence potential to accelerate trends in land use change.

The study is set in Simanjiro District, to the east of Tarangire NP in northern Tanzania. The altitude across the Maasai Steppe varies between 950 m and 2,450 m above sea level. Rainfall in Simanjiro averages around 650–700 mm per year, although this varies with altitude. Livestock husbandry is the predominant livelihood strategy in drier areas, while agriculture and agropastoralism are prevalent in wetter areas. Commercial agricultural farms are concentrated in south-eastern Simanjiro District, growing primarily seed beans for export.

The Maasai, predominantly of the Il Kisongo (Loitokitok) section, are the predominant ethnic group in Simanjiro District (UNPF, 1998), although there has been significant in-migration of other ethnic groups into the region over the past 20 years. Simanjiro District covers 20,591 km^2 and has a population of ~142,000 people, increasing at a rate of 6.4% between 1998 and 2002 (LAMP, 2005b) compared to the average population growth in mainland Tanzania of 2.9%. According to recent census data, annual population growth in various areas of the Maasai Steppe Ecosystem is between 3.1% and 22.8% (TCP, 1998). The bulk of the influx into Simanjiro is into the Tanzanite-mining area of Mererani Ward. About 30% of the

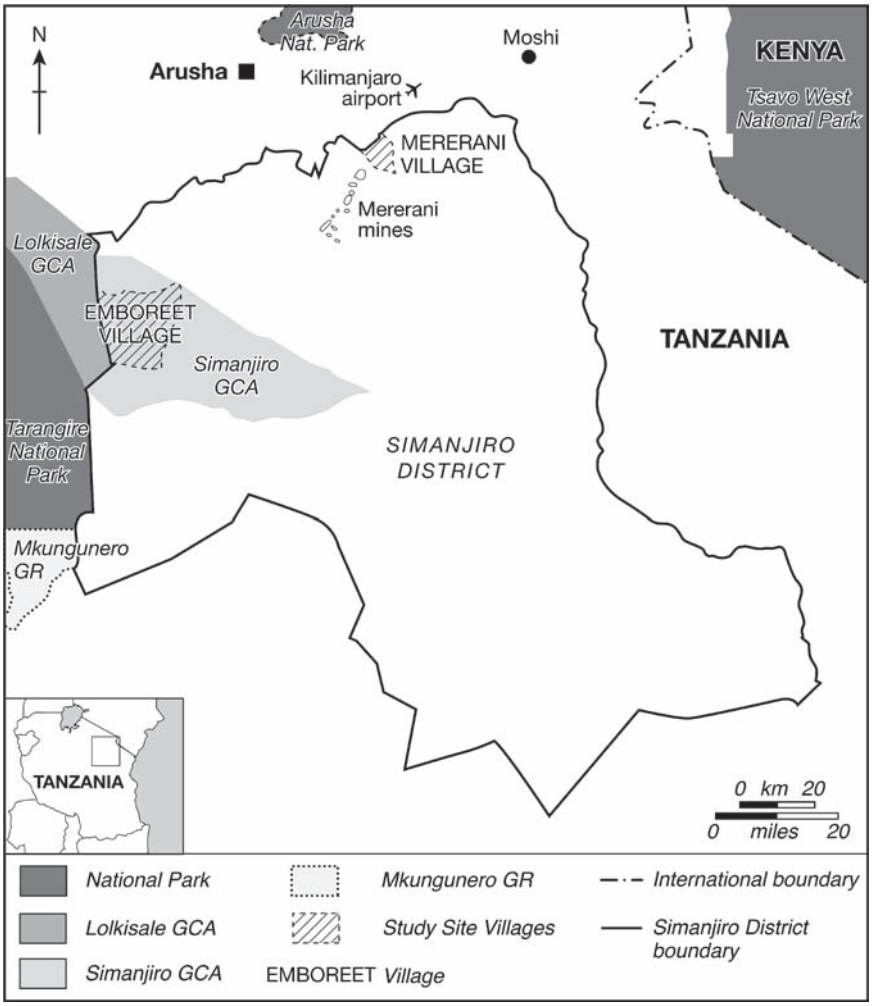

Fig. 7.1 Location of Emboreet and Mererani villages

total population of the district resides in Mererani village (population 38,000). However, population growth rates in Simanjiro are still high, even if the Mererani Ward effect is excluded, with growth still at 4.07% (LAMP, 2005b).

This chapter is based upon fieldwork undertaken in two very different villages in Simanjiro District: Emboreet and Mererani. The bulk of data collection focused on Emboreet village, supplemented with data collected from Mererani. Emboreet village is located in Emboreet ward and Emboreet division (along with Loborsoit village), adjacent to the eastern boundary of Tarangire NP (Fig. 7.1). The village is divided into seven sub-villages: Emboreet sub-village is the site of the village headquarters and houses, government offices, a Catholic mission, primary school, hospital,

a livestock health college, small businesses and homes in small plots. Emboreet sub-village centre is home to much of the area's migratory casual labour and so the population is highly ethnically diverse compared to the surrounding areas.

Outside of Emboreet sub-village, the landscape is one of rural grassland with scattered bomas, and the population is predominantly Maasai in the sub-villages of Esilalei, Ingung, Kati Kati, Laarkaitial, Meleleki and Lenaitunyo. Traditionally pastoral, Emboreet village is now theoretically divided into zones, defined so as to integrate and segregate livestock, wildlife and agriculture as appropriate. The preferred area for agriculture is in the Simanjiro plains where there are no trees, and it is easy to clear land for cultivation with a tractor. The majority of households cultivate using tractors, rented on a per acre basis, with a few households relying on oxen because it is cheaper and a number of women cultivating small shambas by hoe.

Emboreet village lands extend across two game-controlled areas (GCA), Lolkisale GCA and Simanjiro GCA, although the village boundary with Lolkisale GCA is contested. The village contends that its boundary should extend to the edge of the Tarangire NP, but government maps show the village boundary ends at the edge of the GCA. Livestock move in and out of Lolkisale GCA, but there are no permanent buildings in the area. At present there is no agriculture in Lolkisale GCA between Emboreet and the park boundary, though agriculture is prevalent further north in Monduli District in the GCA (Sachedina, 2008). Emboreet is of significant conservation value as it is the main ecological 'bottleneck' for the migration of large mammals to the villages of Sukuro and Terat in the Simanjiro Plains (TNRF, 2005a). It is also the only village in Simanjiro District with a community–wildlife tourism partnership example. It contains two photographic tourism enterprises, and three tourism hunting blocks overlap the village, generating revenue each year for the village.

Mererani is 60 km from Emboreet village as the crow flies, but over 110 km by road. It is situated 70 km south-east of Arusha and 16 km south of Kilimanjaro International Airport. The Tanzanite mining opportunities in Mererani have drawn large numbers of people to the town. A significant number of unlicensed brokers are Maasai from Simanjiro District, driven by the lure of profits and declining livestock economies in their home villages. However, the gold-rush nature of Mererani has also attracted Maasai from other districts (cf. Goldman, 2006) and Tanzanians from all over the country, as well as Kenyans, Zambians and Congolese, to name a few.

Data were collected in Tanzania from July 2003 to June 2006, in collaboration with three Maasai research assistants.[2] The analysis presented in this chapter is based on a series of data sets collected during this period, namely:

1. *Socio-economic surveys:* A broad-scale survey among 226 households throughout Emboreet focusing on background demographic information, livestock and crop production, alternative income-generating activities including tourism and mining and wildlife perceptions. This broad-scale survey was followed up with

[2]Raymond Teekishe, Olterere Lemutunde and Sendu Kisau.

an in-depth, 15-month, repeat-round survey of 37 households in three sub-villages of Emboreet. These sub-villages were selected on the basis of wealth and logistical factors; Esilalei sub-village was the poorest sub-village while Lenaitunyo sub-village was the richest as well as being furthest from social services in the village centre. Laarkaitial sub-village was between the others in terms of wealth and location. The three sub-villages were located along a north–south gradient along the park boundary. Achieving the desired sample size in Lenaitunyo was problematic as household heads were often in Mererani or moving cattle long distances. Mobile phones began to be used in Emboreet in July 2005 when coverage extended across the area and household heads who had travelled to Mererani could occasionally be contacted and interviewed by mobile phone from Emboreet for the repeat-round surveys. In certain cases, we also followed household heads to their temporary *bomas* during the dry season to conduct the surveys.

Both surveys were based on a stratified wealth-ranking exercise, completed for the entire village household list. Households were selected on a stratified-random basis within each sub-village. The household list, based on sub-village census data obtained at the Emboreet Village Office, was updated by each sub-village chairman following a preliminary wealth-ranking exercise with the Village Executive Officer (VEO) and two community animal health workers (CAHWS). The revised list was cross-checked by local groups in each sub-village to further corroborate the list and wealth ranking. Finally, the list was verified at each *enkang*, where we confirmed the list both within that *enkang* and for neighbouring ones. This list was constantly cross-checked during fieldwork to ensure that it was as robust as possible and up-to-date, given the mobility of individuals and prevailing fear of taxation.

There were 437 households recorded in Emboreet village, from which a sample of 226 was selected for the broad-scale survey. As the *Ilkipon* (junior warrior) age-set was close to graduation, a number had begun to marry. Those who were married and running households independent of their father's were included in the list. Unmarried *murran* were not included as separate households. Conversely, there were several individuals from the *Ilkimunyak* (senior warriors) and older age-sets who were not married (mainly due to poverty). They were included in the survey as household heads, as were divorced, widowed and separated women if living independently. There were a number of non-Maasai immigrants who moved into *enkangs* as live-in hired labourers. Immigrant labourers were included in the survey as independent households only if they had been granted villager status and were working their own farms. In spite of these precautions, there remains some bias likely, as a number of female-headed households, the poorest, and non-Maasai immigrants were easily overlooked.

2. *Recorded interviews*: Recorded and transcribed semi-structured interviews were collected from different groups such as villagers, village leaders, district officers, nongovernmental organization (NGO) staff, large-scale farmers, tourism and hunting operators, and government employees.

3. *Archival research*: Land use change dynamics were also examined through archival research of local records at village, ward and district levels. Archives were also explored at NGO offices.
4. *Focal group meetings, key informants, participant observation, and triangulation* methods supplemented survey data with qualitative social and historical information.
5. *Wildlife revenue* streams to Emboreet village from photographic and tourism operators were systematically collected from all tourism operators quantifying every form of wildlife economic benefit going back over 10 years.

From a methodological perspective, gaining access to respondents involved in the chaotic and unregulated Tanzanite industry was complex. Globally, the gemstone industry is dominated by different clusters of firms which are interlinked with each other through trading relations and layers of subcontracting, often bound together through ethnic and family ties, or links built up over long periods of trading. There are close links between the various processing centres, held together by traders, in often-impenetrable networks bound by secrecy (Macfarlane et al., 2003). The high value and easily portable nature of gemstones make them a ready commodity for smuggling and unofficial/illegal trade, with all the attendant secrecy and risks. The Tanzanite industry is no different, and data collection was made possible only with the support of one of the research assistants who had worked in the mines as a *mwanaapolo* (miner) and broker. His family was also connected by clan, friendship and employment to one of the wealthiest and most influential Maasai-mining barons, Lengai Ole Mako. Through him, the principal author was able to gain access to Mererani's subcultures as a personal guest of the '*Fogo*' (one of the Mererani-mining 'bosses').

7.3 Livelihood Strategies on the Simanjiro Plains

Our description of Maasai livelihoods at the household level is based mainly on data from the background questionnaire and repeat-round surveys. Of the 437 households in Emboreet village, almost half (48%) of all households were considered poor (Maa: *meinati*), compared with 23% wealthy and 29% middling. What were the principal sources of income for these households and how much variation exists between them? Comparing income from different activities across different wealth ranks and different sub-villages, we ask whether households of different wealth status and different geographical location had diversified in similar ways.

7.3.1 Livestock Production and Pastoralism

Livestock husbandry continues to be a primary livelihood occupation in Emboreet despite pressures on the livestock economy. Of the broad-scale sample of $n = 226$, only 20 households (9%) kept no livestock at all; 12 of these were

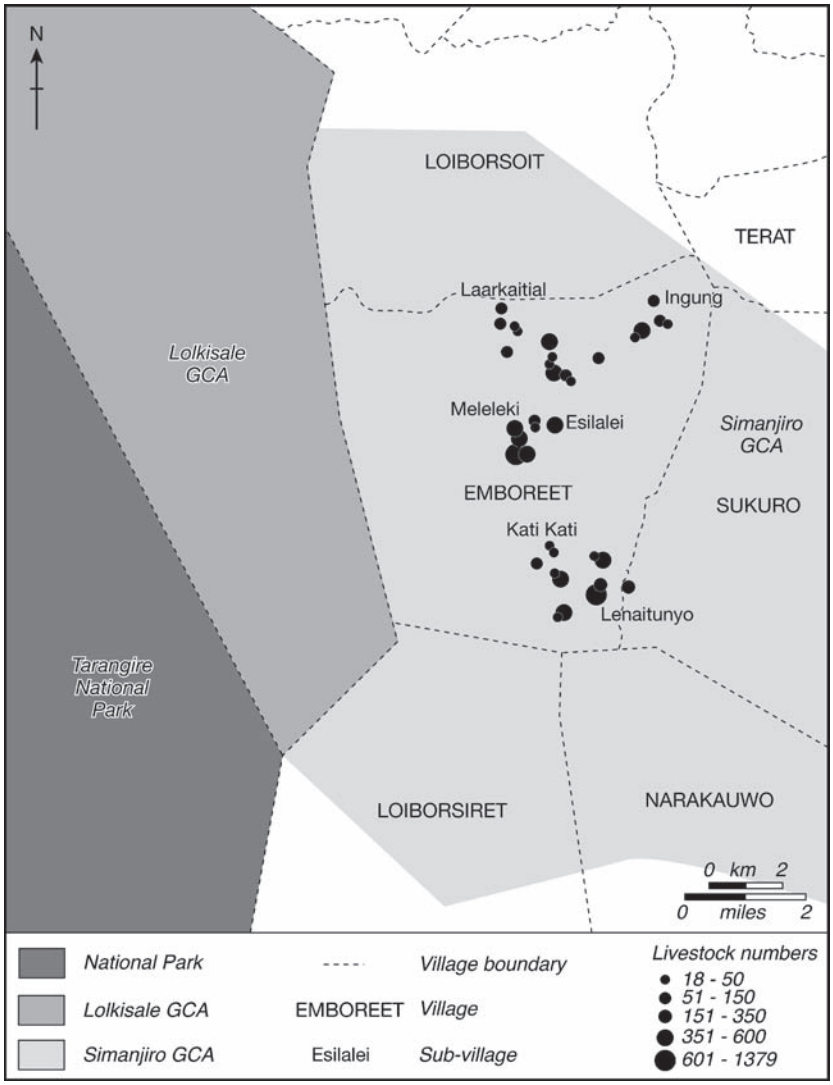

Fig. 7.2 Livestock distribution and density by sub-village in Emboreet

non-Maasai agriculturalists. Ninety-six per cent of Maasai households in the sample kept livestock.

A mapping exercise undertaken at the end of the rainy season, before households had dispersed to dry season pastures, found that bomas were almost all located at a distance of at least 10 km from the GCA boundary and its tsetse-harbouring woodland. They were predominantly located near to the open grassland of the plains, village social services, main tracks to market centres and water supplies, illustrating Maasai spatial preferences of sedentarization and resource tracking (Fig. 7.2). Transhumance patterns in the wet and dry seasons were dictated primarily by the

Table 7.1 Livestock holdings (TLU) per adult unit equivalent

Ethnic category		Mean	*N*	SD
Maasai	Rich	8.1	45	7.9
	Middle	5.3	64	5.3
	Poor	2.2	81	2.2
	Total	*4.6*	*190*	*5.6*
Other agropastoral	Rich	1.8	3	1.8
	Middle	1.1	6	1.4
	Poor	0.7	9	0.8
	Total	*1.0*	*18*	*1.2*
Agricultural	Rich	3.6	2	4.1
	Middle	0.1	2	0.1
	Poor	0.4	10	0.8
	Total	*0.8*	*14*	*1.8*

water and pasture requirements as well as disease avoidance. Livestock mortality was highest in the wet season due to higher tick loads, and many Maasai believed that rain diluted the effects of acaricides. Dense woodland to the east of Emboreet and in the GCA harbours tsetse fly (*Glossina* spp.), an important vector of trypanosomiasis. Malignant catarrhal fever (MCF) and nose bot disease are also carried by antelopes birthing on the Simanjiro Plains in the wet season, although respondents reported reduced mortality due to MCF and nose bot, ostensibly due to declining numbers of wildlife calving in the plains.

Herd sizes varied considerably according to wealth rank and ethnic group (Table 7.1). Livestock ownership is highly skewed in Emboreet as elsewhere in Maasailand, with most livestock concentrated in a few hands. Averaging livestock holdings over 2003 and 2004, just 11% ($n = 24$) of households in our survey owned 50% of all livestock. The poorest 50% of livestock-owning households ($n = 113$) owned just 10% of livestock.

Overall, non-Maasai agricultural and agropastoral households had significantly fewer livestock than their Maasai counterparts ($F = 6.9$, df = 219, 2, $P < 0.0001$). Livestock holdings among the Maasai were significantly higher for wealthy than for middle and poorer households ($F = 19.4$, df = 187, 2, $P < 0.001$, Tamhane's post hoc test $P < 0.001$), but there was no significant difference among the non-Maasai households based on wealth rank. There was considerable variation in livestock numbers within, as well as between, each wealth rank among the Maasai, confirming the fact that livestock wealth was not the only factor influencing wealth status. Univariate analysis of variance among Maasai households found per capita livestock holdings varied significantly between both wealth ranks ($F = 13.3$, df = 2, $P < 0.001$) and sites ($F = 3.1$, df = 6, $P < 0.01$), with the highest tropical livestock units/adult unit (TLU/AU) in Lenaitunyo and Laarkaitial sub-villages (Fig. 7.3). The sub-villages with the lowest TLU/AU among Maasai were Emboreet, Esilalei and Ingung. Lenaitunyo sub-villagers were successful in Mererani and invested mining proceeds into livestock. Lenaitunyo is also a preferred area for pastoralists due to its abundant grazing areas. These figures also show a considerable difference in livestock holdings within the wealthiest rank between villages.

The gross mean value of livestock sales (cow, calf, sheep and goat sales) and of livestock production (the value of livestock slaughtered or gifted out in addition to income from sales)[3] was calculated from repeat-round households as $901 and $1,325 per household per year respectively ($N = 27$, Table 7.2). These data did not include the value of milk consumed or sold by the households and they may therefore significantly underestimate the total value of livestock production to the household.

Cattle were sold at distant markets such as Mererani (also known colloquially as Duka Mbovu) in Monduli District close to Arusha, as well as local markets in Sukuro and Terat. Wealthier households unsurprisingly gained a greater income as well as higher levels of production than poorer households ($F = 8.2$, df = 2, 22, $P < 0.05$ for sales only; $F = 5.0$, df = 2, 22, $P < 0.01$ for production). While the value of livestock production was greater in Lenaitunyo variation was high and the differences between sites were not, in this case, significant.

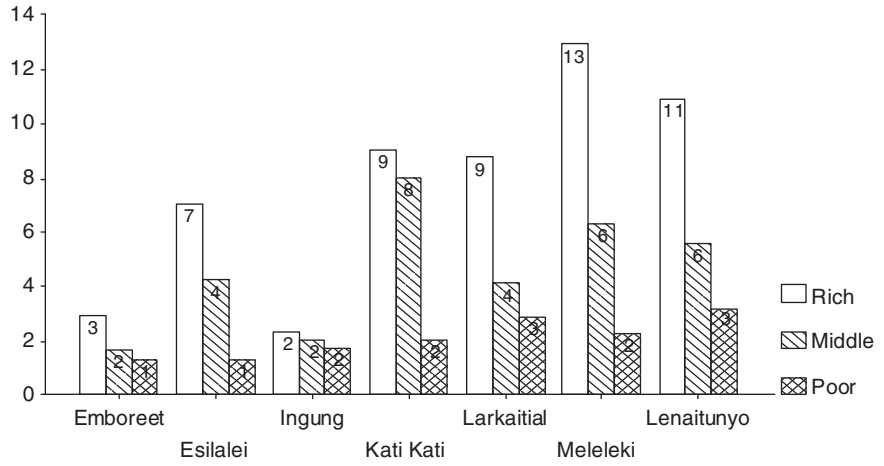

Fig. 7.3 Livestock holdings per capita between sites and wealth ranks

Table 7.2 Annual livestock sale income per household (US$)

	Rank	*N*	Mean	SD	Median
Income from cattle and shoat sales	Rich	5	2,013	993	2,011
	Middle	11	983	992	808
	Poor	11	229	212	172
	Total	*25*	*901*	*1,014*	*411*
Value of cattle and shoat production (sales, slaughtered and gifts out)	Rich	5	2,925	2,041	2,487
	Middle	11	1,495	1,665	1,129
	Poor	11	429	359	309
	Total	*27*	*1,325*	*1,613*	*781*

[3]No data were available on milk sales or milk consumption for this analysis.

There was a strong positive correlation between investment in veterinary care and mean monthly income from livestock sales to the household (Spearman's rank correlation: Rho = 0.632, $n = 37$, $P = 0.01$, 40% shared variance). The wealthiest households, with highest income levels were thus able to invest most heavily in protecting their livestock assets and increasing their income accordingly.

Prior to 1984, the central government provided free dipping services in rural Tanzania. As part of structural adjustment, dipping services were transferred to the mandate of district councils after which they collapsed totally in 1985. In 2002, only 6% (121) of all dips in Tanzania (2,014) were in use (URT, 2002, p. 6). Government-sponsored dipping services limited livestock exposure to TBDs. Once the dipping stopped, much of the cattle population in northern Tanzania were naïve to the range of TBDs. The absence of a functional dip led to some herders spraying acaracide on their cattle in their *enkangs*. However, the high cost of acaracide and need for regular spraying meant that few households regularly treated their cattle, preferring instead to expose the herd to ticks and build natural immunity to diseases like ECF, treating them only when they fell ill. Herds across the region dramatically declined (Owens and Stem, 1999). Between 1987 and 1991, TBDs accounted for 70–78% of cattle deaths in Tanzania (URT, n.d., p. 8). In Emboreet, where the communal dip failed in 1986 due to mismanagement, villagers referred to ECF as a pandemic: 'the HIV/AIDS of cattle' (Emboreet Community Animal Health Worker, personal communication).

Reliable livestock census data are notoriously difficult to obtain. Collating archives kept by ward agricultural and livestock officers, data from the last official livestock census in Emboreet (1984) and census data from this study, it was possible to compile a cattle census data profile for Emboreet from different sources during the time span 1978–2005 (Fig. 7.4). In 1978, Emboreet reportedly contained 16,000 cattle; by 2004 the population had declined to ~7,000 cattle. Villagers

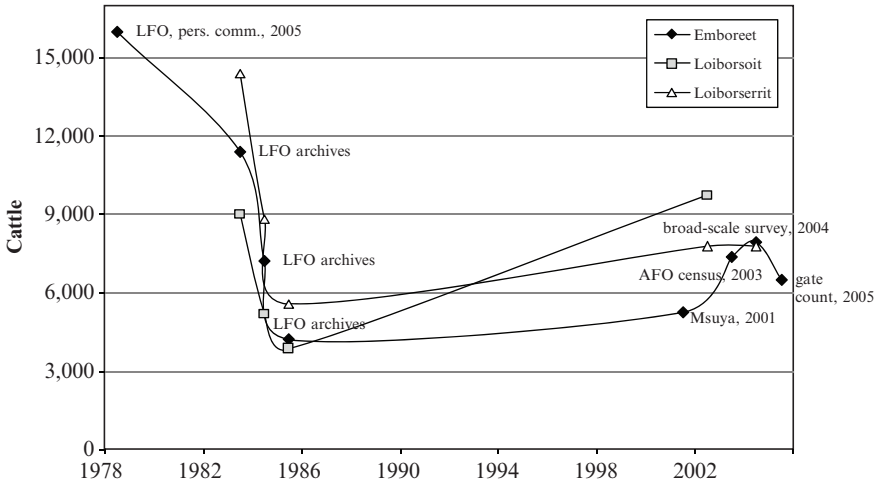

Fig. 7.4 Cattle census in Emboreet, Loiborsoit and Loiborsirret 1983–2005

reported large cattle declines from the mid-1980s, coinciding with the cessation of dipping services; subsistence needs could not be met by livestock, and hunger (Maa: *esumaye)* resulted. Census data from 2002 suggests that cattle populations seemed to have slightly increased since the mid-1980s, which would correspond with a reported increase in natural immunity to ECF (c.f. Homewood et al., 2006; Igoe and Brockington, 1999; VETAID et al., 2005).

In contrast, between 1978 and 2002, the human population of Emboreet village grew from 713 to 3,702 people (LAMP, 2005a; URT, 1983). These figures suggest a significant decline in per capita livestock holdings over the last three decades. Predictions of the minimum number of TLU per capita required for subsistence vary considerably from 9.1 (for milk-based pastoralism: Dahl and Hjort, 1976) to 4.3 TLU per capita (for exchange-based agropastoralism: Kjaerby, 1979), with several estimates in between (e.g. Muir, 1994; Pratt and Gwynne, 1977 cited in Brockington, 1998). In 2004, only 30% of Maasai households in Emboreet owned more than 4.5 TLU/AU. While livestock remains an important livelihood option for most Maasai in Emboreet, diversification of livelihoods is a necessity for the majority of the population.

7.3.2 Farming and Land-Use Change

An analysis of agriculture in Emboreet has two key elements to it – economic and spatial. In terms of the household economy, households benefit from agricultural production, including crops harvested for home consumption and for sale. The analysis of how much land is being cultivated and the extension of land under cultivation, however, relates to a broader issue of power and control over resources as well as trends in diversification.

7.3.2.1 Agricultural Expansion and Land Allocation

Data regarding land use change was drawn from the broad-scale survey (2004), and an additional agricultural study undertaken in 2005. In 2004, out of 214 households, 96% of household heads (204 households) reported that they farmed. There was no significant difference between Maasai and non-Maasai in the acreages reported, with wide variation in all groups, although the 14 purely 'agricultural' households cultivated on average half the area cultivated by Maasai households (2.8 ha vs 5.1 ha). Most of these livestock poor and land poor households are based in Emboreet centre.

Table 7.3 describes the reported area farmed per household in Emboreet from 2002 to 2004. In all years, the mean values are more than double those of the median, suggesting a few households cultivating large areas are inflating the mean. The mean area of land under cultivation per household in Emboreet increased by 7.9% from 2002 to 2003, and by 26% in the 2003–2004 growing season.

Table 7.3 Area cultivated per household by wealth rank, 2002, 2003 and 2004 (area in hectares)

Year	Wealth rank	*N*	Mean	SD
2002	Rich	51	7.27	10.46
	Middle	67	3.55	5.73
	Poor	94	1.97	2.92
	Total	*212*	*3.74*	*6.66*
2003	Rich	51	8.31	8.31
	Middle	67	3.38	3.38
	Poor	94	2.19	2.19
	Total	*212*	*4.04*	*4.04*
2004	Rich	51	10.52	10.52
	Middle	69	4.38	4.38
	Poor	94	2.67	2.67
	Total	*214*	*5.10*	*5.10*

The increase in area between 2003 and 2004 was statistically significant only for households with the highest wealth rank ($t = 2.06$, df = 45, $P < 0.05$). Median values overall remained unchanged, confirming that the main drivers of change are the wealthiest households cultivating the largest plots. Ten per cent of households accounted for 50% of the total area cultivated.

The area reported by respondents included both land farmed by the household as well as land leased to outsiders. Under the Village Land Act of 1999, villagers who had been allocated land by the village council were able to lease that land out, and even sell the rights to it on a permanent basis, even though they still did not formally own it (Wily, 1999). Land leasing was a relatively common phenomenon in poorer sub-villages nearer the plains such as Esilalei and Ingung, where outsiders would make deals with poorer Maasai to farm large blocks of land. The minimum size of land that could be leased to commercial farmers under the Village Land Act (1999) was 10 acres. The plains were preferred due to ease of access and lower input costs to clear land. Households entered into 1-year agreements with commercial farmers to clear and farm their land in return for a small percentage of the harvest. On the basis of responses in the broad-scale survey, involving ~50% of households in the village, the total area under cultivation in 2004 was 2,227 ha. A total of 216 ha were leased by Emboreet villagers to external commercial farmers, suggesting that outsiders (Maasai and non-Maasai), even though relatively few in number, were responsible for almost 10% of Emboreet's cultivated area.

In 2003, respondents stated an intention to expand the area of 86% of the total number of plots they were currently cultivating in the next growing season. In practice only 35% of households increased the area cultivated between 2003 and 2004 and 11% of households actually reduced the area under cultivation. Although many respondents claimed that the motivation to farm was high in order to illustrate land tenure and generate revenue, a primary limiting factor was availability of financial resources to clear and plow new farms. Land leasing, under short-term leases, was an important means of getting land cleared for tenure purposes, even when the terms of the lease were otherwise unfavourable.

Expansion of agriculture was not uniform across all study sites, with Emboreet and Esilalei showing the highest rates of expansion. However, once wealth rank had been taken into account, there was no significant difference between sites across the 3 years. Within the study area, Emboreet sub-village had the highest number of non-Maasai agriculturalists and the concentration of social services also attracted educated Maasai, including government administrators and teachers. Both groups emphasized agriculture over livestock as a livelihood strategy and it is therefore not surprising perhaps that the mean area cultivated in 2004 was higher in Emboreet sub-village than in the other sub-villages, although Lenaitunyo to the south, with the highest density of livestock, had the highest mean acreage in 2003, with its preponderance of wealthy households. Lenaitunyo was the only sub-village to ban land leasing to individuals from outside the sub-village; the banning of land leases to outsiders was passed as a sub-village byelaw submitted in writing to the Emboreet Village Office.

Data from satellite imagery analysis suggests that 2,666 ha were farmed in 2004 in Emboreet (this is slightly more than the estimates from our questionnaire surveys, which may reflect a slight under-reporting by households or could equally be explained by a few larger-scale farms having been excluded from the sample). Satellite imagery has shown that Emboreet is one of the *least*-farmed villages in the Simanjiro Plains, with less than 7% of the total village surface area farmed, based on the official government estimate of village area. However, it is important to note the spatial location of farms in Emboreet and how they relate to the wildebeest-calving zones, areas of high conservation value, located in the Simanjiro Plains (Fig. 7.5). The bulk of the plains of highest conservation value were located in Emboreet, Sukuro and Terat villages, with Emboreet acting as a key migratory 'funnel'. In comparison with Sukuro and Terat villages, the latter with a large agro-pastoral Waarusha community, farming in Emboreet was more prevalent in the plains. Terat village by-laws officially limited farms in the plains for the benefit of livestock, conservation and perhaps to not attract the ire of the government. Respondents reported that farming was prevalent but not as intensive in Sukuro compared with Emboreet, and Sukuro curtailed external leases. In contrast, Emboreet's strategy has been to allocate, lease and farm the plains as rapidly as possible, as supported by these data, with the important exception of the livestock-rich Lenaitunyo sub-village to the south. This map reflects a concern of conservationists that the calving grounds in Sukuro and Terat could effectively be cut off by the swathe of agriculture in Emboreet.

7.3.2.2 Agricultural Production and Household Economics

The total gross value of agriculture to households was calculated from the value of maize and beans given away, retained for consumption and sold by individual households, drawn from broad-scale survey of 226 households (Table 7.4). Crop production represented a mean per household income of US $428 per year in 2003 and US $448 in 2004. These data included households

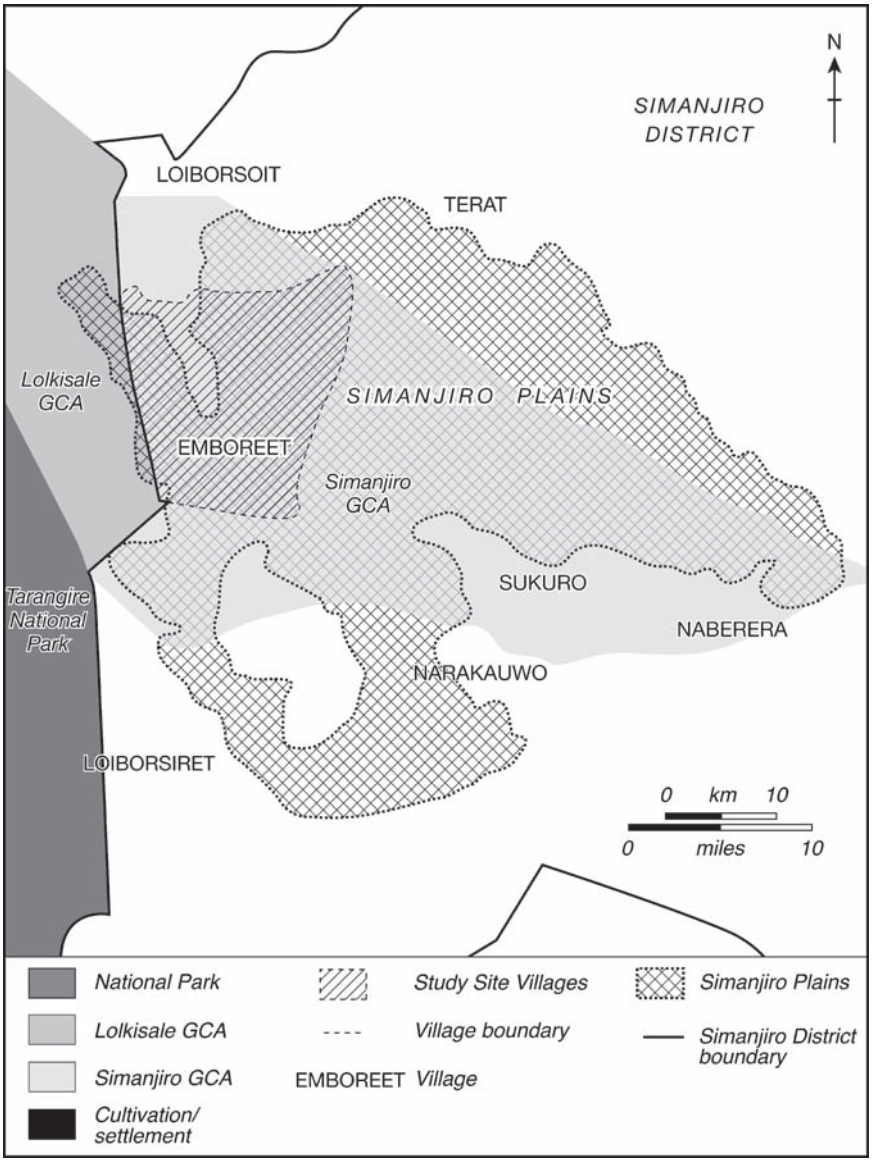

Fig. 7.5 Spatial location of farming in the Simanjiro Plains

that cultivated and whose crop failed; however, it does not include income from land leased for agriculture. Of the households that cultivated land (199 in 2003 and 204 in 2004), the harvest failed for 15% households in 2003 and 11% households in 2004.

These figures already suggest a far lower return to the household economy from agriculture as compared to livestock, when considering gross income. There was also a significant difference between households from different wealth ranks, with households from the wealthiest rank earning on average nearly 3 times more from farming than their poorer counterparts (wealthy: mean = $807, median = $350, SD = $1,309, $N = 51$; poor: mean = $271, median = $140, SD = $443, $N = 89$). The difference in income between wealth ranks was most significant in Emboreet sub-village where just two households, earning in excess of US $6,000 per year from agriculture, had significantly inflated the overall mean. Taking only those households that were involved in the repeat-round surveys ($N = 27$ as for the livestock data), and therefore directly comparable to the livestock sales data described above, the mean returns to agriculture are even lower: $202 in 2003 and $192 in 2004, with no significant difference between the wealth ranks. This represents just 16% of the value of gross livestock production.

7.3.3 Off-Farm Income

Of the 223 respondents from the broad-scale survey, 35% ($n = 77$) reported no sources of off-farm income (two other households were excluded from further analyses due to concerns about the validity of their responses). Mean household income per activity was calculated only for households who reported that source of income (Table 7.5). The 'salary' category included paid jobs that were not related

Table 7.4 Maize and bean income per household in 2003 and 2004 (including only those households that cultivated for each year)

	Mean value of household production (US$)	Minimum	Maximum	*N*	SD
Beans 2003	119	0	3,184	166	397
Maize 2003	363	0	6,134	179	733
All crops	*428*	*0*	*8,773*	*198*	*919*
Beans 2004	72	0	2,364	159	287
Maize 2004	426	0	6,848	190	720
All crops	*448*	*0*	*6,848*	*206*	*793*

Table 7.5 Income per household from off-farm economic activities (from $n = 221$)

Activity	US$/HH/year	SD	Per cent of households ($N = 221$)	Median
Wildlife	1,065	1,675	8	445
Mining	1,008	4,349	29	500
Salary	720	1,858	25	334
Business	561	537	7	334
Remittance	336	489	8	93
Petty trade	250	297	3	93
Overall	*961*	*1742*	*65*	*445*

HH households

to the tourism or wildlife industries, such as teaching or casual labour. Livestock brokering and income from leasing land were included in the business category. Remittances came mainly from the Karatu coffee estates where a number of Moran had sought work as watchmen, and from friends, family and clan mates at weekly markets. Remittances from mining activities at Mererani were included in the mining category. The mean annual income per household from all off-farm income sources was US $961 (SD = $1,742, N = 144). The highest mean household off-farm income came from wildlife-related sources, based largely on salaries and tips for tourism employees, followed by mining, although wildlife-related sources provided an income for just 8% of households in the sample compared to mining which provided an income for 29% of households in the sample.

The mean values for off-farm income mask large variation in income values accruing to individual households. In nearly all cases, a few households earning a very high income from these sources are inflating the average, with median values far lower than the means. There was no significant difference between mean income from the three different wealth ranks for each individual activity, largely due to this high variation within each wealth rank. However, once all off-farm income was accumulated into one total, wealthiest households earned significantly more (mean = $1,766, median = $1,112) than the poorest households (mean = $527, median = $204) ($F$ = 5.9, df = 2, 141, $P \leq 0.01$), that is, households that diversified in a number of different ways were able to capture a significantly higher income overall than those that diversified into fewer activities, although the type of activity clearly played a major part in overall income levels. Comparing the proportion of households with income from different off-farm activities, wealthy and middle rank households are significantly more likely to receive an income from wildlife-related sources (14% and 11% of households, respectively) than poor households (2% of households) ($\chi^2 = 8.4$, df = 2, $P < 0.01$), and poorer households are significantly more likely to receive remittances (13% of households) than middle and wealthy households (4% and 2% of households, respectively) ($\chi^2 = 7.6$, df = 2, $P < 0.05$). However, this does not include remittances from mining activities in Mererani. For all other activities, there is no difference in income between the different wealth ranks.

The data on off-farm income from the repeat-round surveys differed significantly from the broad-scale survey, with a higher proportion of households reporting income from different activities, in particular from wildlife source (15% vs 8%); mining (41% vs 29%); business (including livestock trading – 37% compared to 7%) and remittances (56% compared to 8%). In the course of the repeat-round surveys, all 27 households reported income from off-farm activities, whereas only 72% had reported off-farm income during the broad-scale survey. In almost all cases, however, the actual income reported for specific activities was lower than that estimated in the broad-scale survey, both in terms of the mean and median values, and the total value of off-farm income was lower overall (mean = $736, median = $306). In both surveys, benefits from tourism and wildlife were higher than income from livestock brokerage, included in the business category. Data collected in the repeat-round survey could be considered higher resolution than the broad scale as visits were more frequent, as were opportunities for cross-checking responses.

The wildlife income data from the household surveys did not include income gained by individuals participating in illegal resident hunting guiding, meat sales and/or commercial meat poaching. This data was obtained through key informants and research assistants who interviewed the individuals concerned since poaching is carried out illegally or quasi-illegally. However, the scale of involvement in these activities is small and they do not significantly alter the results above. According to our informants, individuals in Emboreet earn guiding fees from resident hunters and occasionally sell meat in Emboreet. These individuals also obtain resident hunting licenses and sell the meat of larger species like Eland and Buffalo in Arusha. A kilo of beef retails for $1.22, whereas game meat is sold at $0.81. Two individuals also engage in the commercial zebra skin market and sell raw zebra skins for $57 per skin to brokers based in Arusha. The scale of this enterprise was ~44 zebra in 2004 and 7 skins in 2005. There is also a case of an Emboreet villager accused of giraffe poaching. A final form of poaching is Emboreet villagers obtaining farm protection licenses from the District Natural Resources Department in Orkesumet before the hunting season begins. The tourism and resident hunting season officially runs from July 1 to December 31 each year. In collusion with motorized hunters, preseason resident hunting safaris are 'sold' by Emboreet villagers in return for a guiding and 'access' fee. Village guides are also permitted to sell the meat in Arusha or the village while resident hunters keep the trophies.

7.3.4 The Relative Importance of Different Income Sources

Taking these details on different activities together and bearing in mind the high variation that exists within as well as between wealth ranks, univariate analysis of variance found total gross annual household income to be significantly different between both wealth ranks ($F = 6.6$, df = 2, $P < 0.01$) and sites ($F = 4.1$, df = 2, $P < 0.05$) (Table 7.6).

Livestock production is most important relative to the overall household economy for the wealthiest households compared to the middle- and poor-ranking households (Fig. 7.6). Mining plays a significant part in the household economy for wealthy- and middle-ranking households and is almost insignificant for the poorest households, while other off-farm income is of greatest significance to the poorest households. Relative to total income, wildlife-related income, while valuable to those households that take part, is of relatively low value to the community as a whole. While area under cultivation is apparently expanding fastest among the wealthier households, at the time of these surveys agricultural production was of greatest significance in term of the household economy overall among the poorest households that farm relatively small areas.

Comparing the proportion of income from different activities between the three sites included in the repeat-round surveys, there was a significant difference in the proportion of income from off-farm sources ($F = 3.8$, df = 2, 23, $P < 0.05$) and from mining ($F = 8.6$, df 2, 23, $P < 0.01$) but not for livestock, agriculture or wildlife-related

Table 7.6 Gross annual household income by site and wealth rank (US$)

Site	Wealth rank	Mean gross income ($)	SD	*N*
Esilalei	Rich	6,659	–	1
	Middle	1,418	382	3
	Poor	834	372	7
	Total	*1,523*	*1,757*	*11*
Laarkaitial	Rich	1,683	1,014	2
	Middle	1,988	502	2
	Poor	1,328	869	3
	Total	*1,618*	*744*	*7*
Lenaitunyo	Rich	6,224	4,147	2
	Middle	3,287	1,877	6
	Total	*4,021*	*2,612*	*8*
Total	Rich	4,495	3,343	5
	Middle	2,541	1,609	11
	Poor	982	563	10
	Total	*2,317*	*2,150*	*26*

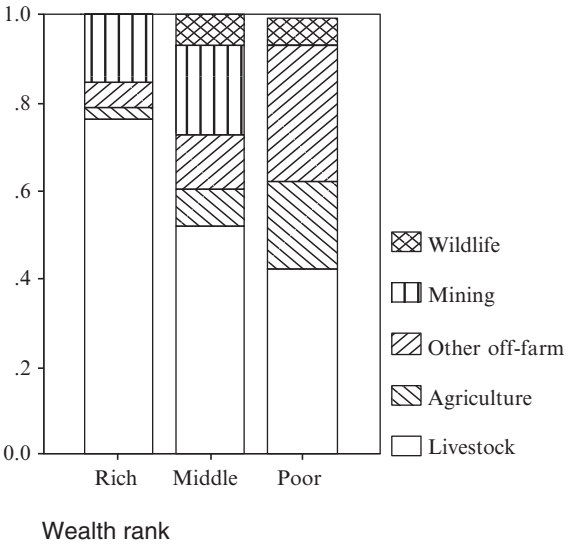

Fig. 7.6 Proportion of income from different livelihood sources (*N* = 27)

sources. On average, Lenaitunyo households received more than 30% of income from mining compared to less than 2% in the other sites, while other off-farm income in Esilalei represented 30% of income compared to 16% in Laarkaitial and 2% in Lenaitunyo (Fig. 7.7).

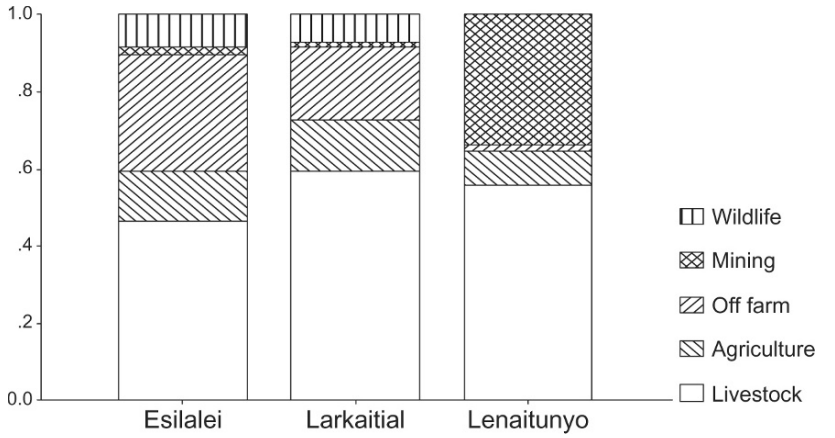

Fig. 7.7 Proportion of gross annual household income from different activities across three sites ($N = 27$)

7.3.5 Investment in Livelihoods

Livestock purchase data were available for the 27 households in the repeat-round surveys. Among these households, there is a strong positive correlation between mining income and the value of livestock purchase (Pearson = 0.828, $P < 0.01$), suggesting that households are investing income from mining into livestock. On average, households with mining income owned 6.3 TLU/AU compared to households with no mining income who owned 3.0 TLU/AU. This relationship is likely to be reinforcing better-off households with greater livestock trading experience who are probably better able to engage as middlemen in gemstone trading and are investing their income in further livestock purchases, in the absence of other reasonable investment opportunities.

With respect to investment in agriculture, there was a consensus among interviewees, that Tanzanite provides an alternative source of cash to fund capital intensive stages of the farming cycle, thereby preserving livestock herds. According to one informant, one of the largest new farms in the plains (400 acres) was initiated in 2004 by mining brokers. An expatriate priest in Emboreet stated that most of the large commercial farmers in Emboreet spent time in Mererani where 'Their eyes are opened to how other tribes are coming up'. Different villagers described how maize farming 'crazed' people; a *Landisi* described his own situation as '*Kichwa kimeharibika kwa mahindi*' ('I have gone crazy for maize'). Gemstone brokering and farming appeal as quicker production systems than livestock production (due to livestock disease). One *Landisi* compared farming to Tanzanite: with luck and skill, huge profits could be realized from both within a relatively short period. Aside from well-off people investing in a potentially very profitable enterprise (as shown by the crazy-for-maize quote) less well-off people also invested in agriculture to enhance food security, land tenure and avoid herd depletion for household monetary needs.

It is, therefore, perhaps surprising that household level data did not reveal a clearer relationship between profits from Tanzanite and the expansion of agricultural land. Mean acreage under cultivation is almost identical for households that receive income from mining (5.9 ha) and those that do not (5.7 ha). And relative to other activities, agriculture does not rank high for those most involved in mining. In fact, Tanzanite profits seem to be invested more in livestock than in agriculture, which mirrors the relative importance of livestock in the economy for the majority of Maasai. Current evidence does not support the theory that the spread of agriculture is driven by Tanzanite, although undoubtedly, the availability of cash will facilitate conversion of land to agriculture by allowing people to hire or purchase agricultural machinery, particularly among the few very wealthy individuals who can afford to speculate on agriculture as well as livestock (see Family Portraits).

In contrast, among households in the broad-scale survey, households with wildlife revenue farmed on average more land than households without wildlife revenue, although the difference is not significant (8.7 ha vs 5.5 ha). Fifty-three per cent of households that received wildlife income increased the area under cultivation between 2003 and 2004, compared with 33% of households that did not receive any wildlife income. These initial results suggest that households receiving income from wildlife-related sources are certainly not reducing their investments in agriculture and households may indeed be investing this revenue into farming the Simanjiro Plains.

7.4 Community-Based Conservation in Simanjiro

The analysis above shows a highly uneven distribution in gross household income and suggests that those households getting most income from wildlife-related sources may be investing this income in further extension of agriculture in the Simanjiro Plains. These plains play an essential role in supporting wildlife populations across the Maasai Steppe Ecosystem, and the extension of agriculture in the plains in Emboreet's village land is a cause of concern for conservationists. As such these results present an apparent paradox; why are the very households that may benefit from wildlife conservation apparently playing a key role in accelerating its decline?

In this section we look in more detail at the potential benefits of wildlife in terms of income to the community as a whole, as well as to households, and analyze the degree to which the distribution of these broader level benefits may be fuelling this apparent paradox.

7.4.1 Background to Wildlife Conservation in Tarangire and Simanjiro

A significant amount of the total surface area in the Maasai Steppe Ecosystem is protected for conservation. The Maasai Steppe Ecosystem area includes two NPs (Tarangire and Lake Manyara), Mkungunero Game Reserve to the south of Tarangire (384 km^2), the Marang and Lossimingori National Forest Reserves and

the watershed of the Northern Highland Forest in the Ngorongoro Conservation Area (NCA). Tarangire was initially established as a Game Reserve in 1957 and gazetted as an NP in 1970, at which time resident people were evicted from the park (Igoe, 2004). NPs in Tanzania are strictly allocated to wildlife conservation, scientific research, and nonconsumptive tourism, whereas Game Reserves and areas outside protected areas are used for centrally controlled tourist hunting. Wildlife outside NPs and Game Reserves is owned by the state but receives very low levels of law enforcement protection (URT, 1995). If only NPs and game reserves are calculated in relation to seasonal wildlife ranges, about 13.3% of the entire Maasai Steppe Ecosystem is strictly protected. This increases to 43% if forest reserves, private conservation areas and GCAs are included. This amount does not include open areas, proposed private conservation areas under development and private tourism concessions on village land. If these land units were included, the amount of land in the ecosystem under some form of private or state conservation management regime would be well over 50% (Fig. 7.8).

The economic value of Tarangire and Lake Manyara's NPs wildlife to the Tanzanian government is substantial and growing. In the period from 1992 to 2006, Tarangire and Lake Manyara NPs logged 1.9 million visitors. Combined annual revenue from both parks grew from $913,000 in 1992 to over $7 million in 2006. Direct tourism hunting revenues (not including multipliers) over a 1-year period in 1997 from the Maasai Steppe Ecosystem were estimated at $523,332. Tarangire NP has generated an operating profit since 1991 and generates surplus revenue for Tanzania National Parks Authority (TANAPA). Revenues from the two parks subsidize several lesser performing parks and generate substantial amounts of foreign exchange, so maintenance of the ecological and economic health of these two parks is an issue of strategic importance to the Government of the United Republic of Tanzania (Otto et al., 1998).

However, the wildlife in Tarangire NP is dependent on grazing and calving areas in the Simanjiro Plains, where thousands of wildebeest (*Connochaetes taurinus)*, zebra (*Equus burchelli*) and elephant (*Loxodonta africana*) congregate during the wet season. Conservation of the ecosystem's migratory wildlife populations largely depends on maintaining these unfenced and uncultivated rangelands on communally owned lands adjacent to protected areas (Borner, 1985; Kahurananga, 1997; TCP, 1998). Ground-based counts conducted in 1995 and 2003 by the Tarangire Elephant Project within Tarangire NP illustrate a clear trend; a decline in the wildebeest population of 80%, 50% for zebra and over 90% for Hartebeest (*Alcelaphus bucephalus*) and Oryx (*Taurotragus oryx)* (TNRF, 2005b). The future resilience of Tarangire NP (and by proxy, its value to the government) will depend in large part on sustaining livelihood activities compatible with the continued survival of large herds of ungulates on village-owned lands adjacent to the parks.

While conservationists are concerned at changing land use outside the national parks, many others argue that the loss of access to land and resources has contributed to rural conflict and socio-economic decline in communities dependent on park resources (Brockington, 1999; Homewood and Brockington, 1999; Neumann, 1998; Norton-Griffiths, 1995). In 1985, when conservationists proposed to designate

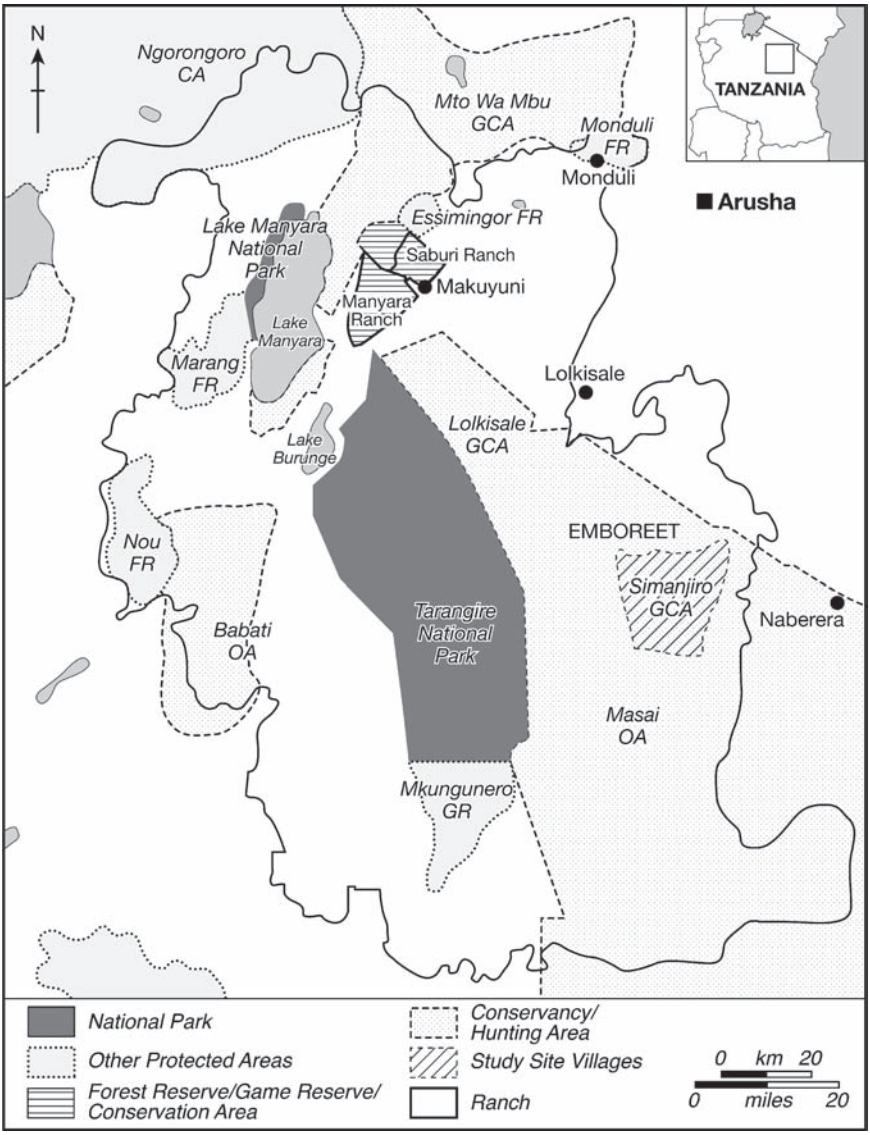

Fig. 7.8 Map of the Maasai Steppe Ecosystem showing various grades of protected areas

a multiple-use conservation zone that limited Maasai agricultural development options in Simanjiro District adjacent to Tarangire NP, the Maasai in Simanjiro vigorously opposed this scheme as it was viewed as a serious threat of further land alienation (Borner, 1985; Homewood and Rodgers, 1991; Igoe, 1999). In 2003, the Government of Tanzania approved the wildlife management area (WMA) regulations under Section 84 of the Wildlife Conservation Act of 1974. The development of WMAs will theoretically enable communities to establish multivillage communal

'conservancies' in which a variety of income-generating natural resource-based enterprises (including wildlife) will be permitted, whereas currently the majority of profits accrue to the central government (MNRT, 1998; see Chap. 8). However, when a delegation, comprised of representatives of the Simanjiro District Council, TANAPA and African Wildlife Foundation staff, travelled to Emboreet and Loibosiret to propose a WMA in Simanjiro, they were threatened with violence in Loibosiret. The perception was once again that the proposal was a government construct to alienate village land to benefit wildlife conservation. Recent developments with the new regulations published in 2007 with immediate effect criminalize all tourism activities not centrally licensed by (and channelling returns through) the State, reinforcing these concerns (URT, 2007).

7.4.2 Conflicts Past and Present

The roots of the conservation and pastoral conflict in Simanjiro are linked to several processes. Between 1973 and 1976, the Tanzanian government forcibly relocated millions of rural people as part of its socialist policy of villagization (Ujumaa) without regard for their customary land tenure and land-use practices. Pastoralists recall traumatic experiences such as bomas being burnt and families and livestock being driven by law enforcement officers to different locations. With economic liberalization, the impacts of displacement remained and were greatly exacerbated by the explosion of foreign investment that quickly followed in its wake (Havenick, 1993).

The gazettement of Tarangire NP in 1970 evokes particularly painful memories for Simanjiro Maasai, mainly due to the loss of access to the well-watered grasslands of Silalo Swamp in the east of Tarangire NP. Silalo is a permanent swamp with extensive grasslands representing an important drought refuge for pastoralists. Respondents report that the eviction was by force, using a light aircraft to herd cattle out of the park and parks staff on the ground burned shelters and drove people and livestock out of the park.

Maasai perceptions of conservation are equally affected by regional politics between Simanjiro and Ngorongoro Districts. Immigration of Maasai from NCA has particularly contributed to these dynamics. In 1974, when the Ngorongoro Crater was designated a World Heritage Site, Maasai were evicted from the crater floor. The crater with its permanent water and graze is referred to as '*peponi ya wafugaji*' ('paradise for pastoralists') by crater evictees. The NCA is now a multiple-use area in which human habitation is permitted but farming is zoned and restricted to 1–2 acres per family. The use of tractors is prohibited and pastoralists can only farm by hand. At the same time, the human population has increased several-fold over the past few decades while livestock numbers have remained the same. Because of increasing poverty, a number of Ngorongoro Maasai have emigrated to Simanjiro to seek farms and improved livelihoods. These immigrants warn that any process termed as 'conservation' is designed to impoverish pastoralists and undermine land tenure in favour of conservation. The new regulations issued

by the Division of Wildlife in November 2007 (URT, 2007), regulating village-based tourism enterprises, are consistent with this view. In each of these events, pastoralists feel that they have been unfairly manipulated by central government processes. Therefore, any conservation or development proposal which touches upon land use touches a raw chord amongst Simanjiro Maasai who view anything related to conservation with suspicion and animosity.

It is against this background that community-based conservation (CBC) has been proposed as a way of enhancing protected areas by creating economic incentives for local communities to manage wildlife on their lands and to enable wildlife to compete as a form of land use. It has also been a major concern to promote wildlife conservation as a potentially more sustainable and economically viable form of land use than dry-land agricultural conversion. CBC projects are being initiated across northern Tanzania, encouraged by central government agencies and international conservation organizations. The focus of these projects has been on establishing revenue-generating, community-based tourism projects on village land that has been zoned for conservation. Wildlife-based enterprises such as tourism hunting and tourism lodges in the Simanjiro Plains are thus concentrated in village land. The economic and ecological impacts of CBC in pastoral communities are still largely unknown (Caro et al., 1998).

There are several ways in which villages gain financial benefits from wildlife in Simanjiro, from both legal and illicit utilization of wildlife. Benefit-sharing mechanisms include outreach from Tarangire NP, community-based tourism revenue, contributions from hunting companies and socio-development project funding support from District Councils and NGOs. There is also a small amount of poaching that has a significant impact on the household income for those few households concerned. The philosophy of TANAPA is that 'Such positive experiences encourage locals to participate in land-use practices that reinforce the long-term viability of wildlife and preserve resources for their own long-term livelihood' (TANAPA, 2002). In this section we describe in more detail the benefits accruing to local communities in Simanjiro and how these benefits are perceived by the local communities.

7.4.3 Benefiting from Wildlife – A Village-Level Analysis

Wildlife-related revenue in Emboreet can be generally divided into three categories:

- Individual benefits – These are mainly employment benefits for individuals employed by the tourism sector from Emboreet village and benefits from development projects, for example, in the form of education scholarships from tourism companies or health clinics facilitated by a tour company. In addition, there is an active wildlife poaching network operating in Emboreet.
- Village account payments – Monies transmitted directly to the village to be managed by the elected village council. These include bed-night payments, concession fees

and contributions from hunting companies directly into the village account for social development projects. The new regulations for WMAs mean that these monies would now be all or mostly intercepted at the level of central government.

- Community benefits – Contributions provided as funding for local development projects. Funds do not pass through the village account but directly to the contractor carrying out the work.

Income received by individuals was captured through the household surveys (see Sect. 3.3 above). Table 7.7 describes the different sources of wildlife revenue received at the community level over 5 years from 2001.

At the community level, between 2001 and 2005, 71% of wildlife revenues accruing to Emboreet were generated from two photographic operations in the village. Kikoti Safari Camp is a mid-scale luxury tented camp with 18 rooms. Dorobo Safaris operate seasonally. This revenue was contributed directly to the village account in the form of bed-night fees for each night a tourist stays in the village, and annual concession fees paid by Dorobo Safaris Ltd. and Tanzania Photographic Tours and Safaris. Development projects consisted of education scholarships paid for by tourism companies and village office construction support. There were also regular donations to the Simanjiro Animal Health Learning Center in Emboreet from Dorobo Tours.

Tourism hunting contributions over this 5-year period provided 13% of the total generated. These funds were contributed by three companies: Luke Samaras Safaris, Tanzania big game safaris (TBGS) and Tanzania Bundu safaris. These payments were directed at social development projects (such as water tank repair) or

Table 7.7 Source and amount of wildlife related revenue into Emboreet village from 2001 to 2005

Source of revenue	2001	2002	2003	2004	2005	5-year total	Per cent of total
Exchange rate (Tshs = US $1)	690	950	1,000	1,050	1,080		
Tourism bed-night fees	$5,512	$13,830	$14,760	$38,499	$36,735	$109,336	51
Concession fees	$2,000	$3,982	$3,857	$3,857	$3,857	$17,553	8
Aid projects (photographic)	$1,170	$7,701	$14,653	$797	$777	$25,098	12
Tourism hunting contributions	$5,989	$9,474	$6,831	$3,743	$2,118	$28,155	13
TANAPA SCIPS	$12,261	$0	$0	$15,438	$5,000	$32,699	15
Total by year	$29,623	$37,939	$43,104	$65,388	$51,572	$212,841	100

Sources: Bednight register and files at Tanzania Tours and Photographic Safaris Ltd.; file provided by TBGS entitled 'Community Development Done on Behalf of Tandala Hunting Safaris (1998) Ltd. and Tanzania Safaris and Hunting (2003) Ltd. between 1998–2004'; file provided by Dorobo Safaris entitled 'History of Tourism Programme Between Emboreet village, Simanjiro and Dorobo Tours and Safaris'; personal communications with David Peterson, Barbara Redding-Jones (TBGS), Pratik Patel (TPTS), Emboreet villagers

TANAPA Tanzania National Parks Authority, *SCIPS* Small Community-Initiated Projects

were contributions in kind, for example of medicines to the Emboreet Hospital or wheelchairs. TBGS also invested during this 5-year period in contributions towards construction of the Emboreet village office and equipping it with furniture.

From 2000 to 2005, Tarangire NP's Community Conservation Service (CCS) contributed a total of $329,669 to Small Community-Initiated Projects (SCIPS) in the six districts adjacent to Tarangire NP – nearly 4 times that allocated between 1992 and 1997. Simanjiro District received 46% of this total, of which $32,700 was allocated to Emboreet for infrastructure projects: a school dormitory, renovation of an administrative block and renovation of a cattle dip (Tarangire CCS Department Records, May 2006). The value of these contributions represents 15% of the total value of conservation-related income to the village as a whole, although the livestock dip in Emboreet was still not functional in 2006 so the efficacy of this project is questionable.

The data in Table 7.7 do not include allocations from wildlife-related income from Simanjiro District Council. Tourism hunting quotas are issued centrally from the Wildlife Division (WD), which also receives payment for quotas from hunting companies in advance. By law, 25% of trophy fees are refunded to the District in which the animals were harvested. These district-level allocations from the WD are intended as a benefit-sharing scheme by the Government of Tanzania to ensure that some of the funds from tourism hunting are channelled back to the communities located in or near tourism hunting blocks.

The average amount of revenue contributed from aggregated wildlife tourism sources to Emboreet village was significantly higher than the total amount of revenue allocated to Simanjiro District Council from the centrally run WD over the same time period. In total, Simanjiro District received $31,899 and this figure has been steadily decreasing since 2001, due to a decline in hunting. This represents just over 2% of the total annual district budget, placing wildlife-related revenue streams low in District authority priorities. Hunting outfitters in Arusha (anonymous, personal communication) reported declines in hunting block viability, which they allege is due to the increase in farming, human population and poaching suggesting that the sustainability of the wildlife industry is in decline.

Furthermore, an analysis of expenditure of tourism hunting revenue in 2003 found that several of these investments were not in prime wildlife areas or even located close to hunting blocks, suggesting that tourism hunting revenue is considered a source of 'soft' funding to support political expediencies at the time across the district. For example, a ward office was constructed in Ruvu Remiti and a school building in Msitu wa Tembo, both located on the eastern boundary of the District, with high numbers of nonpastoralist populations.

Between 2001 and 2005, the total income captured from wildlife sources at the community level in Emboreet village was US $212,841. Thus, wildlife activities generated on average around $42,500 per year in Emboreet for the community as a whole. Based on the results from the repeat-round household surveys (15% of households receiving a median income of $550 per year), direct income to households would contribute an additional total of $36,000 annually to the village-level economy. The mean household size in Emboreet village in 2004 was 7.5 people per household.

Aggregated, these data suggest a mean value of wildlife conservation per capita of just US $24 per year to the people of Emboreet. While this figure may still be an underestimate as there was a paucity of data from hunting operators, our data has shown that most households will not receive anything close to even that level of benefit.

7.4.4 Perceptions: Beyond Economics

When asked whether individual households receive any benefits from Tarangire NP, 95% of respondents replied no. However, 48% of respondents agreed that the park benefits the village through social development services. When asked whether wildlife contributed an overall loss or profit to them: 87% of villagers replied a 'loss', 6% responded a 'profit', and 6% replied 'both loss and profit'.[4] The proportion of people having some form of negative view of wildlife around Tarangire NP (93%) was larger than the 84% reported in 1994 (Newmark et al., 1994). In relation to participation, 80% of household heads said that they were consulted when the tourism programs were established.

It is commonly asserted among the Maasai that one of the major driving factors behind expansion of agriculture is the fear of losing control over their land to conservation. A significant concern of villagers was that the boundary of Tarangire NP had moved towards the village and 72% of respondents said they believed the park had moved beyond its gazetted boundaries into village land. When asked whether individuals would invest hypothetical household-level tourism revenues into farming, 91% of respondents replied yes. A significant number of household heads (74%) felt that land farmed near the park boundary made its expansion less likely, as the farms would block the park. A former village Chairman described farming as 'the cure' to stop park expansion (M.L. Lenaitunyo, personal communication).

One of the hypotheses of this chapter is that the extension of agriculture is being driven at least in part by the desire of the Maasai to prevent further encroachment on their land by central government for conservation purposes. However, alienation of land for conservation is a symptom of a broader issue of insecurity of land tenure. From the late 1980s, land alienation for commercial farming and conservation and immigration have combined to drive people to individualize land (former Chairman, Emboreet, personal communication; former VEO Loiborsoit, personal communication). The Land Act and Village Land Act of 1999 heralded a further shift in policy from state-owned land to private land ownership (Celender et al., 2005, p. 25). While the Village Land Act (1999) recognizes pastoralism as a form of land use, the process of land allocation is complex and highly subject to corruption (Sachedina, 2008). Land that has been cultivated is considered much easier to claim rights to and the Village Land Act (1999) also allowed for leasing and even selling of rights over land that had been allocated, opening up an important potential

[4] Losses cited were crop and livestock damage and wildlife vectored diseases

income source for many poorer Maasai. Combined with the decline in per capita livestock holdings, this has led Maasai interviewed in the course of this study to refer to land as more valuable to them than cattle (Sachedina, 2008).

An assumption is often made that if CBC is made more profitable than alternative land uses, there will be economic incentives for pastoralists to manage natural resources in a way compatible with conservation aims. However, as this section has made clear, conservation policies at a regional and national level, both historically and in the present day, influence and play into not just household economies but entrenched political interests that link to security of tenure, rights over land use and access, and thus the long term viability of the household and the community.

7.5 Tanzanite and Land-Use Change in the Simanjiro Plains

Conservationists are hoping that 'making wildlife pay', once issues of equity in access and distribution can be resolved, will be an incentive for local communities to adopt land-use practices that are compatible with wildlife. The previous section has shown the ways in which perceptions of economic benefits are affected by historical processes, security of land tenure and lack of trust in government institutions. Our analysis of livelihoods not only demonstrates the low impact of wildlife revenues on household incomes in terms of the population as a whole but also demonstrates the potential for cash income from wildlife-related activities to accelerate agricultural extension and fuel the conflict between local communities and government being enacted through land-use policies at national level and land use at household level.

In an area where alternative sources of income are scarce and where most people feel the benefits from wildlife are largely being captured by government and elites while they bear the costs, it should come as no surprise that local communities find themselves battling with powerful national and international institutions for control over Tanzanite riches.

Before Tanzanite was discovered in 1967, Mererani was a predominantly agropastoral village near Mt. Kilimanjaro with production that focused on livestock and maize. What was until relatively recently a rural pastoral village is now the largest town in Simanjiro District and a nexus that is the new *de facto* economic and political capital of Simanjiro District. New luxury four-wheel drives with tinted windows owned by Maasai wearing shukas are common in Mererani. Off the main street, in plain view, brokers set up their stands and congregate in groups waiting for miners to descend from the mining blocks. Artisanal and small-scale miners work in dangerous and risky conditions underground and usually for the lowest financial gain. Partly driving the rush is the knowledge that the supply of Tanzanite is limited. Experts estimate that viable streams of Tanzanite will be exhausted in 18–20 years (Larenaudie, 2007).

[5]Mererani graffiti implying that a gem strike was possible at any time.

The frontier-like atmosphere and the demand for manual labour in artisanal and small-scale mines means that Mererani absorbs large numbers of males irrespective of ethnicity, education or criminal backgrounds. The pursuit of instant wealth and the risks associated with Tanzanite mining engender a somewhat fatalistic outlook on life amongst miners. Combined with its associated thriving bar and guesthouse sector, mining has resulted in Mererani having one of Tanzania's highest human immunodeficiency virus (HIV) prevalence rates (http://www.usaid.gov/stories/tanzania/pc_tz_miners.html). Graffiti seen in Mererani that is meant to give the miners encouragement celebrates the fatalism that Tanzanite represents to miners: '*Kila sekunde ipitayo ni ukaribio mkubwa wa mwanadamu na mungu wake …*' (… Each second that passes brings you much closer to death…); '*Riziki ni kama ajali …*' (… Success is like an accident) and '*Zimwi la mawe halifi …*' (… The Tanzanite ghost never dies). Fortunes are earned and lost on a daily basis. Many lose contact with their home villages and succumb entirely to a cycle of above ground profligacy and long, dangerous shifts beneath ground to pay for the next cycle.

This is not the case for the Maasai in Mererani. Servicing this ethnically mixed boomtown population of miners is a middle level of brokers. Few Maasai actively work as miners. Indeed, the majority of middle brokers are Maasai men, who buy rough stones from miners straight from the pit and then sell these stones on through an intricate chain of larger brokers and stonecutters. Able to amass wealth on a timeline and scale not seen previously in the Maasai Steppe, many men from younger age-sets are selling livestock to obtain money with which to trade in Tanzanite. When successful, these men from younger age-sets are able to substantially influence land use, livelihoods and politics in their pastoral villages. A few individuals, including some Maasai, own their own mines, brokerage firms and stonecutting establishments. This vertical integration has resulted in some individuals amassing fantastic personal wealth and political influence through the artisanal mining sector (e.g. see Mako's story, Family Portrait, Tarangire).

Maasai from Emboreet maintain strong links with their communities and usually are resident labour in Mererani for a season before returning to Emboreet to assist with core livelihood strategies of farming and livestock husbandry. Brokers exhibited money conserving behaviour in Mererani; several men sharing the rent of a single room and a single mobile phone. The goal of these brokers was to grow their initial investment of cash into funds to be used in Emboreet to support livestock and diversification into farming. Few individuals interviewed indicated a desire to stay in Mererani long term. But it represents a strategy for diversification that enables Maasai to return to their villages with profits faster than if they were to seek waged employment in Arusha or on the Karatu coffee estates. Another aspect of Mererani which may appeal to young Maasai men is that brokers maintain a level of independence; they are self-employed, work largely in groups of their own age-sets, while trading is, broadly speaking, a familiar activity for many Maasai.

The perception of Mererani among people in Emboreet is that it is dangerous, the source of HIV in Simanjiro, and where many non-Maasai (*Ol Meek*) come to profit from resources in Simanjiro. However, there is widespread approval of engaging in Mererani as it is within Simanjiro, and many Maasai feel that Tanzanite

is a Maasai resource by virtue of its location. Mererani is becoming a new test of manhood for Maasai *murran* and replacing past trials like lion hunting. *Murran* who go to Mererani and are successful demonstrate their prowess and bravery. Younger age-sets such as the Il Kimunyak (senior murran) are replacing older age-sets in leadership in Maasai society at a sub-village and village level across Simanjiro District. Tanzanite is empowering these younger age-sets in this age-dominated culture who are using their wealth and market links to ensure that they are well represented at all levels of governance. Through this representation, younger, commoditized age-sets are making decisions related to village natural resource use, and are one of the major drivers of land-use change in Simanjiro.

7.5.1 Tanzanite and Tenure – A New Resource, Familiar Patterns

At a local and global level, Tanzanite prices have continued to rise. For example, 1 g of rough Tanzanite of exceptional quality that sold for US $300 in Mererani 1999 was sold for $600 in 2004. The price in 2006 is closer to $900. Cut and polished stones retailed in the United States sell for about US $8,000 per carat. Trading in rough Tanzanite is usually conducted in fragmented and unregulated transactions between low-wage miners and Mererani-based brokers, the bulk of whom are Maasai from Simanjiro. Rough stones are then sold onto Arusha-based brokers with over 80% of rough stones exported to India for cutting and polishing before onward shipping to the final market in the United States (Forrest, 2006).

In 1990, the Tanzanian government curbed artisanal mining and demarcated the area into Blocks A, B, C and D. Block A was awarded to Kilimanjaro Mines Limited, Blocks B and D to small-scale miners and Block C to Graphtan Limited, a graphite-mining company (graphite is a by-product of Tanzanite). Block C of the Mererani Controlled Mining Area is estimated to contain two-thirds of the world's known deposits of Tanzanite. Local people rumoured that Graphtan served as a front for a Tanzanite smuggling operation – why remove Tanzanite as a byproduct and export graphite? Graphtan ceased mining activities in 1996 and African Gem Resources Ltd. (AFGEM) acquired the mining license for Block C. Between 2000 and 2003, AFGEM invested about US $20 million into a modern underground mine in Mererani including exploration shafts, dense media separators and an automated optical grading and recovery system. The company also pioneered a branding and certification process for its gem-quality Tanzanite production (Kabelwa, 2003). In 2004, the TanzaniteOne Group acquired AFGEM's Tanzanite business and assets and the rights to the lucrative Block C.

The main aim of TanzaniteOne is to develop a regulated trade in which supply matches demand at high market value. TanzaniteOne is focusing on building the brand of Tanzanite through a marketing campaign designed to position Tanzanite alongside diamonds, sapphires and rubies. Compared with De Beers $100 million per year marketing budget, TanzaniteOne's $3 million marketing budget to build

brand awareness of Tanzanite is low. However, by focusing on buyers as 'investors' and marketing the 'rarity' of the gem, TanzaniteOne hopes to convince buyers that Tanzanite is an investment due to its finite and limited supply. The company also successfully lobbied to position Tanzanite as a birthstone for the month of December, the first gem added to the birthstone list since 1912. The stated aim of TanzaniteOne is to ensure that the global price of Tanzanite increases by 14% per year. As De Beers has illustrated, gemstone monopolies are profitable. TanzaniteOne controls a significant segment of the market and has a competitive advantage over small-scale miners with its modern mining technology and access to capital. It would benefit TanzaniteOne and move it closer to a monopoly should artisanal and small scale mining be regulated according to its wishes. On the whole, the small-scale, artisanal and brokerage sectors are set to benefit from a continued increase in the price of Tanzanite. However, the company is also positioning itself as a broker for artisanally mined rough stones, which may affect Maasai.

In addition to environmental and social concerns, there are fiscal and political incentives for the central government to encourage the formalization of this sector. The loss of revenue and foreign exchange earnings, through informal gem smuggling and trading in particular, is estimated to be very significant. Tanzanite currently earns the Government roughly US $20 million per year with royalties calculated at 5% of the found Tanzanite value (Ihucha, 2006). This compares to the situation between 1995 and 2000, when recorded gems sales realized only US $64 million, or about one-sixth of the estimated actual value of production. The rest is believed to have accrued to gem smugglers. Investment in large-scale formal mining has been difficult because small-scale or artisanal miners, who engage in gem smuggling, are unwilling to subject themselves to the working conditions of the mining companies. Clashes between small-scale miners and larger mining operators like TanzaniteOne have occurred, with the latter being more willing to impose measures to control smuggling and enforce the payment of taxes.

The ongoing conflict between artisanal miners and TanzaniteOne is characteristic of the land tenure conflicts that are prevalent throughout the District. It is clearly in the interests of national government to be able to increase control over Tanzanite extraction. However, in a country that ranks as highly corrupt (Transparency International rating of 3.9 out of 10 where 10 is highly clean and 0 is highly corrupt), it is most likely that much of the profits seen in Dar es Salaam would not be invested back into public services.

7.6 Conclusion

Although pastoral land-use strategies have historically coexisted with wildlife in this landscape, pressures to diversify livestock-based economies in recent years in the Maasai Steppe Ecosystem have increased conflicts between different land uses. The increase in unmanaged drylands agriculture, decrease in livestock holdings per capita, poaching and land tenure conflicts are all principal threats to wildlife resources in the Maasai Steppe Ecosystem.

In a context of long-term declines in per capita livestock holdings, our data has shown that the poorest households are more dependent on agriculture than the wealthiest. While agricultural production remains a fraction of the value of livestock production, the wealthiest households are still mainly responsible for expansion in agricultural land. Increased revenues undoubtedly increase the potential for rapid acceleration in the conversion of rangeland to agricultural production; our data show that agricultural expansion is as likely to be funded by wildlife-related revenues as Tanzanite income.

The conflict over land use in Simanjiro is thus representative of a broader historical and socio-ecological context, which is driving pastoral diversification and affects the potential uptake of community-based conservation. The wildlife sector is characterized by strong state control over land tenure rights, resources and revenue despite a lack of resources and capacity to manage the wildlife resource outside of NPs (TNRF, 2005a; URT, 1995; Chap. 8). The government perceives protecting wildlife in Tanzania to be a war against poaching and against the assumed destructive impacts of local land use. As the recent National Anti-Livestock Operation demonstrated, the government perceives pastoralism and pastoralists to be in the frontline of this war. In reality, pastoralists are also de facto custodians of land that whether through the minerals it contains or the wildlife it supports, is of great economic potential. Until the rhetoric of community-based conservation acknowledges the more complex social and political processes surrounding land-use practices, and the distribution of benefits in the context of long-term household security, efforts to promote wildlife friendly resource-use practices are unlikely to succeed.

The battle for control over benefits from Tanzanite, widely considered a Maasai resource due to its only being found in Maasailand, is set to mirror that of control over returns from conservation and will only serve to cement further the perception and expectations among Maasai that their needs and rights are low in the priorities of national government. In spite of its unique existence value, the high economic value of the Simanjiro Plains to the broader national economy, and the rhetoric of community-based conservation, this research has shown that the continued status of Tarangire as a world conservation site still presents a greater threat to the Maasai in terms of land access and control. Conversion of land to agriculture must be seen in this context. Rather than deal with these root causes, recent developments suggest that the government response to agricultural conversion is to further reduce Maasai rights to control land use which is likely only to accelerate the process of land conversion and declines in wildlife populations.

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Chapter 8
Community-Based Conservation and Maasai Livelihoods in Tanzania

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8.1 Introduction

Northern Tanzania is renowned for hosting the most significant populations of large terrestrial mammals left on the earth, particularly those found in the expansive ecosystems of the Serengeti and the Maasai Steppe. The region's savanna and grassland landscape, which has been managed by pastoralists[1] for thousands of years[2] through burning, grazing, and the exclusion of large-scale agriculture, maintains a remarkably diverse and widespread wildlife fauna. Since the early colonial era, Tanzania's wildlife has been a focus of management and conservation efforts. Maasailand, with its wildlife richness, has received much of the attention of government conservation initiatives. Pastoralist livelihoods have been transformed by the loss of land to state protected areas, as Tanzania has accumulated one of Africa's most extensive networks of National Parks and Game Reserves (Homewood and Rodgers, 1991; Neumann, 1998; Igoe, 2004). More recently, the rapid growth of northern Tanzania's tourism industry, based upon the wildlife and scenery of the region's pastoral landscapes, has intensified the political and economic forces affecting rural people and their livelihoods.

While the history of the impact of wildlife conservation on the Maasai of northern Tanzania is relatively well-documented, the impact of contemporary developments in wildlife conservation policy and practice on pastoralist and agro-pastoralist livelihoods has been less extensively explored. Using several case studies, we show how Tanzania's formal 'community wildlife management' initiatives may in practice represent the same threat that protected area creation and conventional

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[1] We use the term 'pastoralist' to mean people who herd cattle as a central part of their livelihood, but who may also varyingly complement their livelihoods with farming and other activities.
[2] The Maasai themselves have occupied the region for only about 200–300 years, however.

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wildlife conservation policies have, namely, the loss of lands and resources that rural people depend upon. We provide a political economic analysis of why this is the case and then analyze how and why conservation initiatives operating more independently of formal state interests and agents have begun, in places, to develop a different and perhaps more equitable manifestation of community-based wildlife management (CWM).

We begin by briefly summarizing the underlying 'community-based' thesis that conservation could become an important driver for rural development and livelihood improvement – or at the very least be far less damaging to rural people's livelihoods – if control over wildlife were devolved and benefits more equitably distributed.

8.1.1 Community Wildlife Management and Rural Development

Over the last 15–20 years, a range of community-based natural resource management paradigms have emerged as an alternative and complement to conventional approaches to nature conservation premised on strict central regulation and state protected areas. The shift reflects a broader movement, at least within the rhetoric of aid donors, government agencies, and many conservation organizations, towards more participatory forms of natural resource management throughout sub-Saharan Africa (IIED, 1994; Barrow et al., 2000; Hulme and Murphree, 2001; Awimbo et al., 2004). Various strategies for linking rural development and natural resource conservation fall under the rubric of a number of names and acronyms,[3] and involve a range of passive and active forms of participation (Barrow and Murphree, 2001).

CWM is, for conservationists, a way of involving communities in wildlife management and creating local economic incentives for conservation. CWM is premised on the belief that conservation in rural landscapes, outside of state protected areas, depends on the socio-economic and socio-political incentives that local people have for maintaining wildlife and other natural resources on their lands. In other words, where local people value wildlife and possess rights to manage the resource, they are most likely to want to conserve it. Efforts to implement CWM as a viable natural resource management strategy are thus predicated on its ability to generate economic benefits that outweigh the costs of conservation, as well as the transaction costs of collective management (Emerton, 2001). CWM is therefore both a conservation strategy and a way to improve rural livelihoods (LWAG, 2002). Its viability is contingent on making this link between conservation and local economic benefits from wildlife on communal lands. While the thesis is theoretically

[3]These include community-based natural resource management (CBNRM), community-based conservation (CBC), integrated conservation and development projects (ICDPs), adaptive co-management (ACM), participatory forest management (PFM), and community-based wildlife management (CWM).

simple and appealing, outcomes of CWM in east and southern Africa are often far less directly beneficial to rural people than intended and claimed (Gibson and Marks, 1995; Gibson, 1999; Marks, 2001; Shackleton et al., 2002; Blaikie, 2006; Chaps. 3–7, this volume). In Tanzania, as in other countries in the region, there is often a wide gap between the rhetoric of community participation in natural resource management and its reality at the local level (Songorwa, 1999; Barrow et al., 2000; Nelson, 2007). As background to an exploration of CWM outcomes, we first provide an overview of the interaction between people and wildlife conservation policy and practice in Tanzania, from the colonial era to the present time.

8.2 Rural Communities and Wildlife Conservation in Tanzania: A Brief History

The history of wildlife conservation in Tanzania is a story of increasing central control over wildlife resources across the colonial, post-independence socialist, and post-structural adjustment periods. Two state goals – creating protected areas for wildlife and the spatial concentration and economic control of rural people for 'development' – have often complemented each other in perhaps rather perverse ways, resulting in an increasingly divisive and costly relationship between rural livelihoods and wildlife.

8.2.1 The Colonial Period: Nature, Governance and Economic Control

From the outset of the colonial project the authorities partitioned Tanganyika into administrative districts, and latterly, provinces and chiefdoms. The first regulations for controlling wildlife hunting were introduced by the Germans at the outset of their rule in 1891, and the first game reserves soon followed as early as 1896 (Koponen, 1994; Wanitzek and Sippel, 1998). The British administration retained most of the protected area estate that it inherited from the Germans after World War I, including both game and forest reserves (Neumann, 1998). During the British colonial period, the protected area network was further expanded as the colonial administration reordered the landscape as part of its program of exerting political and economic control (Neumann, 2001). Although the Game Preservation Ordinance of 1921 re-gazetted the game reserves created by the Germans, the Ordinance maintained that, '… the native should be regarded as having a moral right to kill a piece of game for food' (Neumann, 1998, p. 100). This position increasingly gave way to growing restrictions from the 1940s onwards.

In many parts of Tanganyika, people were moved into concentrated settlements as part of colonial efforts to control sleeping sickness and its vector and host, the

tsetse fly and wild animals, as well as capturing and increasing the agricultural production, labour and tax returns of rural Tanganyikans (e.g. Iliffe, 1979, pp. 347–356). The Maasai were moved and 'confined' to a porous Maasai reserve created in 1922 by the British colonial authorities, and encouraged into the cash economy through livestock sales imposed for taxation and destocking (Hodgson, 2001). Despite adjustments to the reserve, they continued to be increasingly excluded from the remaining dry season grazing and more productive areas of their domain (Hodgson, 2001).

During the 1940s and 1950s, an international wildlife conservation lobby became increasingly concerned that local Tanganyikans constituted a fundamental threat to nature and wild places. This European coalition successfully lobbied the colonial office in London for the expansion and stricter enforcement of the protected area estate in Tanzania (Neumann, 1998). With the passage of the new Game Ordinance of 1940 and National Parks Ordinance of 1948, the wildlife estate began to be further expanded (Kjekshus, 1996). People were increasingly evicted by force from newly created or extended game reserves and national parks or cajoled to leave (e.g. Grant, 1954).

Thus in the Serengeti, the Ndorobo, Ikoma, Sukuma and Maasai peoples were coerced into leaving to create the Serengeti National Park (SNP) in 1958–1959 (Neumann, 1998; Homewood and Rodgers, 1991). The Maasai agreed to withdraw by accepting a government proposal that guaranteed them the right in perpetuity to live in the Ngorongoro highlands and crater to the east.[4]

In southern Tanzania, the Selous Game Reserve (SGR) expanded into western Liwale District during the 1930s following a series of enforced resettlement and concentration schemes and elephant control measures by the game department. The impact of the scheme was substantial. Forty thousand people left western Liwale District during the 1930s and early 1940s (Yeager and Miller, 1986, cited in Neumann, 1998, p. 147) and some of the most fertile areas of farmland in the district were lost to wildlife conservation (Neumann, 2001).[5]

In northern Iringa District during the late 1940s, the colonial administration put forth similar reasons for expanding the Rungwa Game Reserve[6] southwards into the Idodi and Pawaga rangelands. Specifically, a dispersed rural population living in a huge rangeland was perceived as presenting substantial administrative problems for the colonial government, which also faced the challenge of controlling the continued spread of the tsetse fly. In 1954, the government began to evict people in order to create the Ruaha Game Reserve, which subsequently became a national park in 1964.

[4] This latter undertaking has for many years been reneged upon, both through successive amendments to the law increasingly extinguishing customary rights and also through extra-legal actions taken by the managing Ngorongoro Conservation Area Authority (Shivji and Kapinga, 1998).

[5] The depopulation of west Liwale District was only brought to an end when it was realized during the mid-1940s that the remaining human population comprised a useful labour reserve for what was to become the ill-conceived and infamous ground-nut scheme (Neumann, 2001, pp. 658–660; see also Iliffe, 1979, pp. 440–442).

[6] Created in about 1937 (Jennings, 1994).

During the late inter-war and post-World War II years, rural human populations recovered and grew from their depressed levels at the end of the previous century (Kjekshus, 1996). People and wildlife increasingly came into conflict, exacerbated by new wildlife regulations enforced by the game department. Increasingly, rural populations were officially barred or regulated from hunting and effectively controlling local wildlife populations. By independence, the Tanganyikan landscape had become extensively partitioned, local resource rights expropriated, and a substantial protected wildlife and forest estate had been created.

8.2.2 The Post-Independence Period: Ujamaa, Crisis and Re-appraisal

The first two decades of the post-independence era followed the wildlife management patterns and policies established during the colonial years. Throughout the mid- to late 1960s the government passed a series of laws that exerted greater state control over herder and farmer production, leading up to the Arusha Declaration of 1967 and the subsequent Ujamaa and villagization policies. The Wildlife Conservation Act of 1974 continued the process of exacting progressively greater state control over wildlife and the elimination of local use rights. All legal use of wildlife required licences purchased from government authorities; this *de facto* excluded most locals from utilizing wildlife since most people did not own firearms and could not afford or easily obtain the licences. The establishment of protected areas and eviction of rural communities from parks and reserves continued in the 1970s, and was linked to the socialist policies of rural transformation that characterized the Tanzanian economy during that decade (Swai, 1996).

Following the Arusha Declaration, a national program of villagization was conducted between 1973 and 1976 to create *Ujamaa* villages.[7] The operation was substantial with up to five million people moved, sometimes forcibly, to new settlements nationwide (Hyden, 1980; Shivji, 1998). Villagization had a major impact on land tenure generally and the rights of rural land-users, and caused widespread confusion in tenure and security for customary landholders (Shivji, 1998).

Maasai pastoralists in northern Tanzania were forced, as part of operation 'Imparnati'[8] to move into livestock development villages (Arhem, 1985; Ndagala, 1982). In each of these development villages there was to be a central settlement, and wet and dry season grazing areas (Parkipuny, 1979). Although existing land-use and settlement patterns were used as the basis for the new livestock development villages, an alien structure of executive leadership was imposed on Maasai society based on administrative village institutions together with restrictions upon

[7] 'Ujamaa' means *community-hood* and is used to circumscribe Tanzania's collectivist and socialist socio-economic policies of 1967–-1986.

[8] Maa for *permanent settlements*.

their stock holdings and movements. Many Maasai were wary of the new villagization programme and they considered it just another step taken by the government to control their livelihoods (Arhem, 1985). This suspicion was subsequently borne out as large tracts of land were allocated, without local consultation, permission or compensation by the state, to other interests including commercial agriculture, wildlife hunting companies and private individuals (e.g. Shivji, 1998, pp. 32–39).

The upshot of the combination of an expanded degree of state control in rural Tanzanian life and the continued emphasis on wildlife conservation in the post-independence period was that Tanzania established one of the world's largest protected area networks, with over 25% of its land set aside in parks and game reserves (MNRT, 1998). Today, these areas include the 'core' protected areas of national parks and game reserves.

National parks are used only for non-consumptive forms of tourism (e.g. lodges and camping, wildlife viewing and hiking), and have underpinned Tanzania's tourism boom since 1990, with gross tourism receipts increasing from $65 million to over $800 million today. In game reserves and in unprotected areas with wildlife populations, including the Game Controlled Areas (GCAs),[9] the principal activity is tourist hunting, which is managed by the Wildlife Division (WD) of the Ministry of Natural Resources and Tourism. Today, there are about 140 concessions and roughly 40 different hunting companies holding them, with the total area used for hunting about 250,000 km^2 (Baldus and Cauldwell, 2004). Since the industry was liberalized in the late 1980s, the estimated total annual value of hunting concessions has increased from about $4.3 million to $27 million by 2004 (Baldus and Cauldwell, 2004).

About half of all hunting concessions (those not in game reserves) occur entirely or partially on lands where local people reside and which therefore may be classified as village lands under the provisions of the 1999 Village Land Act.[10] The jurisdictional overlap between locally controlled land and centrally authorized wildlife utilization activities in these areas has been one of the foremost sources of conflict over conservation policy in Tanzania in recent years, and has been particularly pronounced in pastoralist areas because of their relative abundance of wildlife (Nshala, 2002; Nelson, 2004, 2005).

Tanzania's centralized wildlife management system, as developed in the colonial period and continued after independence, has thus been successful in terms of creating a large protected area estate and providing nominal protection under the law for many animal species. Yet, this approach has significant deficiencies as a conservation strategy. Alienated from wildlife and its economic values, local people

[9]Game Controlled Areas (GCAs) were originally established during colonial times as a way of increasing regulatory controls over hunting outside of reserved lands, and have never involved restrictions on land use or livelihood activities by local people, unlike in game reserves and national parks.

[10]This legislation classifies such lands as 'village lands' and places them under the authority of village council, which is the lowest level of administration and governance in Tanzania.

have had few incentives to invest in or support conservation. Instead, they have been threatened by continued protected area expansion and saddled with the costs of living with wildlife while the benefits of the resource are captured primarily by the state and its commercial clients, such as hunting operators. At the same time, as a result of Tanzania's deteriorating macroeconomic conditions in the 1970s and 1980s, national capacity for enforcing restrictions on wildlife use collapsed. The wages of civil servants declined by over 90% in real terms during this period, greatly undermining the capacity of the state and rendering wildlife increasingly a *de facto* open access resource. A ministerial wildlife policy task force convened in the early 1990s succinctly concluded, 'there is no effective means now in place of conserving biological resources outside protected area networks' (WSRTF, 1995).

Thus by the late 1980s a confluence of historical, socio-economic and ecological forces resulted in growing pressures for reform in Tanzania's wildlife sector (Leader-Williams et al., 1996). Key among these forces were the following:

- The failure of strictly centralized management to conserve wildlife outside of the core protected areas on rural community lands;
- Conflicts between local communities and protected area authorities over wildlife and land uses;
- Macroeconomic reforms promoting private investment and a scaled down role of the state in the economy following Tanzania's adoption of a structural adjustment agreement with the International Monetary Fund in 1986;
- Increased influence in Tanzanian policy-making by foreign donors coupled with growing interest by aid agencies in community-based conservation approaches, such as Zimbabwe's CAMPFIRE programme.

During the following decade, a range of new donor–government partnerships were forged to increase investment in the wildlife sector, reduce illegal wildlife use, and reform Tanzania's wildlife management institutions. The Selous Conservation Programme (SCP) was developed as a partnership between the Tanzanian and German governments and soon became a lead promoter of CWM (Baldus et al., 2003). The British and Norwegian governments joined the Germans as supporters of local CWM initiatives, while the United States Agency for International Development (USAID) began support of the Planning and Assessment for Wildlife Management (PAWM) project in 1990. This project, which ran for 4 years and was jointly managed by the Tanzanian government and several international conservation NGOs,[11] produced a set of comprehensive policy reviews and detailed recommendations for devolving wildlife management outside protected areas to local communities (WSRTF, 1995; see also Leader-Williams et al., 1996).

These recommendations were adopted by the Wildlife Policy of Tanzania, which was released in 1998 (MNRT, 1998). The policy calls for maintaining the core protected areas – national parks and game reserves – as the foundation of wildlife conservation in Tanzania, but advocates a revised approach on village and private

[11] These were the African Wildlife Foundation and the World Wildlife Fund.

lands. The policy states: 'It is the aim of this policy to allow rural communities and private land holders to manage wildlife on their land for their own benefit' (MNRT, 1998). The mechanism for enabling communities to manage wildlife is described in the policy as the Wildlife Management Area (WMA). WMAs are described as a new form of protected area, but one managed by rural communities on their village lands, 'where local people will have full mandate of managing and benefiting from their conservation efforts' (MNRT, 1998).

The basic framework for WMAs, as developed by the PAWM process and early field projects, such as the SCP, was predicated on villages zoning a portion of their land as a wildlife conservation area where exclusion of agriculture and settlement, and perhaps livestock grazing as well, would be designated and enforced through village land use plans and by-laws. In return, the Wildlife Division (WD) would grant the communities a wildlife utilization quota which they could either hunt themselves or alternatively sell to a tourist hunting operator. The economic potential of tourist hunting played a central role in the logic of this framework, in terms of providing the revenues to incentivize local conservation efforts in many remote areas (e.g. the villages surrounding the SGR).

Importantly, the design of WMAs was almost entirely driven by wildlife management and conservation interests. The basic concept was that communities would voluntarily give up agricultural uses of portions of their land, formally creating a 'buffer zone' adjacent to protected areas, and in return would be granted the right to benefit directly from hunting concessions situated on these lands. It is also relevant to note that most of the early donor-funded pilot CWM projects, which played an important role in shaping the WMA concept, were not located in pastoralist areas. In many of these projects one of the first 'carrots' extended to locals to obtain their participation in the projects was to grant them legal access to bushmeat through a quota designated for their own use, a provision which would not have been relevant in Maasai areas where communities traditionally do not eat wild animals. Even more problematic was the general ambiguity with which the integration of livestock grazing and wildlife management was treated under this framework, an issue that has continued to bedevil efforts to implement WMAs in Maasailand.

The legal architecture for WMAs was established in 2002, when the Ministry of Natural Resources and Tourism released regulations for their creation. Under these regulations, the Director of Wildlife may designate a village or multi-village organization as an *Authorized Association* (AA) for purposes of wildlife utilization. All of the WMAs have been planned as multi-village entities, largely rationalized so as to make the WMAs large enough to situate at least one tourist hunting concession. Villages must form and register a representative community-based organization (CBO) that will serve as the AA. This CBO/AA thus becomes the delegated management authority for the WMA, although the respective village councils maintain statutory authority over the village lands that collectively constitute the WMA.

In order to form a WMA and start earning revenue from wildlife uses therein, the communities are required to fulfil at least a dozen procedural requirements (Nelson, 2007). These include preparing a strategic plan, village land use plans, and

a general management or zoning plan for the proposed WMA. Once the planning requirements are fulfilled, the CBO can apply to the Director of Wildlife and the Minister to become an AA and the WMA will be formally gazetted. After the WMA is gazetted, the CBO/AA still must request the Director of Wildlife to designate a tourist hunting block in the WMA (if they wish to capture revenue from tourist hunting activities), develop an investment plan and investment agreements, and have Environmental Impact Assessments carried out on the proposed investments. Importantly, the WMA regulations do not allow the communities to allocate their hunting block to hunting outfitters – that power remains with the central government. Also, the WMA regulations do not specify the proportion of the revenues generated by commercial activities in the WMA that will be retained by the local community; this has been one of the most problematic provisions of these regulations (see Nelson, 2007).

8.3 The case studies

Having set the historical context for the emergence of CWM in Tanzania and reviewed the rationale and structure of WMAs as the government's intended mechanism for operationalizing CWM, we turn to an examination of CWM in Tanzania and its impact on Maasai livelihoods through three case studies (Fig. 8.1). The first two case studies are drawn from the Maasai diaspora in central Tanzania where state-sponsored donor-implemented CWM has – we argue – adversely affected pastoralist land rights and livelihoods. The last case study is drawn from Loliondo Division, Ngorongoro District, where state-sponsored CWM efforts were resisted in favour of an alternative locally emergent approach to CWM.

8.3.1 The Ruaha: Farmer–Herder Relations, CWM, and Rangeland Exclusion

This section describes the development of CWM in the southern Ruaha, in Iringa District, since the early 1990s, and its impacts on local pastoralists. We give a short account of how the initiative played a key role in the formalization of community wildlife use in the Tanzanian wildlife sector during the policy reform period of the 1990s. Of particular note are the institutional relationships that developed between the donor-funded project, the Wildlife Division (WD), Iringa District and villages, without which the project would probably not have progressed. While the development of the WMA eventually gained reasonably wide support among the villages and represents a modest success for the village governments involved in the project, it has spelt disenfranchisement for the pastoralist minority, in an increasingly populated and bound landscape.

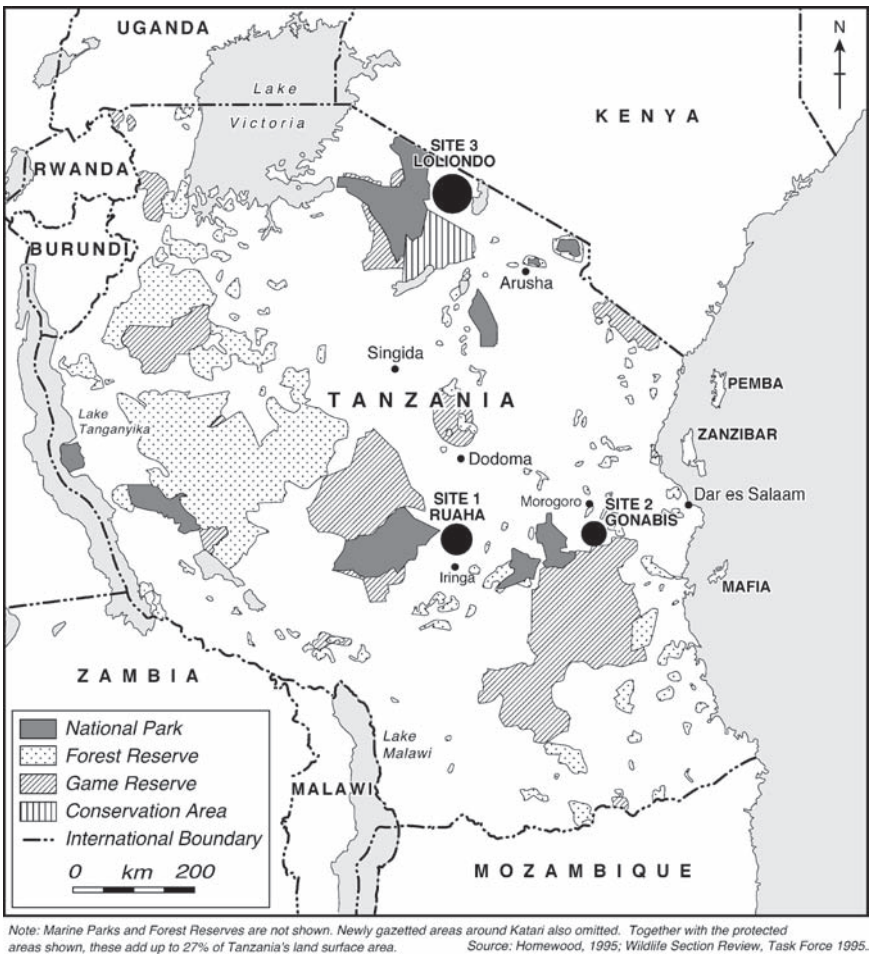

Fig. 8.1 Map showing the three case study sites (indicated with filled red circles) in Tanzania

8.3.1.1 Background: Wildlife Conservation, Ujamaa and Farmer-Herder Land-use Change in the Ruaha

The Lunda–Mkwambi Game Controlled Area (LMGCA) lies in the Ruaha Ecosystem to the south-east of Ruaha National Park (RNP), in Iringa District, central Tanzania. The LMGCA overlaps the village lands of Idodi and Pawaga – two administrative divisions that lie in the western and eastern portions of the GCA. The area has been subject to substantial in-migration by diverse people over the last 50 years who have come to farm the rich soils for rice, irrigated from the streams and rivers running off the southern highlands. While most people (Hehe, Bena and Wanji) are agriculturalists, a significant minority – particularly in Pawaga – are

agro-pastoralist (Sukuma, *Ilparakuyo* Maasai and Barabaig) with a smaller number pursuing transhumant pastoralism (Barabaig). In general, agriculturalists tend to constitute the majority in village councils and retain (particularly in Idodi) an upper-hand in modulating power relations and landscape use practices between farmer, herder, and now, to a lesser degree, wildlife.

The *Ilparakuyo*[12] Maasai are the longest present agro-pastoralists in Idodi and Pawaga, with reports of the first *Ilparakuyo* having moved into Pawaga in 1928 and latterly into Idodi in 1952.[13] The *Ilparakuyo* Maasai live in the semi-arid rangelands of coastal, central and south-western Tanzania. Although culturally and linguistically similar to the Maasai, the *Ilparakuyo* represent the remnants of 'marginal' Maa speaking groups who were pushed out of the Rift Valley in northern Tanzania during the Iloikop Wars of the late nineteenth century. Unlike those groups who consider themselves 'pure Maasai' the *Ilparakuyo* have become increasingly fragmented, occupying no central homeland, and they have continuously moved from place to place in search of pasture. As a result, unlike the Maasai of northern Tanzania, the *Ilparakuyo* are almost always minorities on the margins of agricultural communities. The *Ilparakuyo* have largely followed a semi-transhumant lifestyle in the hundred or more years that they have been in the Ruaha area.

The extension of the Rungwa Game Reserve in 1951, and the eviction of the farming peoples living along the northern bank of the Great Ruaha River in 1954–1955, was the beginning of government-mediated changes in how the landscape was to be occupied and used by the *Ilparakuyo* and their farming neighbours in Idodi. There are no recollections of attempts to create the communal *Ujamaa* pastoralist villages that were established, for example in northern Maasailand, although pastoralist evictions from the south-eastern periphery of the RNP occurred in the late 1960s (Jennings, 1994, p. 23), and indeed continue to occur sporadically to the present day (Mtahiko, personal communication).

However, the *Ilparakuyo* who had chosen – some of them 20 years previously – to site their enclosures near the now rapidly expanding *Ujamaa* villages were to face tenure challenges to the rangelands they were using. The trickle of immigrant farmers erupted into a flood of hundreds of evicted and landless farmers requiring land as part of the villagization process in the mid-1970s. The *Ilparakuyo* recount

[12]The *Ilparakuyo* form one of the 22 associated sections of the wider Maa-speaking peoples of eastern Nilotic origin (Sommer and Vossen, 1993, p. 30).

[13]Although the *Ilparakuyo* were present in what is now southern Dodoma District by the end of the nineteenth century, they only moved more permanently into Pawaga and what is now the periphery of north-eastern Iringa District in the early part of the twentieth century (Redmayne, 1964, p. 392). The first official reports of *Ilparakuyo* pastoralists migrating into the Pawaga area occurred in 1928 and 1934. By 1953, *Ilparakuyo* pastoralists had reached Idodi (Lemu Lebere, personal commnication) and the Usangu (Charnley, 1997). It is likely that the *Ilparakuyo* initially may only have been seasonal transhumant residents in north-eastern Iringa District, but by the late 1930s they had become more permanently established in the area. Redmayne (1964, p. 396) remarks that the *Ilparakuyo* were allowed to utilize the rangelands by the resident Hehe on the condition of refraining from stock raiding, and paying tribute to the Vanzagila (Sub-Chief) of Pawaga (Redmayne, 1964, p. 360).

that they had to make way for the new farmers and move to more marginal areas, as land was allocated by the villages to these new farmers. Thus, areas of rangeland previously used by the *Ilparakuyo* for grazing their stock were converted to farmland, a trend that has since continued as the farming population grows.

The displacement of farmers from the outlying rangelands of Idodi left those *Ilparakuyo* still living in these areas without trading opportunities and services provided by the now-defunct farming communities. Faced with growing socio-economic remoteness and reported increases in the disease threat to their livestock as wildlife re-colonized the deserted farmlands, some of the *Ilparakuyo* began to gravitate to the periphery of the recently expanded *Ujamaa* farmlands. The villages were less remote and provided trading opportunities, closer livestock markets, easier access to grain and basic medical services.

The final factor resulting in the *Ilparakuyo* migrating to the periphery of the settled farming communities was the creation of the LMGCA in 1984,[14] and the associated subsequent evictions in the late 1980s and early 1990s of the *Ilparakuyo* in the Lunda section.[15] In the south-west of Idodi, local Wildlife Department officials were persuaded by wealthy resident hunting interests to evict pastoralists from the area extra-legally in the interests of securing their wildlife hunting prospects. Pastoralists have remained somewhat tenuously in the northern section of the LMGCA, and more recently they are being accompanied by farming communities moving back to revive their old pre-*Ujamaa* settlements. Yet in 2002, there was a further round of evictions (M. Walsh, personal communication) as national authorities sought to minimize the risk of pastoralist incursions into RNP.

There is strong cause to conclude that the depopulation of the larger part of the Idodi rangelands and the more recent eviction of pastoralists from parts of the LMGCA have led to substantial changes in the livelihoods and land-use practices of the *Ilparakuyo*. They have undergone a relatively rapid and, for many, an irreversible transition from pastoralism to agro-pastoralism. Once leading a more transhumant lifestyle, the *Ilparakuyo* now maintain a predominantly sedentary way of life in a tightly bounded landscape. Today, *Ilparakuyo* households live on the farmland margins, and they are prevented from grazing in much of the LMGCA, which has been reserved for exclusive wildlife use. Instead, they are dependent on crop-residue grazing from farmers' fields for their livestock during the dry season. Crop-residue grazing is a constant source of tension and frequent disputes between herders and farmers. Their plight has been further compounded by the continued in-migration of other pastoralist and

[14] Prior to the creation of the Lunda–Mkwambi Game Controlled Area (LMGCA), there had been an 'Iringa Controlled Area' (ICA) probably created in 1951 or 1952, under the Fauna Conservation Ordinance of 1951. It is thought that the ICA became defunct after a number of years. Certainly there is no mention of the ICA during the gazettement process for the Ruaha National Park in 1964 (M. Walsh, personal communication). The LMGCA was created by Government Notice No. 33 published on 1st February 1985 under the 'Wildlife Conservation (Game Controlled Area) (Declaration) (Lunda–kwambi) Order, 1984'.

[15] Pastoralist and farmer evictions in the Pawaga Lunda North section of the LMGCA have continued to occur over the years. More recently, the authorities have targeted Barabaig herders who take advantage of seasonal grazing in the Ruaha National Park.

agro-pastoralist groups, such as the Barabaig and Sukuma, with much increased competition for the remaining areas of rangeland that are not proscribed or unsuitable for grazing.

8.3.1.2 The Development of CWM in the Ruaha

The Ruaha Ecosystem represents a transition zone between the *Brachystegia* (Miombo) woodlands and *Acacia-Commiphora* vegetation zones of southern and northern Tanzania, respectively, and is home to a diverse array of large fauna, such as eland, kudu, roan and sable antelopes, as well as Tanzania's second-largest population of elephant. CWM in the Ruaha formally began in 1993 as a component of the Ruaha Ecosystem Wildlife Management Project (REWMP). REWMP was funded by the British Overseas Development Administration,[16] and was developed to address the major decline over the previous decade in the area's elephant population.[17]

The community component of the project ultimately came to focus on a number of key wildlife management issues in the LMGCA along the National Park's southern buffer zone. The LMGCA is for management purposes divided into two zones: the northern part is a tourist hunting block (Lunda–Mkwambi North), and the southern part (Lunda–Mkwambi South), is reserved for 'resident' (Tanzanian national and resident expatriate) hunting.[18]

Wider developments in the Tanzanian wildlife sector helped support REWMP through a difficult and slow start-up. In early 1994, it was decided that REWMP should try to pilot important components of the new wildlife policy under development that supported increased community participation in wildlife management. These policy changes also provided the opportunity needed for the community component of REWMP to achieve the notice and subsequent support – both in terms of staffing and backing – of the WD, whose then deputy director had pioneered community wildlife use in the Serengeti ecosystem in the late 1980s.[19]

REWMP was one of a number of projects in Tanzania that piloted the concept of WMAs. During 1996 and 1997, the project succeeded in launching and implementing CWM in the LMGCA, after overcoming overt resistance by urban-based and commercial farmer 'resident' hunting interests to the allocation of hunting quotas directly to the villages. REWMP created an important and significant precedent for the villages – that they could legally gain access to and use the wildlife on their land. Based on this initial success, the community component of REWMP

[16] ODA is now the Department for International Development.

[17] REWMP was designed from a traditional protected area conservation perspective to work with Tanzania National Parks (TANAPA) to support park planning and to strengthen anti-poaching.

[18] Resident hunting licences are sold according to a pricing schedule that greatly subsidizes citizens' and residents' access to wildlife. A buffalo costs between $600 and $900 on a tourist hunting licencse, while a citizen can purchase a resident hunting licensce for a buffalo for only 10,000 Tshs., or less than $9 at current exchange rates.

[19] As part of the Serengeti Regional Conservation Strategy which began in 1986.

was then developed into a second-phase DfID-funded 'Matumizi Bora ya Malihai ya Idodi na Pawaga' (MBOMIPA) project. [20] The auctioning to resident hunters of a wildlife quota, allocated by the Director of Wildlife to the local communities, began in 1997 and led to a growing income stream for villages (Fig. 8.2). The auction process also proved to be a turning point in the project's previously acrimonious and tense relations with resident hunters. Under MBOMIPA, the management capability of the member villages was gradually strengthened and village natural resource committees (VNRCs) reformed, leading to their improved governance. Village-based wildlife management was initiated through joint patrols between village game scouts and district wildlife staff, leading to the development of a community-based wildlife monitoring system.

By late 1990s, MBOMIPA was increasingly seen as a successful example of CWM (e.g. Alcorn et al., 2002), particularly as hunting revenues to the villages increased throughout the project's first 5 years, and as more villages asked to be included. Simultaneously, the project played an increasingly prominent role in the

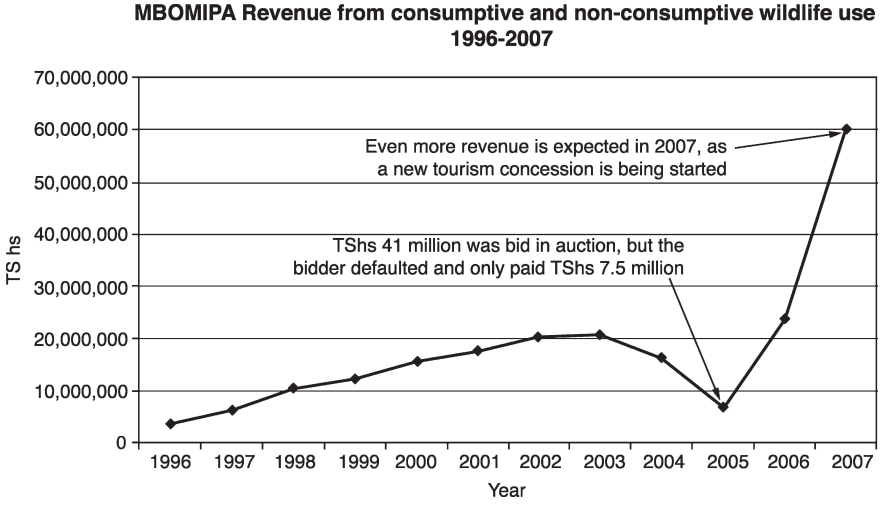

Fig. 8.2 Mbomipa revenue from consumptive and non-consumptive wildlife use, 1996–2007

[20]The concept and impetus for the new CWM project, MBOMIPA arose in part from the District Steering Committee made up of District, ward and other stakeholder representatives – including resident hunters. Established in 1996, and although falteringly at first, the committee's members increasingly came to recognize a commonality of interests and a joint vision for the future management of wildlife of Lunda-Mkwambi south. Notably, the committee played a central role in negotiating the auction system with resident hunters in 1997 and then played a key role in helping resist continued pressure for cheap hunting by some resident hunters, with the strong backing of the WD (Walsh, 2000).

development of the new national WMA guidelines and regulations and the operationalization of the new wildlife policy.

However, from the end of the 1990s, it became increasingly clear that MBOMIPA was handicapped by the lack of policy implementation required for the formation of WMAs. Regulations providing for the legal creation of WMAs were not released until December 2002, and their provisions contained a complex and time-consuming set of requirements for villages to qualify for WMA gazettement (see also Nelson, 2007). By the end of a 3-year trial period running from 2003 to 2006, MBOMIPA had yet to attain the status of a formally gazetted WMA.[21]

In the interim, the MBOMIPA project became a victim of a sharp swing in the United Kingdom's aid policy during the late 1990s towards a renewed focus on poverty reduction and a much greater emphasis on programmatic and budgetary support, and a commensurate shift away from traditional project-mediated forms of aid. Thus, although a short no-cost extension was granted in 2001, the MBOMIPA project was not renewed for a second phase. It was only shortly before MBOMIPA project's closure that a registered CBO (called MBOMIPA Association) for the envisaged WMA was finally launched in 2001. Unfortunately, this left an insufficient amount of time for the project to provide adequate support to foster the growth and development of the MBOMIPA Association. At the closure of the project, while the MBOMIPA Association was left in place to proceed with the extended process of developing a WMA submission to the Wildlife Division, it was effectively left without sufficient support to do so.

After the cessation of DfID support to MBOMIPA in 2003, a project manager from the WD remained in post. However, apart from facilitating the annual wildlife quota auction, development of the WMA submission and institutional strengthening of the MBOMIPA Association was initially slow and weak. The slow progress can be ostensibly ascribed to a lack of financial resources as well as human capacity both in the MBOMIPA Association and in the district-based project management team.

It was only when the Wildlife Conservation Society (WCS), as part of its wider Ruaha–Rungwa Landscape Conservation Programme,[22] began to support the development of the Pawaga Idodi Wildlife Management Area and the MBOMIPA Association that more substantive movement towards securing user rights and higher levels of revenue for the villages was achieved.

For several years, the Association's revenue from auctioning the wildlife quota to resident hunters barely covered the basic costs of running the Association, maintaining village-based wildlife patrols, in addition to returning some revenue (set at 40%)

[21] Most of the other early CWM pilot areas had also failed to achieve WMA status despite over 10 years' investment in the process; the consensus in Tanzania by 2006 was that the political will required to devolve management responsibilities to local communities simply did not exist (see Baldus et al., 2004; Baldus, 2006).

[22] The World Wildlife Fund (WWF) in Tanzania provided a relatively substantial grant through WCS for the MBOMIPA Association to support its institutional development. WWF is currently undertaking a larger project in the area that is trying to address the complex and difficult issues relating to the sustainable management of the Greater Ruaha river basin.

back to the 19 constituent villages. Thus, until very recently investor-related revenue has been very low. In part, this is because the former MBOMIPA project and its partners were wary of rushing into agreements that may not have served the best interests of MBOMIPA's main stakeholders – the villages. In 2007, and after a false start in 2005, MBOMIPA began to receive much more substantial revenues from tourism-related developments. The long period of relatively low revenues was exacerbated by the lack of the finalization of the WMA regulations and guidelines. The reliance of MBOMIPA on donor support, and the failure of state wildlife authorities to continue to sufficiently support MBOMIPA when the UK Government support was withdrawn, brings into question the sustainability of CWM in this locale. It also begs a wider question as to the sustainability of the national WMA initiative, which relies heavily on foreign donors and NGOs to facilitate the development of the WMAs. This indicates that there is grossly inadequate institutional capacity in the WD to facilitate and sufficiently support the development of WMAs in an equitable and sufficiently participatory manner, or insufficient commitment to the WMA process in the WD, or both.

MBOMIPA was regarded at best with ambivalence by the *Ilparakuyo* pastoralists who associated the project, key project staff, and project clients (the resident hunters) with the loss of their access to key dry season grazing in the Lunda section of the LMGCA. During the late 1990s and early years of the following decade, pastoralists in Idodi felt even more threatened as the land-use planning processes sponsored by or associated with MBOMIPA continued to shift them to marginal areas.[23] Certainly, their participation and voice on the natural resource committees (VNRCs) was negligible. To be fair to the VNRCs, the *Ilparakuyo* were a minority, but the decisions made by the VNRCs heavily impacted pastoralist access to village rangelands and their occupancy of the landscape. In the Idodi villages, VNRCs generally considered the *Ilparakuyo* and Barabaig pastoralists a nuisance and a threat to the interests of the WMA under development. Moreover, as tension and conflict over dry-season crop-residue grazing increased, the political elite among the farming community, encouraged by district staff, viewed these conflicts as further justification for the need to marginalize and dissuade pastoralist mobility in their villages.

Although popular with village governments in that MBOMIPA continued to return modest revenues (US$400 per village in 2003), the villagers have had mixed

[23] In recent years, a more accommodating stance has been adopted in that grazing boundaries have been agreed between pastoralists and village natural resource committees in the Lunda section, facilitated by the World Wildlife Fund and the Ruaha–-Rungwa Landscape Conservation Programme of the Wildlife Conservation Society of New York. With continued relatively high levels of seasonal herder immigration, the rangelands are coming under increasing pressure, and understandably villages are keen to ensure that parts of the rangeland remain less affected by heavy grazing. But the high level of pressure on the Idodi and Pawaga rangelands is symptomatic of local failures in natural resource governance, coupled with rising local human populations relying on an ever-more limited resource-base. The situation is compounded by inappropriate country-wide policies and attitudes to pastoralism and agro-pastoralism.

feelings about MBOMIPA, perhaps more due to unfulfilled financial expectations and an anecdotal increase in human-wildlife conflict.[24] For many years, revenues remained low as the value of hunting in the LMGCAs is limited by the relatively low value of the resident hunting auctions relative to the revenue derived in tourist hunting blocks, and the large number of villages (19) that have become part of the MBOMIPA Association. While the MBOMIPA project resulted in the development of limited wildlife benefits and stable wildlife populations for the Idodi and Pawaga villages, the project did not resolve some of the costs of CWM and wildlife management, particularly for locally resident pastoralists. Fundamentally, the WMA was only given full status in 2007, some 4 years after the DfID funded project closed. This has meant that the MBOMIPA Association's overriding need to move beyond resident hunting auctions to a formal WMA where the communities can potentially capture a fuller range of economic values from wildlife, and possess more secure rights to manage the resource as called for by the wildlife policy, is only now just beginning to become a limited reality.

8.3.1.3 Conclusion: Compressed Landscapes, Marginalization and a Lost Future

The recent socio-ecological history of the Idodi and Pawaga rangelands told in this section reflects wider trends in Tanzania towards a future of increasingly compressed and crowded landscapes, continued pastoralist marginalization, and an uncertain future for many rangeland peoples. As the Tanzanian government continues to roll out its *de facto* policy of enlarging its protected area network by stealth, the area left for a growing human population is becoming increasingly compressed, crowded and contested. This means that the challenge of resolving complex environment and development issues has been compounded as landscapes are compressed and polarized between wilderness and humanity. And even as the state grudgingly allows rural Tanzanians some rights to manage and benefit from wildlife on the lands remaining to them, it seeks still to continue to control and extract most of the benefit.[25] Thus, while the state enlarges and increases its appropriation of communal lands and wildlife resources, it is rural Tanzanians, and particularly its marginalized people – such as pastoralists – who will suffer from diminishing and increasingly threatened livelihoods.

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[24] A result of operation *Uhai* (a large scale anti-poaching operation carried out in the late 1980s), most firearms in the villages were confiscated, resulting in an anecdotal increase in localized populations of 'vermin' such as baboon, vervet monkey and bush pig.

[25] In September 2007, the Minister of Natural Resources and Tourism signed regulations that now totally control all investor partnerships with communities, and appropriate what may be up to 75% per cent of all revenues from these agreements.

8.3.2 The Ilparakuyo in Morogoro District

This section describes the experiences of *Ilparakuyo* pastoralists in Southern Morogoro District, on the northern boundary of the SGR. The villages in which these pastoralists reside have been targeted as part of the SCP,[26] which has required villages to set aside land for conservation purposes in a WMA. As a marginal minority, and as people who previously occupied the areas set aside for conservation, *Ilparakuyo* herders have disproportionately borne the costs of CWM here, while realizing few of its benefits.

The *Ilparakuyo* in this case study trace their origins to Handeni in the 1950s, and before that to the Mkomazi Game Reserve in north-eastern Tanzania. They gradually moved south and eastwards, until they finally wandered into Zambia in the early 1970s and were returned to Tanzania by the Zambian Military. As pastures became scarcer in the south, they sent scouts back northwards by the Tanzania–Zambia railway to look for places with available pasture. They had a great deal of difficulty, as many communities did not want pastoralists living in their midst. According to local informants, their fathers found an area called Gonabis[27] just next to the SGR, where they settled in 1976. They were shown the area by a local farmer, whose favour they bought with several head of livestock.

The elders who moved to Gonabis described it as an excellent place for livestock. There was plenty of pasture and plenty of water from the Mgeta River. There was also a nearby railway station, since closed, where they could take their livestock – and thence by rail to Morogoro and Dar es Salaam, where they sold them in the markets. They remember this period as one of significant prosperity. They recount that the only major problem they had was with tsetse fly and sleeping sickness in their livestock.

During this period, the herders at Gonabis made important infrastructural investments. They hired a grader to make a road connecting their homesteads with the main road to Morogoro. They also sold livestock to raise money for a cattle dip, a house for the district livestock officer when he visited Gonabis, and a church. During this time, Gonabis was also targeted by a government programme called, ‘Development of Pastoral Villages in Conflict’. However, people recall they never received any of the money that this programme was meant to provide as matching funds for their efforts, and they were still engaged in trying to secure this money.

In 1987 and subsequent years, the Mgeta River flooded. The herders at Gonabis endeavoured to stay in the area, but eventually were forced to move by

[26]This project is one of the longest-running WMA pilot initiatives in Tanzania, and was started by the Selous Conservation Programme in the early 1990’s. For background on this programme and its impacts in Morogoro District, see Baldus et al., (1994); Baldus and Siege (2001); and Ashley et al., (2002).

[27]This area is administratively the Gonabis Game Controlled Area.

human and livestock disease. They were losing significant numbers of livestock to foot and mouth disease, exacerbated by the standing water after the floods subsided – while increasing numbers of people were dying of malaria. Finally, they agreed to be resettled.

People describe the resettlements as less than satisfactory as there were no large areas of pasture to which they could all move. They were forced to divide themselves into several smaller groups, each of which settled in one of the villages bordering the SGR. The problems with this arrangement were twofold. Firstly, there was not adequate pasture in any of the villages to satisfy the needs of their livestock; and secondly, the division of the *Ilparakuyo* of Gonabis meant that they became a political and cultural minority in all of the villages in which they resettled.

During this same period, the Tanzanian Government and the German Development Agency (GTZ) introduced the SCP, a CWM programme targeting the same villages to which the *Ilparakuyo* had been resettled. This program facilitated the creation of the JUKUMU Society and the formation of a pilot WMA, the heart of which was Gonabis. Like their counterparts in the Ruaha system, the *Ilparakuyo* in these villages adjacent to the Selous were disproportionately marginalized by the programme. The area set aside for the WMA formerly belonged to pastoralists, while the benefits from the WMA and managed by JUKUMU (such as they were) accrued almost exclusively to members of Swahili-speaking agricultural groups, who represented the majority population in these villages.

One of the first steps that the WD took towards establishing the Gonabis WMA was to build a series of dams and levies along the Mgeta River, which brought the flooding of Gonabis under control. Informants were not certain of the exact year, but this occurred sometime in the late 1990s. Once the flooding was brought under control, the *Ilparakuyo* tried to return to Gonabis. Upon entering the area, they were confronted by Selous game rangers, who told them that they would need permits from the Dutumi village government if they wanted to herd in Gonabis. The area had since been incorporated into Dutumi, when it was officially registered. Upon arriving at the village offices, they were told that no such permits existed. When they returned to Gonabis, they found that the rangers had called in reinforcements to keep them out. Since then, they have not returned to Gonabis, although they still hope to do so.

While village land use plans, prerequisite for the establishment of a WMA, set aside pastureland in each village, this land-use designation has been poorly enforced. Each pastoral area was designated as a sub-village. The chair of each sub-village represented his constituents as members of the village council. Unfortunately, the *Ilparakuyo* had been divided up in such a way that they did not constitute a majority even in pastoral sub-villages, let alone having influence in village governments. Only in two villages were they able – by bribing key voters – to elect *Ilparakuyo* sub-village chairs. However, these two leaders repeatedly complained about their inability to advocate effectively for *Ilparakuyo* interests in village government.

This meant, they claimed, that they were kept in the dark about the amount of money that their respective village governments received from JUKUMU each year, let alone being consulted on how the money should be used.[28] Furthermore, they pointed out that one of the primary benefits of JUKUMU was the sale of subsidized meat in member villages. *Ilparakuyo*, they pointed out, do not eat game meat. They are unable, therefore, to take advantage of this specific benefit. Even worse, they further pointed out, the availability of subsidized game meat in the area drove down the demand for beef in the area, forcing them to trek more of their livestock to distant markets in order to receive a fair price. Finally, the few jobs created by JUKUMU never went to *Ilparakuyo*.

More fundamentally, the WMA process has contributed to the insecurity of land tenure for *Ilparakuyo* pastoralists in these villages. Groups in two villages have been told not to build permanent homesteads, as it is likely that they will soon be resettled again. Land upon which they have been settled will soon be claimed by outside investors, who have reportedly already entered into agreements with the village governments in question. They have been told that the government has set aside an area for their resettlement, but have yet to be shown the place. They themselves have sent out scouts looking for new places to settle, and have even considered moving as far away as Mtwara. However, reports from *Ilparakuyo* already living in this area indicate that conditions there are actually worse than those where they are already living.

Meanwhile, their politically marginal position has made it difficult to defend even the meager pasture resources that they have been allotted within the villages where they have been resettled. Agricultural incursion into the pastoral sub-villages is common, and in at least two cases we found that people had farmed almost right up to the door of *Ilparakuyo* homesteads, making it nearly impossible for livestock to leave their kraals without entering into people's farms. When they enter people's farms, they are required to pay a fine of ~$50 to the village government; money that they claim is then misappropriated by village officials. Furthermore, it is nearly impossible to keep their livestock out of people's farms on their way to the river to drink. This amounts, they claim, to an unduly burdensome tax on livestock keepers.

The saving grace for the *Ilparakuyo* is their relative wealth in livestock, which in some ways offsets their political marginality. They have already pooled their livestock wealth in an effort to buy electoral success. As noted above, however, this

[28]The amount of revenue generated by JUKUMU has been limited (see Ashley et al., 2002) and barely suffices to cover the operational costs of the association. The core problem in this area, as with MBOMIPA, has been that formal gazettement of a WMA that would allow the community to develop income streams from lucrative tourist hunting activities has not been possible. JUKUMU submitted a formal WMA application several times to the Wildlife Division during the pilot phase of 2003–2006, but was rejected due to technicalities each time (see Baldus et al., 2004). By 2006, the lead donor to the entire Selous Conservation Programme, GTZ, had ended its long-running support to CWM in Tanzania due to an increasingly contentious relationship with the Wildlife Division over WMA implementation, leaving the prospects of JUKUMU and other pilot CWM initiatives around the Selous highly uncertain.

strategy has met with limited success. Their livestock wealth has also allowed them to pay fines and bribes when their livestock enter into farms. However, this has become increasingly difficult to do as pasture has become increasingly limited and farms increasingly dense – in part because farmers have been displaced by the northern boundary of the WMA, further exacerbating the existing local conflicts over land use. Over time, they fear that this arrangement is not sustainable, and that the fines will eventually bankrupt them.

Finding a way out of this difficult situation will require new and innovative livelihood strategies. In one focus group discussion that we undertook, *Ilparakuyo* youth and elders discussed what such strategies might look like. In so doing, they drew from their knowledge of initiatives by other *Ilparakuyo* and Maasai groups. One possibility they discussed was the liquidation of livestock resources, with the proceeds being invested in real estate. They cited two groups of *Ilparakuyo* living on the road from Morogoro to Dar es Salaam, who had used this strategy to establish villages that were exclusively for pastoral use. They had achieved this objective by gradually buying up farms and converting them to pasture. They had also invested in guesthouses and restaurants along the road, which were proving to be a lucrative business venture. Another strategy these groups mentioned would be to establish their own non-governmental organization (NGO), something that *Ilparakuyo* living near Mbeya had undertaken with a fair amount of success. This strategy, they reasoned, might provide an alternative to local government in their pursuit of political power. In addition to attracting powerful outside allies to their struggle, it might also bring monetary resources that they could convert to political capital at the local level. Moreover, an NGO might provide some of the development opportunities that village governments had failed to provide them as marginal minorities.

These discussions were especially interesting, in that they revealed that these *Ilparakuyo* were actively thinking about new livelihood strategies that would allow them to capitalize on the resources that they currently had at their disposal. Unlike Maasai in northern Tanzania, who are numerous enough to avail themselves of opportunities presented by wildlife ventures in their communities, these small *Ilparakuyo* groups are unlikely to benefit from enterprises and development initiatives managed by village governments. Recognizing this dilemma, their strategies focus on market opportunities and the NGO sector. The crucial question at this juncture is whether they can convert their livestock capital into new types of economic and political power before incursions by WMAs and farmers onto remaining pasture preclude these opportunities.

8.3.3 Village-based CWM as an Alternative to WMAs in Loliondo

This section describes the experiences of Maasai pastoralists living in Loliondo Division of Ngorongoro District. Loliondo Division is geographically bounded by the Serengeti National Park (SNP) to the west, the Ngorongoro Conservation Area (NCA) to the

south, Kenya to the north and the rift valley to the east. The Loliondo area is rich in wildlife year-round, and is an important dispersal area for the annual Mara–Serengeti wildebeest migration. This case describes the experiences of six villages in Loliondo which lie along the eastern perimeter of the SNP. What sets this case apart from the previous case studies in this chapter is that the predominantly Maasai villages have reaped significant financial benefits from wildlife conservation and tourism on their lands, but also used their brand of CWM to defend village land rights. In contrast to the villages in the Ruaha or Gonabis, the Loliondo communities have rejected the government's WMA framework. Struggles over land rights, tourism income and wildlife management are ongoing and as the experience of Sinya village illustrates (see Chap. 6, this volume), the ultimate outcomes and effects of the Loliondo communities' efforts are as yet unclear. However, the case illustrates the ways in which local histories of state-society relations and local political organization and activism can shape the meanings and practices of contemporary community wildlife management.

The role of Maasai leaders was a fundamental driving force behind the wildlife reforms of the 1990s described above, thrusting the troubled relationship between Maasai and conservation into the national and international spotlight. While many observers saw the shift towards CWM as inevitable or resulting from overwhelming international support for decentralization and devolution, the very idea that Maasai are entitled to greater control over local resources, such as wildlife, would not be possible without the activism of local Maasai representatives and leaders. The case of NCA has historically been and continues to be a flashpoint for debates concerning Maasai livelihoods and wildlife conservation (Homewood and Rodgers, 1991; Arhem, 1985; Parkipuny, 1979). Many Maasai believe that their rights have continuously been subordinated to wildlife, directly contradicting the promises by the colonial and post-colonial governments that Maasai livelihoods would take precedence over conservation in the NCA (Shivji and Kapinga, 1998). Loliondo leaders, such as Lazaro Parkipuny, who served as the first Member of Parliament for the Ngorongoro District from 1980–1990, were vocal advocates for Maasai rights, openly critical of the role that conservation played in displacing Maasai and dispossessing them of their resources.

If Loliondo leaders played a central role in pushing the state, however reluctantly, towards CWM reforms, it is ironic that Loliondo Maasai are the only residents to reject the government's proposal to devolve legal rights over wildlife to local communities. Since 1998, even before the official release of the WMA regulations in 2002, the villages in Loliondo have steadfastly rejected the state's proposed framework for CWM. Greater local control over wildlife use and management is a goal of the villages, but to Loliondo's communities the proposed WMA represents more threat than opportunity for increased local authority over land and natural resources. While conservation in Tanzania involves multiple interests, including foreign and local elites, investors, nationalists, indigenous rights groups, etc., the struggle for control over wildlife has been primarily framed as one between central authorities and local communities. For several reasons that we will now explain, the villages in Loliondo favour an alternative CWM framework based on joint ventures between individual villages and private ecotourism operators.

8.3.3.1 Joint Ventures: Tourism Revenue and Conservation

CWM in Loliondo originated in the early 1990s, when ecotourism operators were looking for areas outside of national parks for camping and walking safaris. Because of Tanzania's history of dividing wildlife management between national parks and hunting areas, there was no regulatory framework for ecotourism outside of parks. In 1991, one private ecotourism company entered into agreements with three adjacent villages in Loliondo Division – Oloipiri, Losoito/Maloni and Olorien/Magaiduru – establishing one of the first CWM initiatives in Tanzania. The agreements enabled the company to use village land for walking and camping safaris. The contracts, which were good for a period of 5 years, granted exclusive access to the communities' lands in exchange for revenue paid directly to the village government. The initial contracts brought in an average of between US$3,000 and US$5,000 per village for the first 5 years. The contracts specified that village residents would limit certain land uses, such as large-scale agriculture and permanent settlement in important wildlife dispersal areas, but guaranteed access to the areas for seasonal livestock grazing according to customary land use patterns. The contractual agreements between operators and villages provided for annual rents, bednight fees and opt-out clauses that would enable either party to pull out (see Dorobo Tours and Oliver's Camps Ltd., 1996). The tourism operators were only to use the land for camping and walking and could not build any permanent structures. Refraining from permanent infrastructure, such as a central lodge or the development of water sources, minimized the risk to both parties. While Loliondo Maasai were wary of losing valuable resources to foreign investors, the ecotourism operators presented themselves in a different light, as partners, acknowledging local rights to resources and distinguishing themselves from the typical investor who courted the central government to gain access to local resources.

The company directors approached the villages for a variety of reasons. On the one hand, they had a conservation agenda and believed that providing revenue from conservation to communities would transform local values and practices. On the other hand, they had a business agenda. There was no sanctioned way for ecotourism companies to legally operate outside of national parks, as the village lands were also GCAs, where the government had the exclusive authority to grant wildlife use rights to hunting companies. The village contracts provided the companies some form of legal recognition. As the WD had recently embarked on CWM reforms through the PAWM project described earlier, they were willing to accept these projects as temporary experiments with the expectation that they would eventually become part of the new reforms. Although the tourism operators were able to convince the WD to sanction these ecotourism projects in GCAs, the viability of these ventures depended on strong local support. The operators hoped to establish long-term relations that would empower villages and hopefully cultivate loyalty towards the company. As there was no protocol for establishing village–private sector partnerships, other tour operators and villages closely followed these initial agreements. At around the same time, in 1991, Ololosokwan village, the northernmost village in Loliondo, negotiated a lease for the development of a cattle ranch that

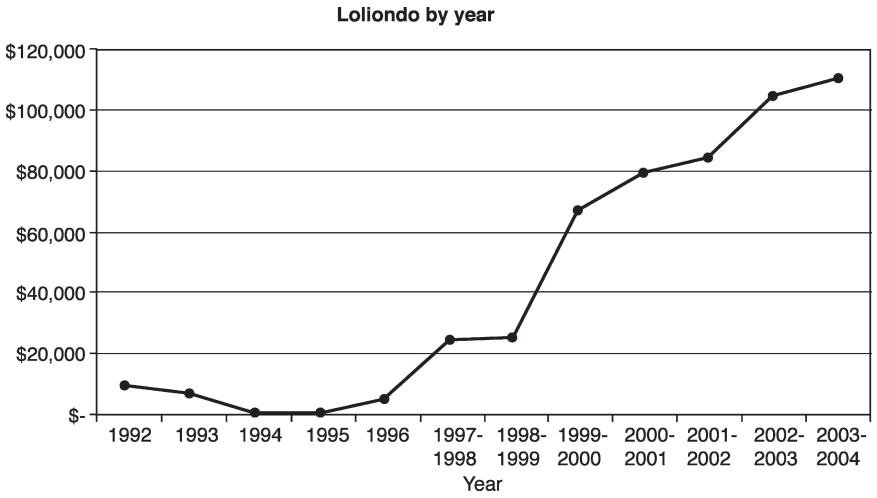

Fig. 8.3 Loliondo revenue from consumptive and non-consumptive wildlife use 1992–2004

became the source of a court battle and was eventually sold to Conservation Corporation Africa (CCA), a South African tour company. In 1999, the area was developed as the CCA Klein's Camp tourist lodge. The African Wildlife Foundation (AWF) helped broker the agreement between CCA and the village, offering their services to help both parties negotiate a fair contract. Ololosokwan earns significantly more revenue than the other villages in Loliondo as a result of this investment. Because of the permanent lodge, the CCA contract provides for a core area of 25,000 acres that are for the exclusive use by CCA for photographic tourism. AWF reasoned that given the significant capital investment, the contract should run for 15 years, as opposed to the 5-year contracts of the other villages. Since 1999, the village of Ololosokwan has earned between US$50,000 and US$60,000 annually. The other villages in Loliondo earned between US$5,000 and US$15,000 during that same period. These tourism ventures enabled the villages to capture revenues from wildlife that was unmatched in other parts of Tanzania (Fig. 8.3).

By the late 1990s, there were many more companies interested in pursuing ecotourism outside state protected areas, and Loliondo became one of the most desirable destinations. This was in large part due to its proximity to Serengeti, diverse wildlife and natural features including dramatic rock kopjes. Loliondo was also attractive to new ecotourism companies for its precedent of successful village contracts and joint ventures. The existing agreements provided a framework for other companies to enter into similar deals with villages. As of 2005, there were at least seven companies regularly operating in Loliondo and each of the six villages had designated specific areas for tourism and conservation on village land. While the revenue of individual villages varied dramatically, with Ololosokwan village earning several times that of neighboring villages, the direct village income represented a significant increase in village earnings from wildlife. Prior to the joint venture contracts, villages earned no direct income from wildlife.

The central government collected all revenues from hunting and then redistributed about 20% of this revenue to the District. A portion of these funds was supposed to be set aside for village development activities, although most villagers expressed their belief that this money never actually went toward village development. The next section explains how and why the joint ventures came to represent a form of land rights and not merely a source of revenue.

8.3.3.2 Hunting Interests, Land Reform, and Evidence of Property

The Loliondo Game Controlled Area covers the entire division including the village land of the six villages in Loliondo Division. Together with resident herding and farming, the area is used for tourist hunting. The WD governs the process of granting hunting block concessions among over 40 different hunting companies operating in Tanzania (see Baldus and Cauldwell, 2004). Besides the arrival of the ecotourism operators, 1991 marked a significant change in hunting activities in the area. Three companies had previously utilized Loliondo's two hunting blocks, paying the annual lease fee of $7,500, together with individual game licence fees. In 1991, a Brigadier of the United Arab Emirates submitted a letter requesting the use of the Loliondo hunting blocks. The government agreed, subject to a few conditions. Hunting blocks could only be leased to companies registered in the country and not to individuals. The Ortello Business Corporation (OBC) was created and the block granted in 1992. The OBC was accused of obtaining the block through high-level graft (e.g. Honey, 1999; Odhiambo, 2000; Anon., 2002; Thomlinson, 2002), and of being given considerable autonomy by their patrons in central government. The OBC was seen by many observers as being able to do whatever they wanted. In part to quell local opposition to the concession and as a response to the government's request that the OBC contribute to local development, the OBC agreed to provide two million Tanzanian shillings (~$2,000) to each of the six villages annually. They also promised significant employment and local development assistance, including road building, water projects and building local schools. The company's offer and presence was met with a mix of scepticism and expectation by the villages.

By 2000, relations between villages and the OBC had soured, and most Maasai saw the OBC as an impediment to development and threat to their land rights. While the joint ventures between ecotourism companies and villages were far from perfect, and presented their own dilemmas concerning equity and power, they were a stark contrast to the relations between the OBC and the villages. Increasingly, the villages defended the rights of the ecotourism companies to operate on village land, in the face of legal challenges from the government that the area could only be used as a centrally-licensed hunting concession (Nelson, 2004). In the case of Ololosokwan, village leaders had successfully negotiated this conflict between central and local jurisdictions, preventing the OBC from using the area that the village had leased to CCA. The OBC was legally entitled by the state to hunt wherever they pleased within the hunting block, but the village governments of Loliondo had

delimited their activities, so as not to threaten the ecotourism activities. The OBC pressed the WD to intervene (cf. Chap 6, this volume), but to date the WD has been unable or unwilling to confront the Loliondo village leaders directly. Also, the OBC itself has backed off from this aggressive tactic, fearing that national and international press attention is not in their best interests.

As these struggles for control over wildlife played out during the 1990s, the meaning of conservation and its influence on land rights was also changing shape. In 2001, the Land Act, 1999 and Village Land Act, 1999, came into force, nullifying all existing village boundaries and titles and calling for new processes of demarcating and registering village lands. The implications of the new law were unclear and caused great anxieties in rural communities throughout Tanzania. For pastoralists in particular, these land tenure reforms created conditions, all too familiar, enabling the alienation of pastoral lands on the grounds that the land is not being productively used or being improved. While the drafters of the law made special considerations for pastoral land use, it was unclear on what grounds pastoralists would have to demonstrate productive use and occupancy, and what would count as evidence. As the implementation of the land law converged with the increasing hostilities between the OBC and the villages over the ecotourism joint ventures, village leaders began to see their contracts as one form of evidence to defend property rights.

The Loliondo villages also engaged in a process of land-use planning and creating village by-laws.[29] These plans and by-laws were meant both to clarify the roles of investors and villagers in private–public partnerships, but also to illustrate how the villagers were using the land. While not necessarily a strategic attempt to produce evidence in the strict sense of the word, the joint ventures, village land-use plans and by-laws did provide visible forms of evidence of productive land use.

Initially based on a relationship of convenience, the ecotourism ventures became an important part of regional land rights advocacy. The joint ventures had received support not only from village governments, but also from youth leaders and activists working for local NGOs or as employees of the ecotourism companies. These youth had helped build a coalition in support of the joint ventures, arguing that they represented a more authentic form of decentralized natural resource management. They connected the joint ventures to the broader land struggles between villages and the state. This helped unite the villages in their struggle against the state for control over wildlife and territory. It also contributed to an environment where the tour operators were received as local partners rather than being associated with either international conservation organizations or well-connected investors. Where the interests of the ecotourism operators lie is not altogether clear, especially as the number of companies grows and each joint venture takes on its own unique character. But the political work of Loliondo activists has transformed the climate of private investment in the

[29]Tanzania's Local Government Act of 1982 allows village councils to formulate and pass their own by-laws, which are legally binding and enforceable in courts of law. These village by-laws have been widely used during the past ten 10 years to support local natural resource management in both forestry and wildlife sectors.

area. Whereas in many Maasai communities in Tanzania, investors are seen as a threat to land security, in Loliondo investors have positioned themselves as partners in a struggle between communities and the state.

8.3.3.3 WMAs: Whose Wildlife, Whose Land?

By 2000, although formal regulations and guidelines remained in draft stage, the WMA concept was beginning to have an impact on how residents understood and acted upon their rights. As in the cases described earlier, foreign donors and international conservation organizations played a central role in promoting, creating and implementing the WMA. One stipulation of the reform was that each pilot area would have a specific facilitating NGO that would provide training and technical assistance, as well as the bulk of funding to establish a WMA. The Frankfurt Zoological Society (FZS), an international conservation NGO with a long history of supporting conservation in SNP,[30] was identified as the official donor and facilitator of the pilot WMA in Loliondo. FZS began to lay the groundwork for a WMA in Loliondo by the late 1990s. They organized field trips for village leaders and advocated for the early placement of beacons for demarcation of the WMA. They even drafted letters on behalf of the communities requesting they become part of an official WMA.

This approach backfired. FZS is locally regarded as the main organization responsible for the evictions of Maasai from SNP in 1959, and their ongoing funding of anti-poaching patrols. Many Maasai in Loliondo see national park game scouts as prejudicial to local rights and livelihoods, particularly as a result of long-running conflicts between villages and the park over boundaries and grazing rights. Promises of increased local benefits from WMA formation were met with scepticism. Eventually, the communities requested that they wait until the official regulations were released and could see for themselves the legal implications of accepting the WMA. FZS's impatience with this request led to a more forceful approach fostering further antagonism with villagers. If state wildlife officials wanted to build a 'new relationship between the state and communities', as one WD officer put it at a meeting in Loliondo in 2003, choosing FZS to facilitate this rapprochement was in hindsight a poor choice. FZS's active role helped create the clear impression for many Loliondo residents that the WMAs were a continuation of historic centralized conservation practices in the country. The WMAs were seen as a continuation of various attempts to extend the boundaries of SNP in the 1960s and 1970s and create buffer zones in the 1980s and early 1990s.

By 2002, the six villages in Loliondo saw more direct benefits from photographic tourism than from hunting and were frustrated by the unfulfilled promises of the OBC. While the WMA policy supposedly offered avenues to increase local

[30]The founder of FZS, Bernhard Grizmek, wrote the internationally acclaimed book *Serengeti Shall Not Die*, in the late 1950s, and was a staunch proponent of protection of the Serengeti and eviction of resident peoples.

authority over hunting, residents did not trust the WD or FZS. On close scrutiny of the WMA regulations following their release, Loliondo leaders identified several weaknesses in this law and cited historical precedents, such as the alienation of SNP and NCA as times when the government had gone back on its promises. The WMA required creating a single management area under the authority of a CBO, where each village would have one representative alongside district and national government representatives. Having already increased the capacity of local village institutions through their by-laws, land use plans, and tourism agreements, they were in no mind to relinquish the increased status and authority of the village. When the WMA regulations were finally released in 2002, the government declared that creating and registering a WMA was the only legitimate avenue for communities to benefit from wildlife resources. At that time, all existing community tourism arrangements, including those in Loliondo, were officially declared illegal. Despite this, Loliondo leaders have continued to defend their joint ventures and take the associated risks. As we have stated, thus far the tactic has worked with both the WD and OBC reluctantly allowing the ecotourism companies to continue operating, and efforts to establish a WMA in Loliondo effectively having been abandoned since 2004 as a result of local opposition. However, it is unclear whether private sector partners will be willing or able to continue their support for the joint ventures under the weight of significantly increased government pressure.

8.3.3.4 Conservation and Maasai Livelihoods in Loliondo

The Loliondo experience demonstrates one way that Maasai communities have tried to use tourism to gain economically while hoping to turn conservation's historical legacy of threatening Maasai land tenure into a tactic to defend property. The village-based CWM model in Loliondo is an alternative that the authors of this chapter believe complies more closely with the spirit of the 1998 wildlife policy reforms to encourage public–private partnerships than the highly bureaucratic and top-down WMA. By using tourism revenues to fund the construction of local offices and schools, pay school fees for village students and operate the village lorry, the villagers assert that their model provides greater livelihood security than would the WMA.

Although the Loliondo villages have been able to generate high revenues from their tourism ventures, antagonism towards the government's policy for CWM has left them in a precarious position. Legal mechanisms including by-laws, village land use plans and the joint venture contracts themselves are still largely untested and the security of rights of village residents remains in question. While many leaders see their alliance with the tour operators as a way to enhance land security, it is possible that it could backfire. The Sinya case shows that the government could exert more pressure to enforce the ban on Loliondo's tourism joint ventures. To date, the political organization of the villages to defend the joint ventures and the rights of the ecotourism operators has been the difference that has enabled the Loliondo partnerships to persist.

8.4 Wildlife Conservation and Maasai Livelihoods

The historical relationship between Maasai livelihoods and the wildlife that they co-exist with in East African savannas has been characterized principally by the alienation of pastoralist grazing tracts and water sources by state wildlife conservation interests. While CWM suggests a radically different approach, endowing pastoralists with new rights and access to benefit from wildlife, in reality wildlife conservation in Tanzania continues to be a highly centralized affair often at odds with local livelihood interests. The new devolutionary and decentralist CWM narratives are not reflected in experiences at the local level.

Formal CWM initiatives around RNP and SGR, where *Ilparakuyo* communities are minorities within larger polyethnic agro-pastoralist settlements, have served to transfer local grazing areas to what amounts to exclusive wildlife preserves. Although these areas, according to the new WMA framework, are nominally to be managed according to local interests, the existing legal framework for managing WMAs retains a great deal of authority in the hands of the state. While the MBOMIPA and Gonabis/JUKUMU projects are considered two of Tanzania's more successful CWM initiatives, the scale of benefits to the communities thus far has been small, and after 10 years of development the communities have not yet been able to obtain wildlife utilization rights through a formal WMA. Even if the WMAs in Ruaha and Gonabis were placed under more devolved village authority, problems of elite capture and exclusion of pastoralists from decision-making processes would result in the same largely negative impacts on those sub-sections of the communities.

In Loliondo, the WMA framework has been rejected due to fears about loss of local authority and land rights linked to the way WMAs retain power in the hands of central authorities and the failure to fully adapt the framework to pastoralist land use systems. State-local tensions over land and wildlife dominate conservation and land use issues in Loliondo, as they long have throughout Tanzanian Maasailand. In Loliondo, villages and private tour companies have developed a well-established system of CWM which, using existing village institutions, achieves the twin goals of conserving land for wildlife and increasing local incomes. It is highly notable that Loliondo's village tourism joint ventures have generated new income streams to the villages much greater than those attained anywhere through the WMA process. But despite their apparent congruence with Tanzania's formal policy objectives, these local initiatives have not received sustained support from the state and have been pressured to give way to formal WMAs. This refusal on the part of state agents and conservation NGOs operating in these areas to adapt the wildlife policy's objectives to local land and resource use practices and objectives, and an insistence on replacing existing locally supported ventures with an untested WMA management framework, is among the most seemingly perverse dynamics in Tanzanian CWM today.

The explanation for this apparent paradox is that, in reality, CWM in Tanzania has been as much a way for state agents to extend their influence in rural landscapes as it is a way to devolve power to local communities. The tensions over CWM reflect broader macroeconomic and political trends, and the governance patterns of

the modern Tanzanian state. The post-structural adjustment era has brought a tremendous set of political economic changes, including a flood of foreign private investment and a shift to multi-party politics. State elites closely connected with ruling party interests have become more engaged in capitalist enterprises exploiting the country's resource wealth, and the importance of this wealth, and the instruments of the state which control it, have become a more prominent part of neopatrimonial governing norms in this environment (Kelsall, 2002). As a part of this trend, the misappropriation of public resources and rent-seeking have become widespread since the late 1980s as corruption becomes increasingly institutionalized (Kelsall, 2002; URT, 2005).

For pastoralists, this has meant sustained pressure for local land- and resource-use practices to be integrated with, or replaced by, more formal commercial and externally controlled investments and enterprises. This is the current Tanzanian policy objective in the livestock sector and a driving factor behind contemporary land tenure reforms that seek to support private ownership and financing arrangements (Mattee and Shem, 2006). With tourism one of the largest sources of commercial investment in Tanzania, and Maasailand home to a disproportionate amount of the key wildlife areas prized by this industry, there is constant pressure for resource expropriation for centrally controlled investments. The resistance to the alternate model of CWM in Loliondo by government agencies and international conservation organizations indicates that CWM enterprises are only acceptable if they are subject to a relatively high degree of central control. The maintenance of hunting concessions on village lands by wildlife authorities and their preference for WMA's over local tourism ventures demonstrates how the state's vision of what constitutes productive economic activities and investments is paramount over a more objective consideration of local livelihood interests.

For more sedentary agricultural communities that do not rely on extensive pastoral production systems, the WMA framework and land use zoning processes may be more acceptable and the pressures to alienate lands for tourism and conservation less a threat. For Maasai communities, with their continued spatial intermingling with wildlife and maintenance of large dry season grazing reserves, often perceived by state agents as unused land ideal for commercial investments, the pressure on livelihood interests is more substantial. However, the Loliondo case demonstrates that, although the richness of these lands is the incentive for external interests to appropriate them, controlling access to these natural resources can translate into political capital for defending local claims and interests. Indeed, it is principally in Loliondo, where communities have developed their own systems for benefiting from wildlife, that communities have challenged the WMA framework and the state's existing monopoly over wildlife management.

Major questions arise regarding the future course of these negotiations over wildlife management, land rights and pastoralist livelihoods. The communities that have made the most progress capturing benefits from wildlife have also been the ones subjected to the most pressure from state wildlife authorities. Some, like Sinya (Chap. 6, this volume), have lost this struggle and been thoroughly marginalized from influencing future initiatives as a result. In Loliondo, it is possible that the

villages will continue to strengthen their claims as a result of their high level of organization and the resources for political advocacy that they are able to mobilize, but it is also conceivable that state interests will overwhelm their ability to maintain their desired systems of land and wildlife use. Agricultural communities, such as those in the MBOMIPA project, who have, at least through their village leadership, embraced the WMA framework, may be in a better position to negotiate over CWM with the state because they have collaborated with external state and donor objectives. Ultimately, CWM will only be able to emerge in Tanzania in a way that supports local interests when there are greater institutional incentives for devolution of power. Such incentives are largely dependent on a substantial increase in the effectiveness of grassroots pressure for reform and greater incentives on the part of central authorities to respond to local interests; such popular influence is likely to emerge in Tanzania slowly but in an unpredictable and non-linear way.

8.5 Conclusion

Wildlife conservation policies in Tanzania have tended to benefit local, national and international elites at the expense of the more egalitarian vision that CWM lays out. Wildlife conservation in Tanzania has had a major influence on existing Maasai land use patterns and livelihoods during the past century, and this continues today. The historical legacy of centralized wildlife control and alienation particularly affects agro-pastoralists and pastoralists, since they have a close relationship with natural resources and continue to occupy the bio-physical spaces over which the state and its clients would like to extend greater control. While formal conservation policies are increasingly couched in the participatory and devolutionary language of CWM, the reality remains strict central control over wildlife and an expanding effort to expropriate many pastoralist lands through protected areas, hunting concessions and potentially the contested landscape of the new WMAs. The Maasai Diaspora in southern-central Tanzania has been most adversely affected by CWM initiatives as a result of their marginalization within the communities where they live as minorities on the fringes of village decision-making processes. For them, CWM has meant their exclusion from key areas now used for WMAs, although the larger communities in these areas have yet to gain full authority for wildlife and access to benefits due to lack of progress in implementing the WMAs.

In northern Tanzania, CWM itself has become hotly contested terrain, physically and conceptually. Villages in the Loliondo area have developed their own means of capturing economic benefits from wildlife outside the purview of any formal state-led CWM projects, as a result of the emergence there of village-tourism ventures. These are among the most economically profitable community-based natural resource management initiatives in Tanzania from the local perspective, and the communities in Loliondo have invested their resources in protecting these ventures from numerous attempts by state agents to prohibit them. Government wildlife authorities, with the support of foreign donors and conservation NGOs, have insisted

that these local agreements are not in line with policy, despite their ostensible harmony with livelihood and conservation goals, and must be replaced with formal WMAs. Unlike in Ruaha and Gonabis, pastoralists in Loliondo have expressed concern about the land rights implications of gazetting WMAs, and in particular the potential impact on livestock movements as well as existing income streams from tourism. Community concerns focus on land tenure security and maintaining the authority of existing village governance structures, while the state seeks to increase its influence in terms of controlling investments and ensuring land and wildlife use practices conform to its WMA blueprint. These differing interests and visions have been subject to little constructive negotiation and the result is a relatively consistent and recurrent series of political conflicts over land and resource use decisions in these areas. Formal CWM initiatives are merely one component of these long-running contests. Ultimately, the shape of CWM in pastoralist areas, and wildlife's ability to contribute to local livelihoods, is tied to the broader political economic influence that local communities are able to exercise over these land rights struggles.

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Chapter 9
Policy and Practice in Kenya Rangelands: Impacts on Livelihoods and Wildlife

Katherine Homewood

9.1 Introduction

Kenya's new Draft Wildlife Bill singles out Mara, Amboseli and Kitengela as critically endangered ecosystems (MTW, 2007). The Narok and Kajiado districts which contain these ecosystems are at once the site of extraordinarily rapid economic development and land use change in their urban, peri-urban and higher agro-ecological potential zones, and also characterized by persistent poverty that is both wide and deep (Thornton et al., 2006). In this book, the Mara, Amboseli and Kitengela case studies have illustrated the changing patchwork of pastoralist development and wildlife conservation throughout Kenya Maasailand. The present chapter draws on that material, together with the wider literature, to tease out the ways in which national policies have shaped the present circumstances of both Maasai livelihoods and rangeland wildlife, and their implications for ongoing change. It builds on this analysis to consider current and future policy options.

As far as pastoral development is concerned, livelihoods data from studies in this volume show rural communities remain strongly dependent on extensive livestock production as a central strand of household economies, despite perennial state efforts to transform or replace this system. Alongside livestock production, diversification is certainly widespread. Areas with higher agro-ecological potential are rapidly being converted to cultivation, and there is a growing reliance on non-farm activities. This diversification is as often an expression of poverty and insecurity as of positive choices and investment. With a few notable exceptions (well-placed households adjacent to high-earning, top-end protected areas, and relative to the other sites, the Mara), the proportion of households benefiting directly from wildlife tourism revenues is low, as is the level of benefits such households on average receive.

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Alongside these clear messages from the Mara, Kitengela and Amboseli case studies, the available data on broader aspects of development (education, health, infrastructure and economic opportunities) suggest that there has been considerable differentiation in standards of living in Kenya Maasailand over the last decades. For some, land privatization and new economic opportunities have created great wealth. For a majority of rural households, however, there has been little improvement. Mean incomes and standard of living indicators remain below national averages. Private land ownership has forced many off the land altogether, with few positive alternatives to go to (Galaty, 1994).

Formal government policy also seems to have failed quite spectacularly with respect to conservation aims in Kenya's rangelands. There has been a national and local decline in wildlife populations of over half of all wildlife as recorded by aerial census 1977–2007, and much higher declines in the case of some species and areas. Macroeconomic analyses attribute these declines to failures to ensure that returns from wildlife are maximized, and that landowners can benefit from wildlife. However, as well as explanations centring on the total returns from wildlife as opposed to other activities, livelihoods data and social analyses also emphasize the paramount role of distributional issues. The absolute amounts earned from wildlife tourism may be large, but where they are primarily captured by a small elite, rural people are impoverished rather than supported by wildlife tourism, and the land use decisions of these non-beneficiaries are unlikely to be conservation-compatible. As a result, conservation priorities at the macro-level, and development priorities at the household level, are rarely well-aligned.

These insights are important to inform future policy debates, and this chapter explores the issues not only qualitatively but also through reviews of quantitative and statistical models simulating outcomes of specific potential policy changes.

Finally, gaps between policy and practice across the whole field of conservation and development are a major concern. In a context of strong vested interests and intense contest, where transparency, accountability and regulation are weak and potential for corruption is high, there is a gulf between theoretically predicted policy impacts, and the actual outcomes of those policies. This chapter ends by looking at the ways in which international agencies, non-governmental organizations (NGOs) and investors impact on the political context, and how the pursuit of short-term results may be impacting on both conservation and development in the long term.

9.2 The Policy Framework in Kenya

In addition to land tenure, agriculture and livestock policies, markets and the associated infrastructure shape land use and livelihoods change. In this section, we examine first the evolution of land tenure policy and its implications for Maasailand, up to, and including, the current Draft National Land Policy (DNLP: MoL 2007a, b), before considering policies within the agricultural sector, including livestock development policies.

9.2.1 Land Tenure Policy

Land tenure systems underpin resource access, livelihoods and land use. Chapter 1 gave an historical overview of changing land tenure in pre-colonial, colonial and post-colonial Kenya and Tanzania, including the early twentieth century Masai Moves, which removed Kenya Maasai from their more northerly rangelands on the Laikipia Plateau to concentrate them in the Southern Reserve, now the districts of Kajiado and Narok. These were initially communal areas held as Trust land. However, even before independence, contemporary economic thinking, backed by international financial agencies and buttressed by contemporary ecological wisdom, led to intense pressure to privatize Maasai rangelands, a process described briefly here (Chap. 1; Homewood et al., 2004).

As in other African countries, the Kenya post-independence administration was strongly influenced by ecological and economic theories developed in other contexts (Toulmin and Quan, 2000; World Bank, 1975). Conventional ecological wisdom held that pastoralist systems tend to cause overstocking, overgrazing and degradation with progressive and eventually irreversible losses of productivity and biodiversity (Brown, 1971; Lamprey, 1983) potentially leading to a vicious spiral of local climate change and further desertification (Charney et al., 1975; Sinclair and Fryxell, 1985). Applying the theory of the Tragedy of the Commons to rangelands, it was assumed that pastoralism relied on open access systems, with no controls over resource use, and leading inevitably to destructive extraction (Hardin, 1968). This conventional ecological wisdom came together with western economic theories to postulate that private tenure was essential to investment, and to economically and environmentally sustainable development (World Bank, 1975). Where conventional economic theories unequivocally supported privatization as the basis for investment and wealth creation, conventional ecological wisdom was taken as further clear theoretical justification for privatization and the formation of individual, company and group ranches. It also meshed well with the Kenyan Government's political concerns over unregulated mobility and security in border regions, and over delivery of services to sedentarized communities. This thinking has since been strongly challenged (Sandford, 1983; Behnke and Scoones, 1993; see Vetter, 2005 for a balanced overview). Indigenous pastoral systems have been increasingly recognized as common property resource management systems, with established institutions for communal control, which can deliver sustainable use, and have commonly done so. And ecological understanding of the boom and bust patterns in availability of pasture, associated with fluctuating rainfall patterns in arid and semi-arid rangelands, challenges the idea of establishing fixed stocking rates in rangelands. However, government and international donor institutions have been slow to recognize these crucial caveats, as is evidenced in much current national land use policy.

Key legislation revolved around the Land Consolidation Act (1955), the Land Control Act (1967), the Land Adjudication Act (1968), the Registered Lands Act (1968), and the Land (Group Representatives) Act of 1968. It also includes the Agricultural Act (1963: see next section) and the Land Planning Act (1968: mainly concerning urban areas). The Land Control Act established political and government

structures and mechanisms for controlling land transactions, with minimal participation of the public and of landowners (Gachugu, 1997). Kenya's second National Development Plan of 1969 proposed a Land Use Committee as the institutional structure for management and control of land, and later the District Focus for Rural Development initiative established a hierarchy of development committees from sub-location through to district, in a largely ineffectual attempt to decentralize decision-making, empower district level stakeholders, and co-ordinate their activities with those of government and NGOs (Gachugu, 1997).

The Land (Group Representatives) Act of 1968 was formulated so as to capture economic benefits in arid and semi-arid rangelands and ultimately provided a basis to operationalize adjudication and registration for individualized tenure (Gachugu, 1997). At least to begin with, few of the new group ranches invested in land improvements in the ways the policy makers had envisaged (Bruce and Migot-Adholla, 1994). However, with privatization to the level of a group ranch, land that had been inalienable became a commodity. People in positions of power within group ranches not uncommonly leased out or sold land on for personal profit, to the detriment of other group ranch members (Galaty and Ole Munei, 1999; Homewood et al., 2004). As trust was eroded, pressure rapidly mounted to subdivide and get individual title, as preferable to losing out altogether (Rutten, 1992; Galaty, 1999; Mwangi, 2007a, b, c). Getting one's name on the group ranch register, and the names of one's sons, became a major issue: some long-term residents failed to be registered and lost all chance of a land share; other individuals who had little connection with the group ranch managed to get their names entered and to become legally entitled to shares. The process was fraught with corruption and lack of transparency (Galaty, 1999; Homewood et al., 2004).

Those failing to be included on group ranch registers before land subdivision have effectively been dispossessed, as are those who through bad luck or bad judgment fail to retain their land. They end up as squatters, or absorbed into patron households, gravitating to rural trading centres or becoming urban migrant workers. Maasai women and children were not generally considered for inclusion on the group ranch registers, and so were directly dispossessed (Talle, 1988, 1999), although some well-placed (and not necessarily Maasai) women and minors were included in the registration and received land titles (Galaty, 1999; see also Family Portraits – Amboseli, this volume). As land privatization has proceeded, there has been a learning process. Younger group ranch members, better educated with respect to the wider system, are employing lawyers to represent their interests in the subdivisions – a strategy more easily managed by the better-off.

Three decades on, the context of production has changed dramatically: in terms of markets, in terms of technology, in terms of informal credit networks and in terms of the information revolution, with mobile phones linking even small producers in remote areas to markets as never before. Urban markets drive investment in crop and livestock production: Norton-Griffiths and Said (in press) estimate Nairobi returns some $400,000–$500,000 annually to its hinterland in farmgate prices, driving further subdivision and intensification. At the same time, and quite apart from the value of production, land values in areas within easy reach of Nairobi have increased dramatically. In parts of Athi-Kapiti/Kitengela, land values have risen to $9,000–$10,000 per

hectare. In the Nairobi suburb township of Rongai, land reaches $300,000–400,000 per hectare; land values fall by 14% with every kilometre distance from Rongai centre (Norton-Griffiths and Said, in press). As a result, some argue that the Maasai collectively are among the largest and richest landowners in Kenya today, with a high proportion of their rangelands in relatively good agro-ecological potential zones,[1] with most of this area adjudicated, and with low population densities (15/km^2). Privatization of land, first to group ranches and then to individual tenure, is seen by some as having created wealth, social benefits, and economic opportunities, which communal land ownership would deny. Norton-Griffiths (personal communication) estimates that across Kenya rangelands overall, the 50% of land under traditional customary tenure produces 23% of the total crop and livestock revenues, while the 35% rangelands under private tenure produces around 55%.

However, the selective excision, preferential privatization and conversion of higher potential land (Southgate and Hulme, 2000), has resulted in artefactual relationships between tenure status and productivity. Privatization has led to reduced mobility, which has had devastating impacts on herds, particularly during drought periods when access to distant pasture has been curtailed. The view of successful growth pays scant regard to distributional issues, and arguably gives insufficient weight to the extent of land loss to outside investors (Galaty, 1999), and to the observed levels of poverty prevalent among the wider rural population (Thornton et al., 2006; see below). This flipside of spiralling economic growth on the back of Maasai group ranch establishment has been described and analyzed by Galaty (1980) and Rutten (1992).

Land privatization and the land market that it created have thus driven rapid socio-economic differentiation (see also Chaps. 3 and 5). Privatization has allowed some to create great wealth by developing agriculture or tourist concerns or investing profits from livestock into non-farm enterprises. For others, the transformation of formerly inalienable communal rangeland, to group ranch, to privatized and subdivided individual holdings, may have driven a downward spiral into poverty (Rutten, 1992). Some remain on the land, where the studies in the present volume suggest general standards of living remain below national averages, with many below national and international poverty lines. Some may leave to go to positive alternatives, but many become stockless, landless, unskilled migrants to Kenya's urban slums. The losers are largely invisible to post hoc evaluation (cf. Murton, 1999). The economic opportunities and successes of privatization have thus gone hand in hand with wider poverty impacts.

The current and controversial DNLP (MoL 2007a, b) is a remarkable document, which takes as central theme the problems created by historical land alienation, abuses of the land privatization process and wider social injustice. The DNLP acknowledges the poverty impacts of past land allocation and privatization and sets out a major program of land reform and redistribution which, if carried through,

[1] With around one-third of their rangelands in each of < 500 mm; > 500—800 mm; > 800 mm rainfall, as against a distribution of 70:20:10 for all Kenya rangelands: (Norton-Griffiths data and analyses).

would revolutionize access to land in Kenya. The DNLP seeks to mesh customary and overlapping access rights with official national frameworks of land ownership, to cast back across the last century to redress historical injustices, and to deal equitably with pastoralist and other marginalized groups, with gender and poverty issues. Among other far-reaching measures it proposes significant restrictions on the ownership of land by non-nationals, and major changes with respect to the sanctity of title and first registration and on inheritance, emphasizing the need to take other legitimate historical claims into account. The DNLP has elicited strong criticism, for example, from the Kenya Landowners' Federation, who see it as not representative of most Kenyans, but rather as the combined product of pressure from liberal international NGOs and development agencies, and a government bid for the popular vote in an election year (KLF, 2008). KLF predicts capital flight as foreign investors shift to less risky possibilities elsewhere, with severe adverse impacts on the agricultural and commercial economy. The DNLP has also elicited criticism from the conservation NGO lobby (e.g. Norton-Griffiths, 2007b).

The extent to which the poverty alleviation principles of the DNLP become formal policy and the ways in which the proposed reforms may play out in practice remain to be seen, given the opposition to the draft policy and wide experience of corrupt practice in land allocation in the course of any land tenure change in Kenya and elsewhere. The outcomes have major implications for the future of pastoralism, small and large-scale cultivation; for settlement patterns, land fragmentation, wildlife habitat and associated economic returns, issues discussed in the sections that follow.

9.2.2 Agriculture and Livestock Policies

The livelihoods studies in this volume show the enduring importance of livestock across Maasailand, both as a mainstay of household economies and as a dimension of wealth, just as other studies show the dynamic and vigorous nature of livestock production and marketing across East Africa. Livestock offtake has risen year on year in Kenya since the mid-1970s, despite broadly stable national herd numbers (Norton-Griffiths and Said, in press). Given the agro-pastoral frontier expanding from higher to lower potential areas (Campbell et al., 2003) up to 50% of the 'standing crop' of Kenya's livestock may now be associated with medium- (500–800 mm) and high- (>800 mm) potential zones (Norton-Griffiths and Said, in press).

The increase in offtake has complex roots because a large, though unknown, proportion of these animals come not originally from Kenyan producers intensifying production from a stable and increasingly sedentarized national herd, but are sourced instead from mobile pastoral herds across Kenya's borders. For example, there is a well-documented cross border flow of livestock from Tanzania (drawn by the higher prices and harder currency: Zaal et al., 2006) and Somalia (with civil disruption and the isolation of Somali ports from their hinterland, and the attendant collapse of the Somali export trade to the Gulf: Little, 2003; McPeak and Little, 2006). Given the unofficial nature of the cross-border trade, which could be classed as smuggling, it is

not recorded in official figures. Estimates of its scale rely on grassroots field work based on detailed interviews with the herders and traders carrying out these stock movements and transactions, rather than on evaluation of national datasets. The limitations of official datasets in dealing with such issues are well recognized (see Sandford's 1983 classic exposition of the way animals bred and reared in remote parts of the pastoral system only start to appear in official figures under commercial systems through which they eventually pass en route to destination markets). These data problems remain a major issue today (WISP, 2008). Steadily increasing flows are likely to have been elicited by the year on year rise of the Kenya urban market demand. The scale of the cross-border flows is not an indictment of Kenya's livestock production and trade, but rather an affirmation of the scale and importance of the pan-East African system and of the Kenyan indigenous livestock sector's contribution as producer, middleman, consumer and exporter within that system.

> The evidence … shouts loudly that livestock marketing in eastern Africa is not a marginal economic activity. It generates thousands of jobs, revenues equivalent to millions of US dollars, and supplies a large percentage of the beef demand in the region's major urban centers. Yet, pastoral production and marketing still suffers from stereotypes of it as mainly subsistence-oriented and considerably less significant than other commodity-based systems in the region, like coffee, tea and maize. … public investments in market infrastructure, roads, security, education, and human and institutional capacity building for pastoralists and other programmes in rangelands suffer badly, especially proportionate to the economic benefits these areas generate. (McPeak and Little, 2006, p. 254)

In spite of, and arguably counter to, the successful growth of the livestock sector, agricultural policies in Kenya have historically tended to favour farming over livestock production. The current Agricultural Act (dating from 1963) covers all land used for agriculture including livestock. The Act seeks to manage land use to develop agriculture while preserving soil and water resources by regulating cultivation or grazing on fragile or vulnerable soils or pastures. It also allows for dispossession and preservation orders. However, the Act was primarily formulated for high agro-ecological potential land. It fails to consider pastoralism and wildlife in arid and semi-arid lands (ASALs) and instead sees those lands as empty and open for development. Tellingly, it does not even mention the Director of Livestock Development (Gachugu, 1997). The focus on production and marketing of crops including maize, beans, high value irrigated vegetables and flowers, driven by the growth of domestic as well as export markets (Norton-Griffiths and Said, in press) has resulted in the excision of key areas of swamp or highland that are consequently barred to the dryland ecosystem grazers (wild and domestic) they have hitherto sustained (Kimana: Southgate and Hulme, 2000; Loitokitok: Campbell et al., 2003). Meanwhile, Kenya livestock development policies have consistently supported 'western' style commercial ranching operations over indigenous production systems (Raikes, 1981; Sandford, 2006), and livestock within smallholder mixed farming, rather than the less administratively accessible herds of mobile pastoralists.

The preamble to the current Draft National Livestock Policy (MoLF, 2006) does acknowledge the importance of the ASAL for livestock. It estimates the ASAL has

over 70% of Kenya's cattle, the great majority of small stock, and 60% national milk production (not allowing for home consumption), all of which are mostly associated with extensive, mobile pastoralist systems. It estimates that over 90% of the ASAL population is employed in livestock-related activities and recommends that provision should be made to enhance opportunities for mobile pastoralists, particularly through improving security, market access and animal health support. However, the bulk of the draft Policy concerns regulation rather than enabling policies, and focuses primarily on issues related to commercial and smallholder livestock management in medium to high potential systems. Much of the regulation proposed, which includes regulation of drugs, animal feeds, surveillance and monitoring, to regulation of animal movements and range use, seems to be beyond the capacity of the Department as it stands, requiring better resources, manpower and infrastructure. Furthermore, increased regulation could be more likely to foster increased corrupt rent-seeking than to produce improvements for the livestock sector. As set out, the new policy suggests little attempt at constructive cooperation with existing systems or practices. For example, official marketing provision is widely acknowledged to be less than equitable and efficient (Sandford, 2006; McPeak and Little, 2006), particularly where markets and infrastructure are poor and funding to improve them likely to remain limited. In this context, the draft Livestock Policy seeks simply to curtail the activities of middlemen and traders, rather than finding creative ways to work with them. The enabling measures proposed are in some cases already superseded (for example the market information systems proposed may have largely been overtaken by private mobile phone use) or in others, are heavily reliant on areas beyond the brief of MoLF (security, early warning systems, agricultural use of chemicals, and wildlife management).

With structural adjustment, Kenya has progressively withdrawn animal health provision in rural areas. The draft Policy makes strong statements on monitoring and surveillance but little on veterinary provision; inputs are acknowledged to be hard to access in ASAL, in contrast to their ready market availability in higher potential areas. Until very recently, the highly effective infect-and-treat East Coast Fever vaccine was banned in Kenya, despite the serious economic burden of this disease, because the government prioritized acaricide producers (Homewood et al., 2006). And quarantine policies that undermine indigenous pastoral producers, in favour of protected official export market producers comprising a relatively small part of the livestock sector overall (Raikes, 1981; Waller and Homewood, 1996; McPeak and Little, 2006; Scoones and Wolmer, 2006) are set to continue to do so (MoLF, 2006, para 3.3.9).

9.2.2.1 Impact of Agricultural and Livestock Policies on Pastoral Development Indices

There is a whole literature on the political and economic marginalization of pastoral societies across sub-Saharan Africa and beyond (Bonte and Galaty, 1991; Homewood, 2008; Oxfam, 2006; WISP, 2008; Little et al., 2008). As stated above, agricultural policy has persistently failed to consider pastoral production as an economically and

ecologically valid form of land use, and conventional economic and ecological wisdom, now much-challenged, has over decades encouraged anti-pastoralist attitudes (cf. Tanzania's "National Anti-Livestock Policy": Chaps. 7 and 8). Reinforcing that political marginalization, their remoteness, the difficulties of access, and the mobility of their people all make it hard to provide health, education and infrastructure in the pastoral zones, even where dedicated programmes attempt to do so (Haldermann, 1985).

Whether still active in the livestock economy or part of the long-term poorest within the pastoral landscape, households in Kenya's pastoral rangelands are, on the basis of the limited good data available, overall poorer than the Kenya national average. Nationally, the proportion of people in Kenya living on less than a dollar a day was estimated at 23% in 1997 (World Development Indicators, WDIs online). Per capita gross national income averages are reported as $540 per year for 2005 and $580 per year for 2006 (WDI data), considerably higher than the mean and median values for Maasai in Mara, Amboseli and Kitengela reported in Chaps. 3–5 (see also Chap. 10, Tables 2 and 3). Narok and Kajiado populations are middle-ranking in Kenya's poverty and poverty index data.[2] However, sub-district level poverty estimates show significant parts of Kajiado as having average or higher than national average levels of poverty. Twenty-one per cent of the population of Kajiado is calculated to be below the national absolute poverty line of KShs825 (~US$13) per adult equivalent per month (Kabubo-Mariara et al., 2006). National census data shows that in 21 of 45 administrative locations in Kajiado, over 50% of the population live below the rural poverty line of KShs1,239 (~US$16) per adult equivalent per month (Thornton et al., 2006). Our livelihoods data, set out in earlier chapters, suggest that the majority of rural Maasai households and individuals are currently living on significantly less than a dollar per person per day. Alongside the spiralling land values and returns to crop and livestock production set out earlier, most rural Maasai across Kajiado and Narok remain structurally poor (cf. Norton-Griffiths and Said, in press), if somewhat better off than pastoralist households in the northern ASAL (Chap. 10).

Lack of development and opportunities in the Maasai rangelands are also reflected in other standard development indicators, such as education and health. WDIs for Kenya recorded 80% enrolment in primary education in 2005. ILRI, working from 1997 DHS data, calculated figures of 81.1% 6–11-year-olds and 86.6% 12–14-year-olds attending school in the 'mixed rainfed, arid and semi-arid' (MRA) livestock production areas, which encompass Narok, Kajiado and other pastoral districts of Kenya (ILRI, 2002). While these figures for pastoral areas in general and Maasai areas in particular suggest levels of enrolment comparable to national levels, they still fall short of the 100% target of the World Bank Millennium Goals and there is no evidence of improvement over the last decade. More significantly, these figures are far higher than those found in detailed local estimates for rural Maasai populations (e.g. 32% of 7–12 year olds: Coast, 2002). Also, they cannot convey the quality of that primary education nor the degree of literacy and

[2] Available at www.health.go.ke, disaggregated by province and constituency.

numeracy that may result. In Tanzania, Bishop (2007) found that a high proportion of Maasai children who had completed primary education were functionally illiterate, due to a combination of poor provision in pastoral areas and issues around uptake. There is good reason to expect similar problems of primary education provision, quality and uptake in Kenya Maasailand. However, the once-significant gender disparity between enrolment and educational achievement by boys and girls seems to have waned, at least at primary level, and there is evidence of a positive shift in attitudes to education for Maasai girls (Bishop, 2007; Coast, 2002).

National- and province-level figures do not indicate that pastoralist areas are more disadvantaged in terms of child nutrition than the national average, nor in terms of infectious disease burden, though they do suggest unacceptably poor figures across the board. Thirty-two per cent of children under five are recorded as stunted both nationally and in Rift Valley Province, which is largely pastoral and includes Narok and Kajiado. However, it is not clear that the surveys on which these data are based dealt adequately with issues of sampling bias for pastoral areas. Studies measuring anthropometric status and nutritional intakes among East African pastoral adults and children have in the past shown dietary energy intakes averaging around 70% Recommended Dietary Intake, and high levels of wasting (Nestel, 1986, 1989; Galvin, 1991; Homewood, 1992, 2008). Nutritional status relates to poverty but also to way of life, seasonality, work patterns, diet and disease, making sampling an important dimension in interpreting results (Fratkin et al., 1999, 2004; Fratkin and Roth, 2005). National datasets do not allow for this level of understanding. ILRI (working from 1997 DHS data) estimated 43% households in the MRA (pastoral) areas as having an improved water source, compared to the national figure of 61% (WDI data for 2007–2008) and 5.7% of households in the MRA areas have sanitation, compared to the national figure of 41%. From the Maasai households accessed during our field studies, the ILRI figures are closer to prevailing conditions.

Problems of sampling, of data aggregation and of data validity mean there is only the most tenuous basis on which to evaluate standards of living, health and education trends in pastoral areas in general, including Maasai areas in particular, as against national values (Randall, 2008; Randall and Otieno, 2006). Nonetheless the data from the studies in this volume suggest that pastoral areas and households are income-poor, that disproportionate numbers live on less than a dollar per person per day, and that many are below national rural poverty and absolute poverty thresholds. In some pastoral areas, such as Mara, privatization of land 10 or 20 years back may have created what are now more prosperous localized communities, where the poor have either lost their land and had to leave, or have been assimilated as socially less visible, marginalized dependants and hired hands within better-off households (cf. Murton, 1999, revisiting the Machakos intensification story). Elsewhere, Little et al. (2008) point out there is considerable heterogeneity in pastoral areas. While there is deep poverty, especially among those who have lost access to land and livestock and who exist alongside rather than within the pastoral economy, there are also many households who are asset-rich if cash-poor. The devil is in the detail, and the national, provincial and district-level data do not allow analysis at the level of dynamic expansion of winners against movements of losers in and out of the system. Overall there

are neither good data on which to evaluate these trends nor supporting evidence to suggest that policies have resulted in significant progress towards the national goals of halving numbers in poverty, achieving full primary education for all, (other than perhaps improved gender parity in education), and reducing the burden of morbidity and mortality significantly by 2015 in these pastoral areas (World Bank Development Indicators, available online). The consensus among development agencies is that in general the gap between pastoralist and other areas has widened further.

Due to economic and political marginalization, the arid and semi-arid lands (ASALs) are today the most underdeveloped areas of Kenya. The pastoral inhabitants of these lands have both the right and the ability to maintain a decent livelihood but have been denied an appropriate and effective development policy for decades. (Oxfam, 2006, p. 1.)

9.2.3 Wildlife and Conservation Policy to Date

At independence, Kenya was left with a network of protected areas, mostly in former pastoralist territory (Table 9.1), and originally established with the National Parks

Table 9.1 National protected areas in Kenya (from draft Wildlife Bill, MTW, 2007; excludes marine national parks and national reserves; areas rounded to nearest Km^2)

National parks		National reserves and sanctuaries	
Park name	Km^2	Reserve name	Km^2
Tsavo East	1,747	Marsabit	1,564
Tsavo West	9,065	South Turkana	1,019
Aberdares	766	Nasalot	194
Mt Kenya	715	Losai	1,806
Lake Nakuru	52	Shaba	239
Amboseli	392	Samburu	165
Nairobi	117	Buffalo Springs	131
Meru	870	Bisinadi	606
Kora	1,787	Rahole	1,270
South Island	39	North Kitui	745
Mt Longonot	52	Lake Bogoria	107
Hell's Gate	68	Kamnarok	88
OlDoinyo Sabuk	18	Kerio Valley	66
Marsabit	68	Kakamega	45
Sibiloi	1,570	Masai Mara	1,510
Mt Elgon	169	South Kitui	1,133
Saiwa swamp	2	Mwea	68
Ndere Island	42	Arawale	533
Malka mari	876	Sanctuary name	
Chyulu Hills	736	Maralal	5
Central Island	5	Lake Simbi	42
Ruma	120	Ondago Swamp	<1
Arabuko	6	Kisumu Impala	<1

Ordinance of 1945, which 'signaled a shift in conservation policy from protection through hunting legislation to preservation through land protection' (Western, 1994:15).

The colonial government also sought to protect Amboseli and Mara ecosystems, but as these areas fell within the Southern Reserve, they were eventually established as national reserves under the administration of district ('county') councils.

Not counting the four marine national parks and six marine national reserves, around 8% of Kenya's ~582,646 km^2 surface area is currently designated as protected conservation estate, comprising 23 national parks (including Amboseli whose current status remains contested), 28 national and primate reserves (including the Masai Mara national reserve) and four national sanctuaries (MTW, 2007: Table 9.1). Many of these areas are located in rangelands formerly used by pastoralists. This tally of conservation estate does not include the many privately protected areas in Maasai rangelands, such as the privately owned Laikipia ranches, and communally owned group ranches such as Ololorashi and Mbirikani around Amboseli, where land use is regulated under local agreements or voluntarily.

Throughout the 1960s, national parks tended to reinvest their rapidly-growing tourism earnings in conservation, while county councils diverted reserve income for the benefit of more densely populated urban areas elsewhere rather than investing it back into protected areas or locally in reserve-adjacent populations (Western, 1994). Tensions and conflict grew between conservationists (many of them expatriates) and Maasai communities. Western (1994) has given a detailed, nuanced account of the personalities, micro-politics and practical outcomes in his analysis of the evolution of wildlife conservation and people/parks conflicts around Amboseli up to the mid 1990s. From the late 1960s revenge killings of Amboseli rhino and other species, and later ivory poaching, began to decimate wildlife. It was in this context that Western's seminal integration of Maasai ecology, economics, politics and land use on the one hand, and wildlife ecology and ecosystem dynamics on the other, took shape. The upshot was Kenya's first community-oriented conservation initiative, which continues to evolve into the present day (Chap. 5). Amboseli was upgraded to national park status, but a surprise ministerial decree in 2005 downgraded the area back to county council reserve. This degazettement stalled in the face of international conservation pressure, but is still in principle being taken forward.[3] Amboseli provided the basis and test case for recognition within Kenya's wildlife policy of the need to channel benefits to reserve-adjacent landowners, and constituted the first integrated conservation and development initiative from which CAMPFIRE and others across sub-Saharan Africa took their cue (Chap. 5 and Western, 1994).

Prior to 1975, Kenya's wildlife policy was broad-based (including everything from strict preservation to live capture and export; ranching, cropping, sport hunting

[3]The downgrading was subject of an immediate legal challenge by the African Wildlife Society and animal welfare representatives, though other conservation NGOs stayed out of the debate. The court injunction remains in place at the time of writing. Just before the troubled 2007 presidential election, in a step which conflicted with the court ruling, the Ministry, the Kenya Wildlife Service and the Kajiado County Council signed a management agreement concerning Amboseli, eliciting further legal challenges. The stand-off continues (Norton-Griffiths, personal communication, 2008).

and the like), with very large benefit streams to landowners. In 1975, the entire development budget of Kajiado came from hunting revenues, and was in real terms larger than it is today. In that year, Mbirikani Group Ranch adjacent to Amboseli National Park, earned $35,000 from hunting fees – worth more in real terms than it earns today from tourism (Norton-Griffiths, 1998; Norton-Griffiths et al., 2008).

The Wildlife Policy introduced in 1975 was based on sessional papers that addressed the issues of participation and of the costs and benefits to landowners and reserve-adjacent communities of wildlife on their land (Gachugu, 1997). In essence, Kenya's wildlife policy aimed to use benefits from parks to keep the migratory routes around them open and viable, while developing a more compelling case for coexistence on a far larger scale (Western, personal communication). In 1976, independently of the policy development process, President Kenyatta banned hunting of wildlife other than game bird species, as a short-term measure to sort out corruption in the hunting industry (possibly with the paradoxical impact of entrenching Mama Ngina's well-documented poaching activities). It was never revoked: Kenyatta died not long after, and after the failed 1982 coup against Moi, the hunting ban dropped from the political agenda. It may yet be challenged in the courts, and KWS has a position paper to re-license hunting (Norton-Griffiths, personal communication). As a result of the ban, revenue from wildlife in Kenya is restricted to income from tourist game viewing and photography.

The Wildlife (Conservation and Management) Act passed in 1977 laid some basis for negotiation between the Ministry and landowners affected by wildlife, but focused primarily on conservation of wildlife in protected areas, and anti-poaching enforcement. Participatory and benefit sharing approaches were acknowledged but in practice largely resisted rather than embraced by the Ministry (Gachugu, 1997). Although Kenya policy (particularly the 1989 and 1996 amendments to the 1977 Act) led the way in allowing local landowners to benefit directly from such returns to wildlife on their own land, as well as developing benefit-sharing for reserve-adjacent dwellers, it simultaneously constrained those returns severely by banning the lucrative possibilities of consumptive use of wildlife, including hunting.

A great variety of innovative and individual wildlife conservation ideas and experiments have evolved and proliferated across Kenya over the last 3 decades without any formal policy change (apart from the recent strongly contested changes of status and management of Amboseli). That wealth and diversity of initiatives and informal practice is beyond the scope of this chapter to describe, (e.g. see Chap. 3 for a description of Wildlife Associations and Conservancies around the Mara). These local initiatives have in many cases been supported – or driven – by conservation NGOs and outside entrepreneurs, lessening dependency on government in both positive and negative ways.

9.2.3.1 Wildlife Conservation Outcomes and New Policy Directions

> It was never the policy of the government of Kenya to lose more than 50% of its wildlife in 30 years. (Norton-Griffiths, 2007a, p. 58)

Systematic aerial census monitoring of Kenya's rangelands began in 1977. Numerous authors have analyzed parts of these longitudinal data (Norton-Griffiths, 1995, 1998; Ottichilo et al., 2001; Homewood et al., 2001; Norton-Griffiths et al., 2008; Western et al., 2006) and drawn essentially consistent conclusions: in the two decades 1977–1997, Kenya as a whole lost a massive proportion of its large mammal wildlife. Exact figures vary depending on the precise way the data have been pooled or disaggregated, the extent to which independence and/or auto-correlation of successive and/or complementary counts have been dealt with, and the precise time period for which the analyses are carried out. The most recent comprehensive statistical analyses suggest Kenya lost 38% of its large mammal wildlife overall 1977–1997, the national parks and reserves combined lost 36%, and some individual protected areas, ecosystems and species lost considerably more (Western et al., 2006).

This recent overview of wildlife and conservation outcomes across Kenya in general and Maasailand in particular disaggregates data by ecosystem, by protected area or land use zone (investigating trends in private conservancies as well as in and around parks and reserves), and by time period, exploring post-1990s as well as 1977–1997 trends. It reveals unexpected new insights. Kenya's national parks now contain only 10% of the nation's remaining large mammal wildlife (Western et al., 2006). Maasai Mara Reserve alone accounts for 25% of Kenya's wildlife while the largest proportion (40%) is found in the medley of private conservancy initiatives of various sorts that have sprung up over the last 15 years. The final 25% of Kenya's large mammal wildlife are scattered across open rangelands (Western et al., 2006).

Between 1977–1997, Tsavo, Nairobi and Meru national parks and Mara National Reserve (collectively responsible for 98% of Kenya's protected area populations) showed an overall wildlife decline of 41% (Western et al., 2006). The largest parks showed the steepest declines (Tsavo East and West, 63%; Meru, 78%, both highly significant). Amboseli and Nakuru protected areas showed non-significant increases, but over the decade post-1990, Nairobi, Amboseli and Nakuru national parks all showed significant declines (probably in part driven by climatic downturn during that period). Where data are available, the wider rangeland ecosystem around each protected area showed related patterns of decline (superimposed on drought cycles, and on the reciprocal movements into and out of the national park as wildlife migrate between protected dry season refuge and wet season dispersal areas outside them).

In contrast to most national protected areas and their surrounding ecosystems, of the six private wildlife sanctuaries for which data exist, four showed a non-significant increase in wildlife post-1990. Two other sanctuaries, Laikipia and Machakos, show significant declines. The Laikipia decline is thought to have been driven by the increase in large predators, which has in turn impacted on other large mammal populations (Georgiadis et al., 2007).

Overall, Kenya has lost a spectacular proportion of its wildlife despite considerable investment in strong anti-poaching enforcement, wildlife management and conservation strategy principles that prioritize community outreach and conservation involvement, and massive inputs by conservation NGOs. More puzzling still, national protected areas seem to have failed quite dramatically to conserve wildlife, and now retain an embarrassingly small share of the remaining populations. By

contrast private sanctuaries appear to buck the overall trend of decline with a relatively successful conservation outcome, and despite their limited extent now account for the largest share of remaining wildlife populations.

Why are wildlife declining faster in national parks and reserves, and why the differences between national protected areas and private sanctuaries? National protected areas are mostly centred on dry season refuges and mostly rely on wider wet season dispersal areas outside the protected area boundaries. As opportunities for wildlife to disperse outside the protected area become more constrained, so the ecosystem population declines, driving a decline in that part of the population counted within the park. Private sanctuaries may have tighter security, be more likely to provide inputs (including water, veterinary care, supplementary fodder and restocking), and ensure connectivity to support their wildlife, while excluding livestock to minimize competition for available grazing.

Perversely, the new Draft Wildlife Bill (MTW, 2007) proposes measures that will bring this vigorous proliferation of private initiatives under strict control. It proposes a multi-tier system of committees (community, constituency, district and national levels), and will make ministerial approval mandatory for activities such as wildlife viewing and photography, as well as tourist accommodation such as lodges or campsites. Commentators fear the adverse impacts of this bureaucratic system on all tourism outside national parks. The draft Bill gives the State powers over any private land used for wildlife-related purposes, conferring powers for KWS to charge fees for game viewing on private land, and to impose and enforce a variety of measures on landowners. The bureaucratic hurdles are such that consumptive use of wildlife, though possible in theory, is unlikely to be economically worthwhile. The draft Bill uses broad definitions that create a degree of confusion and further criminalize customary and current everyday practices. By giving new far-reaching powers to the State, it runs counter to current wildlife policy that emphasizes decentralization and devolution; it fails to articulate with existing community-based and user associations, and attempts to replace these with government-dominated institutions. Overall, it can be interpreted as a disincentive to wildlife conservation and as reining in the expansion of positive possibilities. The Ministry of Tourism and Wildlife opts for a command and control approach rather than focusing on enabling economic and institutional measures; KWS emerges as having a focus on paramilitary training and enforcement rather than on community collaboration.

Despite its central presence in the national Wildlife Conservation and Management Strategy, community-based natural resource management is not supported by the content of the 2007 draft Bill. The creation of wildlife associations described in Mara (see Chap. 3) would become subject to complex requirements (management plans, environmental impact assessments), major responsibilities of monitoring and enforcement, and approval by four tiers of committees (local, regional, district and constituency).

Mara, Amboseli and Kitengela are the only three ecosystems to be listed as Fourth Schedule, critically endangered ecosystems within the 2007 draft Bill. This categorization implies severe anthropogenic degradation, with a high risk of irreversible transformation. The draft Bill implies (though does not make explicit)

that these ecosystems will be made subject to recovery plans and protection measures, which can be imposed and legally enforced without consultation with landowners being necessary. Given persistent official misperceptions about pastoral land use and rangeland degradation, this could have serious implications for pastoral livelihoods.

9.3 Policies and Outcomes: Why the Gap?

Why have large proportions of rangeland populations stayed so poor, despite rising crop and livestock production, and despite policy and practice aimed at improving standards of living and security of food and livelihoods? Why have policies that recognize the need for landowners to benefit from wildlife on their land, failed in terms both of conserving wildlife populations, and of contributing to Maasai livelihoods? To what extent can these observed trends, each running counter to conventional assumptions, all be tied in to an integrated explanatory framework? Finally, can such a framework deliver insights for improving policy, practice and outcomes in the future?

Policies and the initiatives based on them are sometimes ineffectual in the face of market forces and practices driven by political and economic interests divergent from formal policy (Homewood, 2004). The pace of economic and land use change in Kenya's rangelands is driven more by market forces than by policy (Norton-Griffiths and Said, in press). However, some policies, such as land privatization, and the ban on consumptive use of wildlife, have been anything but ineffectual. They have had far-reaching impacts – both positive and negative, intended and unintended, described above.

This section first considers failures in attempts to make wildlife pay its way, and to influence Maasai decisions on land use. It goes on to review simulation models that evaluate land use change and shed light on land use decisions and flaws in current land use policies across Kenyan Maasailand.

9.3.1 Wildlife Revenue Sharing

The 1977 Wildlife (Conservation and Management) Act was meant to lay the basis for pastoral households to get income from the wildlife on their land, thereby enlisting their support for conservation. However, 'exclusion from a visibly profitable activity is a much more effective stimulus to production than encouragement (or enforcement) to produce what is not profitable' (Raikes, 1981, p. 23). Maasai populations have for well over 100 years been exhorted to transform their livestock production and instead to produce wildlife. They have repeatedly been moved, excluded or constrained for the benefit of wildlife. Yet wildlife revenues have been elusive for most, and hard to capture and retain where they do accrue. Norton-Griffiths

(1998, 2007a; Norton-Griffiths et al., 2008) estimates landowners capture around 5% of wildlife income, with the rest going to the tourism 'cartel' of service workers, management and investors. Worse still, landowners bear the main risk when tourism collapses, for example, in the face of civil disruption, as has happened at the time of writing in January 2008.

Whether short-changed by their own leaders or by outside operators, many resident Kenyan Maasai have either negotiated poor rates of return for wildlife tourism concerns operating on their land (Norton-Griffiths et al., 2008), or lost control of the land altogether (see for example rates of land sales in Kitengela, Chap. 4; also Chap. 5 and Rutten, 1992; Galaty, 1999). Studies in this book suggest that while some do well, most Maasai receive trivial returns from tourism. As a result, many Maasai landowners see wildlife as irrelevant to their central concerns of food security, long-term survival of the herd, cash for health and education needs, and diversification into off-farm employment for their children.

This has major implications for land use change and wildlife declines. Norton-Griffiths (2007a; Norton-Griffiths et al., 2008) uses regression analyses relating average returns to agriculture, livestock and wildlife for a range of agro-ecological conditions, to argue that across Kenya, landowners are making simple economic decisions to pursue the most profitable forms of land use. Simply put, the economic returns per unit area of land vary with agro-ecological potential and with land use, but across a very wide range of rainfall values, returns to crops outweigh returns to livestock, and outweigh revenues to wildlife even more. Only at the most arid end of the range do potential wildlife returns become comparable to or exceed those from crops or livestock. Added to this, the costs of wildlife in terms of disease, predation and crop damage, and now potential loss of control over resources to central government institutions with the draft Bill (2007), are such that eliminating or excluding wildlife significantly increases crop and livestock returns as well as autonomy. Wildlife cropping – where permitted – has been profitable less because of the direct returns than because of reduced impacts of wildlife presence (grazing competition, disease, etc., Norton-Griffiths and Said, in press).

The relatively poor returns from wildlife to Maasai households (and overall) are a product of several perverse aspects of policy and practice. First, the ban on consumptive uses of wildlife means that only game viewing on landowners' holdings can provide income to wildlife, and game viewing is most likely to take place in or near protected areas. Landowners further from prime viewing sites carry the costs of wildlife with no prospect of benefit. Tanzania by contrast makes considerable revenues from consumptive uses of wildlife, and those revenues accrue across the country irrespective of the location of protected areas. Parker (2006) argues for reinstatement of sport hunting under licence in Kenya as a way to allow landowners to benefit from wildlife on their land. Norton-Griffiths (1998, 2007a; Norton-Griffiths et al., 2008) argues more generally for the reinstatement of economic incentives so it is once again worth the while of landowners and users to conserve and invest in wildlife.

Beyond the general macroeconomic argument, the political economy and ecology of wildlife returns have significant implications for both conservation and for

development in Maasai rangelands. The distributional issues around wildlife returns have an important impact on both conservation and development outcomes. They differ markedly from the distribution of returns from cultivation and livestock, which are more easily captured by the landowner and are by their nature more widely distributed among households (Thompson and Homewood, 2002). Norton-Griffiths (2007a; Norton-Griffiths et al., 2008) shows that the relative shares of wildlife revenue captured by landowners and the tourism cartel are out of balance, with landowners capturing a scant 5% of returns. However, landowners are not a homogeneous group. Households differing in endowments, education and skills differ in their ability to capture wildlife returns, and those differences are important in determining the behaviour of landowners (cf. Ribot, 1998). The data presented in this book suggest only a few households capture most of the returns from wildlife, and of those fewer still reinvest in conservation. The majority of households is excluded from significant tourism returns and is likely to make their land use decisions accordingly (Thompson and Homewood, 2002; Thompson et al., 2002; Chaps. 3–5). This makes the outcomes even less favourable for conservation than Norton-Griffiths' case would allow.

Who are the landowners and beneficiaries, and how are they changing through time? Despite the wide range of types and management models that intensive farms and private conservancies encompass, many, particularly the more lucrative, are owned and/or run by outside investors (including expatriates), as is an increasing proportion of land across parts of Kenya Maasailand. Some concerns are managed by outsiders on behalf of local communities. For example, Laikipia shows the full range from very large conservancies with exclusive, luxury tourist facilities and global investor ownership, through to smaller, low-end concerns such as the Ndorobo community-based tourist enterprises (for Laikipia examples see Mizutani, 2005; Mara conservancies: Walpole and Leader-Williams, 2001). Aggregate figures for Laikipia are impressive.[4] However, disaggregated livelihoods data suggest that conservancy wildlife contributes significantly to local livelihoods in Laikipia primarily because incomes are so low overall that even small returns are significant, and because the Ndorobo owners of the conservancy are currently able to graze their livestock and gather resources illegally and unofficially on their absentee landowner neighbours' ranches, so are able to retain other livelihood activities (Mizutani, 2005). As for the majority of communities studied in this volume, local households' access to the benefits of tourism is limited. The implications of expanding tourism enterprises and private conservancies in Maasai rangelands under current models are ambivalent for Maasai livelihoods and poverty reduction. They could further undermine the hoped-for synergies of conservation and development. The draft Wildlife Bill offers few concrete enabling measures, and increases opportunities for rent-seeking. The DNLP, which could revolutionize access rights and distribution of benefits, is likely to be much toned down before it goes into effect, limiting potential reform.

[4] Annual tourist spend in Laikipia ca.~ US$30,604,160; 60% trade controlled by Kenya citizens; 55% concerns owner-operated; 1,250 tourist sector jobs with annual wage bill ca.~ US$2,677,864; annual operator spend an estimated US$1,530,208 on supplies in nearest urban centre Nanyuki (Norton-Griffiths, personal communication).

9.3.2 *Livestock Versus Agriculture: Simulation Models to Evaluate Land use Change in the Kenyan Rangelands*

There is a whole literature on the political and economic marginalization of pastoral societies across sub-Saharan Africa and beyond (Bonte and Galaty, 1991; Homewood, 2008; Oxfam, 2006; WISP, 2008; Little et al., 2008). An earlier section touched on the failure of agricultural policy to consider pastoral production as an economically and ecologically valid form of land use, and sketched the conventional economic and ecological wisdom, now much-challenged, which over decades has encouraged anti-pastoralist attitudes (cf. Tanzania's "National Anti-Livestock Policy": Chaps. 7 and 8). The political marginalization, remoteness and mobility of many pastoralists make it hard to deliver development inputs and infrastructure effectively (Haldermann, 1985). In spite of these disadvantages and disincentives, the majority of Kenyan Maasai are still choosing to prioritize livestock production over any other land use (Chaps. 3–5).

This section looks at work simulating the impacts of potential policy changes on farm productivity and poverty reduction in Kenya Maasailand. It discusses the broader challenges of fostering development in Kenya's arid and semi-arid rangelands and the extent to which this is consistent with conserving biodiversity, landscapes and productive, resilient savannas.

There have been numerous reviews, critiques and commentaries on development policy outcomes for poverty and livelihoods in Kenya's rangelands (Rutten, 1992; Oxfam, 2006; Swift et al., n.d.; Little et al., 2006). For example, Tegemeo data from Kamba smallholders in Makueni suggest livestock production can be considerably higher on land with broadly similar rainfall, and on 20 ha plots rather than the 50 ha plots of subdivided Maasai group ranches, but careful comparative analysis of the reasons underlying differences between Kamba and Kajiado remains to be carried out.

Alongside these reviews, a number of studies have sought to model the implications of specific policy actions. These include, for example, the implications of land subdivision for pastoral households (Thornton et al., 2006; Kabubo-Mariara et al., 2006), of intensification through breed improvement, water development (Boone et al., 2006) and/or soil conservation practice changes (Kabubo-Mariara et al., 2006). These studies are briefly reviewed here to explore possible lessons for policy.

Thornton et al. (2006) and Boone et al. (2006) build on decades of work by researchers in a number of Maasai ecosystems, integrating research ranging from community-level participatory feedback discussions of the motivations for and impacts of subdivision, through BurnSilver's work on the livelihoods and income streams of different households in Kajiado, to specialized systems and simulation modelling. They use a combination of two long-established modelling tools to explore the impacts of a range of possible policies and interventions in Kajiado. They link SAVANNA, a sophisticated ecosystem model, and PHEWS, a relatively simpler rule-based model, which is nonetheless capable of considerable differentiated detail and specificity in tracking cash and calorie flows for different types of

pastoral households. The SAVANNA-PHEWS simulations build up from grassroots processes, based on a detailed understanding of the ecological workings of pastoral and grazing land systems, and a Maasai-specific, locally-adapted model of pastoral household economy, processes and linkages, differentiated by wealth and by economic activities. The models take account of the range of household level strategies, income streams, production and consumption. Food requirement estimates are built up from the age and sex composition of the household and from international dietary requirements tables, adjusted for local intakes.

The PHEWS model estimates crop production for maize, beans and vegetables (tomatoes and onions) on a sliding scale and allowing for different levels of household income and expenditure on inputs and/or share cropping, as well as for different abilities to exploit cropping seasons, all leading to considerable variability in yields. Similarly, livestock production is estimated in terms of milk production for different seasons and consumption of meat from dead or dying animals as well as from periodic ceremonial slaughter. Off-farm and remittance earnings along with cash earnings from sales of milk, meat and crops are tracked as household cash flow and vary with wealth level. As well as purchases of grain, tea and sugar, there are recurrent expenditures on veterinary inputs, clinic and school fees.

In the model as in real life, shortfalls in consumption are made good by selling or exchanging livestock for grain, by gifts from family and friends or from food aid. The proportion of such externally derived calories in the diet is taken as a measure of food security. Market forces, transport networks, technology variables (mobile phones facilitating market information etc.) may have more than doubled farmgate prices for pastoral livestock producers in the last decade or so: these effects are captured in the household decisions which integrate constraints and opportunities through people's behavioural choices.

PHEWS tracks calories and cash flows on a monthly basis through iterative runs accumulating across years. Once linked to SAVANNA, which provides the ecosystem production conditions month by month, control runs simulate conditions for long runs of years and for different spatial extents. For example, to explore the effects of privatization, five simulation 24-year runs were then carried out for a 196 km^2 area for each group ranch (with associated population and livestock numbers scaled down to match) giving a 1 km^2-resolution picture of the implications of restricting herds to a private holding of average size.

The model showed that under conditions of subdivision restricting mobility, livestock numbers overall decrease drastically as a result of the restriction, as do livestock per person ($TLU.AE^{-1}$), mostly as a result of households having to sell more animals for food. As livestock numbers fall, the proportion of externally derived calories rises and food security deteriorates. Impacts are more marked in areas of lower agro-ecological potential. In addition to exploring subdivision, other simulations explored the implications of breed improvement by crossing Maasai zebu with the larger Sahiwal and Borana cattle; of increasing access to grazing areas by increasing water availability across space and through the year (by installing new pipelines, tanks and access points). The simulations suggested there is limited potential to intensify through breed improvement because of the greater

needs and vulnerabilities of the larger animals. A possible optimal mix might have around 40–60% of improved animals in a herd. Water development changes rangeland use in ways that constitute a mixed benefit. Most water development scenarios led to a decline in numbers of livestock, and eventually in food security, through overuse of otherwise reserved grazing. The model suggested optimal livestock numbers and performance could be achieved by strict controls on water development, allowing access only after 3 months of drought (Boone et al., 2006).

Loss of key dry season grazing could be compensated for some households and areas by expanding upland rainfed plots, but this is not a widely available option. The impacts of subdivision emerged as different for different households and ecological circumstances. However, SAVANNA-PHEWS simulations show clearly that unless owners of individual holdings can combine to form grazing associations, subdivision has problematic implications for differentiation, poverty and livelihoods. At the same time, the simulations suggest that there are only limited opportunities for intensification of cultivation and livestock production, and that it will be important to diversify off the land. Unless other economic opportunities develop outside agro-pastoralism, the prospects for improving standards of living among rural households remain poor.

Kabubo-Mariara et al. (2006) analyze three seasonal repeat-round surveys of 1,600 households in Kajiado. Rather than building up from grassroots processes as do the SAVANNA-PHEWS simulations, their analysis seeks to drill down from an essentially cross-sectional dataset, and then to use their empirically established regressions to simulate the impact of policy shifts effecting a 10% change in private land ownership and/or in adoption of soil conservation practice. Productivity was measured through the yields and prices of maize, beans and vegetables. It is not clear how (or whether) they integrated milk and meat production, consumption and trade into their estimation, though earlier associated work explores herding and livestock production (Kabubo-Mariara, 2002). The analysis is primarily statistical and economistic, with little ethnographic and ecological context, and despite statistical procedures designed to avoid auto-correlation and confusion over causality, it runs the risk of masking both the major distributional issues and the artefacts they may create.

Kabubo-Mariara et al. (2006) found that private property rights predicted higher revenue per acre, and that farmers with large holdings reported higher productivity than smaller holdings. To simulate policy impacts, the authors assumed that any increase in productivity enhances welfare, and explored the change in head count poverty index, which their empirically derived relations predicted would ensue from policy change. According to their simulation, a 10% increase in the proportion of land held privately would reduce the proportion of people living on less than a dollar a day from 21% of the sample population to 18.94%. A 10% increase in the proportion of farmers adopting soil conservation measures would reduce the head count by 1.4%. Combining the two would reduce the head count ratio by 2.2%. Increasing the biomass per unit area by 10% would reduce the head count by 2.5%. It is not clear whether ‘biomass increase’ was taken to represent some level of vegetation conservation, or is conflated with variation in agro-ecological conditions, which would be less open to manipulation.

On the face of it, the two very different approaches to simulating policy impacts produce radically different views of processes in Kajiado and carry quite different policy lessons for Kenya Maasailand (Thornton et al., 2006; Kabubo-Mariara et al., 2006). Consistent with ecological ideas of ideal free distribution and density-dependent habitat selection, SAVANNA-PHEWS warns against the spatially restricting effects of privatization and subdivision leading to the erosion of livestock production and hence of food and livelihoods security. SAVANNA-PHEWS sees the scope for compensatory expansion of cultivation as limited in terms both of absolute area and of who might be able to carry out such additional cropping. By contrast Kabubo-Mariara et al.'s (2006) study supports the neoclassical economics theory that privatization entails much-needed investment in soil and vegetation conservation, and they envisage it leading to improvements in crop production through increased agricultural productivity, based on intensified use of progressively improving soils.

It may be easier to reconcile these seemingly divergent policy lessons than may at first be apparent. The empirical relations established by Kabubo-Mariara et al. (2006) are in part created by better-off and/or in-migrant households farming privately-held higher agro-ecological potential areas at one end of the spectrum and poor dryland farmers working unadjudicated marginal lands at the other. Areas of high agro-ecological potential were more likely to be privatized sooner, and there was well-documented cherry-picking of such sites by elites or outside investors better able to invest in improvements. The predictions made by Thornton et al. (2006) deal with agro-pastoral Maasai households across arid and semi-arid rangelands, for whom livestock continue to be central to the household economy and for many of whom the political economy and political ecology of land privatization and subdivision have proven hard to control. It is not clear from Kabubo-Mariara's work (2002; Kabubo-Mariara et al., 2006) whether the knock-on effects of agriculture, such as reduced access to remaining resources and the impacts this has on mobility and livestock production, and for environment and livelihoods, have been fully integrated into the analysis. Finally, the empirical relations presented by Kabubo-Mariara et al., cannot easily take account of the displacement and dispossession effects that have become associated with processes of privatization, subdivision and land transfers in Kajiado and elsewhere (Rutten, 1992; Galaty, 1999; Mwangi, 2007; Murton, 1999; Igoe, 2007). These two studies focus on rather different, only partially congruent dimensions of resources and production systems within the rangelands, and the subgroups whose activities they analyze are only partially overlapping.

More importantly, the positive changes in poverty rates predicted by Kabubo-Mariara et al. (2006) are surprisingly small relative to the policy-practice changes on which they are predicated. If the caveats raised in the context of Kabubo-Mariara et al's (2006) work are problems in real life, then the small improvements predicted to follow on quite large policy-to-practice shifts might be achieved not only in very limited sites, but also at the expense of significant silent dispossession (Murton, 1999), if at all. This is not to deny that small improvements in soil conservation and fertility may accumulate to bring about long term significant change

(Kabubo-Mariara et al., 2006), but rather to suggest that the impact of such effects on poverty reduction and food security may be swamped by the magnitude of other changes driven by privatization policies in arid and semi-arid Kenya Maasailand.

The SAVANNA-PHEWS simulation studies thus suggest that notwithstanding panel data correlations between private tenure, investment in soil conservation and crop productivity, further privatization and subdivision could drive livestock losses, declining food security and impoverishment in arid and semi-arid Maasai rangelands. They suggest it is possible to mitigate these outcomes where households can develop cooperative grazing associations and diversify successfully into profitable non-farm activities (rather than alternative on-farm activities such as wildlife).

This brings us back to the continuing theoretical debate between ecologists and economists as to whether the optimal environmentally and economically sustainable land use system is achieved through, on the one hand, ideal free distributions allowing mobility and density-dependent habitat selection in response to patchy and unpredictable production, or on the other, private land tenure, which constrains mobility but allows investment. Both ecological and economic insights need to be kept in view and their relative importance and the forms of their interaction under different social and political systems better understood. In line with Thornton et al.'s (2006) predictions, Mwangi's analyses (2007a, b, c) show that pastoral households find ways to overcome the ecological constraints imposed by subdivision. The drive to subdivide and privatize individual holdings continues to be carried through, even where agro-ecological constraints make continued extensive livestock production and sharing larger areas of communal land clearly preferable. There is evidence that following subdivision, landowners have clubbed together to re-establish shared, reciprocal access in order to deal with the ecological constraints of patchy and variable intra- and inter-annual shifts in resource availability, both in the aftermath of group ranch demarcation (Grandin and Lembuya, 1987) and with the current subdivision of group ranches into individual plots (Kabubo-Mariara, 2002; Kabubo-Mariara et al., 2006).

Now that higher potential areas have largely been converted, intensification of livestock or crop production in rangelands seems to carry limited further potential to improve scenarios. Current markets and agricultural policies favour crop rather than livestock production, but the agro-ecological limitations of the rangelands, and the emerging impacts of climate change, are already imposing new challenges which mobile pastoralism may be better equipped to meet.

9.4 Policy/Practice Distortions: Powerful Players, 'Participation' and 'Partnership'

Most international conservation continues to be devised and directed by a small but influential group comprised of conservation organizations, donors and advisers. Despite widespread rhetoric concerning participation, local consultation and democratic approaches remain largely absent (Vermeulen and Sheil, 2007, p. 434).

This section considers broad governance issues affecting parks, wildlife and the future of ranching, land ownership and livelihoods in Kenya. Calls for conservation partnerships with local people are common, but the partnerships they envisage are often dictated by outside interests and may fall into the same trap they purport to avoid. They have been described as partnerships of the sort found between rider and horse, with one partner enjoying the scenery while the other shoulders the load (Mavhunga, 2007). Mavhunga (2007) focuses on who sets the agenda, whose priorities frame the initiatives, and how the costs and benefits are distributed. However, there is an additional issue, not always identified or acknowledged. Powerful outsiders choose congenial or expedient local structures or institutions through which to promote their aims, and on that same basis recognize some local groups as representative while avoiding others. Those processes of choice and recognition, and the conferring of conditional power which they entail, are not politically neutral, and can and do have serious impacts at all levels, national through to local.

> Natural resources are critical for local democratic development. They are already in the local area, they are meaningful for local livelihoods, and they generate revenue – as opposed to health, education and infrastructure sectors. Because powers over natural resources can strengthen local authorities, it matters deeply whom environmentalists choose to empower – democrats or despots, representatives or autocrats. (Ribot, 2006, p. 115–116)

Such processes of institutional choice and recognition may be powerful influences fostering or disrupting the growth of local democracy. Similarly, many feel that, in the end, only local democracy can underpin environmental justice and sustainability. However, it is clear that powerful interests can often impose their preferred outcomes irrespective of local wants and needs in the short and even medium term (Brockington, 2004). NGOs that act on the basis of principled decisions may find it harder to operate effectively than do those that take such an opportunistic, pragmatic approach (Avant, 2004). On the other hand, weak players are not powerless and can exercise considerable agency in shaping or stalling outcomes (Scott, 1985).

The impacts of disrupting processes of grassroots representation are particularly serious in the context of areas that are increasingly seeing the emergence of exclusive, identity-based forms of belonging (ethnicity, lineage, origin, etc.) rather than inclusive, residency based citizenship.

> Opting for local government is a choice for residency-based citizenship, choosing customary authorities produces and strengthens identity-based belonging, while privatization creates interest-based forms of belonging. Environmentalists must understand how the identities they are fostering interact, create mutuality or explode into violence. (Ribot, 2006, p. 117)

Support to local institutions is thus potentially a double-edged sword, given both the dependence it may foster on outside funding and also the resulting pressures on such institutions to let their primary functions of local representation slip in favour of a focus on securing further funding (Igoe, 2003; Sachedina, 2008). Accountability shifts away from a downward focus on the population that these organizations are supposedly representing, towards an upward focus on those who write the cheques (Ribot, 2006).

Policies for development and for conservation have created lucrative opportunities for some, but the livelihoods data presented in this volume suggest few positive

impacts for the wider population across Kenya Maasailand over the last decades. In Kenya's rangelands, the proliferation of initiatives seeking to foster local synergies between conservation and development has produced little for either rural people or for wildlife. On the contrary, rural development in the rangelands has if anything been undermined by the national and international preoccupation with wildlife. Environmentalists concerned about degradation, and government agencies concerned about losing control, have been over-ready to adopt and retain potentially misleading models of land use dynamics that justify displacement and restriction of pastoral production. For all the rhetoric of participation, livelihoods and poverty reduction, policy and practice have tried to transform and replace rather than support livestock production, have sought compliance through often flawed processes attempting but rarely achieving consultation, and presided over land privatization that has driven differentiation, dispossession and impoverishment for many while creating investment and wealth for some. Nonetheless, studies in this volume, and broader evaluations of pastoralism (WISP, 2008), suggest livestock rearing on extensive unimproved pastures remains the single most robust and important dimension of rangelands livelihoods. In terms of conservation, policies have failed to create positive incentives and opportunities for residents of the rangelands to support wildlife-compatible land uses, constrained people from making the most of the economic potential offered by wildlife, and facilitated elite capture rather than equitable distribution of returns.

The concentration of powerful conservation interests in Kenya has the potential to distort development priorities, potentially over-emphasizing both the role of wildlife in relation to other sources of livelihoods, and also the benefits from wildlife as opposed to the associated costs, in ways that have muddied working partnerships between conservationists, communities and individual landowners. That nexus of powerful conservation interests has impacted on local institutions, choosing some as partners and recognizing others as legitimate representatives, in ways that have taken little account of their broader context and which risk adversely affecting the evolution of grassroots democracy. Responsible NGOs and investors must recognize their interventions cannot be politically neutral. As part of their wider accountability, the many powerful conservation agencies and entrepreneurs seeking to shape policy and practice in Kenya need to take more responsibility for their choice of local institutions with which to work, and for the long-term effects of these choices on development and environment.

9.5 Summary and Conclusion

This chapter has outlined main areas of policy as they affect land rights, wildlife conservation, and agro/pastoral land use in Kenya. It set out some of the evidence as to the outcomes in practice of each of those areas of policy. It reviewed current economic, political-economic and political analyses as explanatory frameworks within which to understand the observed outcomes. The chapter explored the

implications for future policy, both in terms of the findings of current simulation studies addressing policy issues, and in terms of the wider theoretical understanding of the ways outside organizations at once support, undermine and shape policy and policy impacts.

Overall, there is little progress towards national goals in Kenya's rangelands, for all the strategies, policies, NGO and entrepreneurial time, money, research, intervention and implementation. In fact, changes across Kenya's rangelands and pastoral systems are arguably driven less immediately by policies than by markets, but policy environments have radically affected those markets and their access. Livestock remain the central pillar of household economies. However, the draft Livestock Policy 2006 shows few signs of enabling as opposed to regulatory measures, fails to engage with the informal systems currently operating much of the market, and does little justice to the dynamism, resilience and adaptability of pastoral livestock production.

Prominent international theorists in development economics emphasize the importance of property rights for the poor and, by extension, the desirability of privatizing in order to create land title.[5] However, the impact on poorer Maasai of the unfolding land privatization policies in Kenya is consistent with a more widely observed phenomenon:

> While "rights" still enjoy a central place in de Soto's works and in neoliberalism in general, they are substantially different than in the classical sense of a "social contract" between the state and its citizens. Rather, they are narrowly defined as guaranteed rights over property, which qualify people for loans, which in turn allow them to enter the global economy as investors, producers and consumers. Investments, of course, carry no guarantee. It is possible, even probable, that people will lose their capital due to limited opportunities on the bottom rungs of the ladder. Poor people are also more likely to consume capital due to the numerous emergencies in their lives. Moreover, poor people have little capital and little experience of how to effectively invest it. The reregulation of resources, even when ostensibly to their benefit, often works to their detriment. They often find themselves divested of their property even when that property is putatively protected by law. (Igoe, 2007, pp. 243–244)

Wildlife populations have diminished drastically, and yield comparatively few returns to total residents. Kenya's protected areas have singularly failed to preserve the species and ecosystems they were established to protect, and private conservancies are increasingly seen as the main if not the only effective way to conserve wildlife (Western et al., 2006; Norton-Griffiths, 2007a). It remains to be shown what private conservancies, however successful for conservation purposes, have done for Maasai residents, and for rural people generally in Kenya's arid and semi-arid rangelands. The studies in this book suggest that wildlife returns are generally too low to substitute for other natural resource-based livelihoods except in very particular areas, even in periods when tourism is functioning well. On top of this,

[5]De Soto/Albright Commission on legal empowerment of the Poor. -Available at www.undp.org/legalempowerment

the 2007 draft Wildlife Bill takes a command and control approach, centralizing rather than devolving powers, creating bureaucratic hurdles for community based conservation, and hampering economic incentives to wildlife conservation. Mara, Kitengela and Amboseli are singled out as critically endangered ecosystems where the Ministry of Tourism and Wildlife propose imposition of special measures of ecosystem management and recovery plans.

Norton-Griffiths (2007a) suggests bundles of changes to recreate incentives for landowners to conserve and keep wildlife; to ensure they receive a better proportion of total tourism earnings for wildlife; to impose greater accountability on NGOs and other agencies which drive through interventions; and to re-establish consumptive uses of wildlife. Others, less focused on wildlife and more on the people of these rangelands, suggest a more far-reaching revolution will be needed, addressing persistent marginalization (WISP, 2008; Mavhunga, 2007; Ribot, 2006). Conservation and development futures in Kenya are tied in with the future of land ownership, ranching and livelihoods generally. The bigger challenges of fostering the economic and broader welfare of the people of Kenya's arid and semi-arid areas must go beyond conserving biodiversity and landscapes and beyond allowing Kenya's productive, resilient savannas to become simply an opportunity for global investors. The DNLP 2007 addresses these issues head on, and has potentially momentous implications, but it remains to be seen how these will translate into action, and with what implications for Maasai livelihoods.

Maasailand has attracted intense interest from outside development agencies, conservation organizations and outside investors, both national and global. Powerful interests sometimes influence or over-ride government and the structures of local democratic representation. Those powerful and well-resourced players inject resources, and have generated an enormous diversity of different enterprises and models of community conservation, of which some may emerge as successful in important ways. However, outside organizations introducing new resources empower otherwise peripheral players and undermine the authority of established structures. Governments and their policies are weakened and sidelined, whether at the local, district or national level (Ribot, 2006). Where there is opportunity for corruption, the safeguards are down. Kenya's policy failures in pastoral development and wildlife conservation are in part a product of the very concentration of resources which outside interests have focused on those issues, and particularly of the power imbalance fed by conservation NGOs and global investors (Norton-Griffiths, 2007a; Ribot, 2006).

Some positive lessons for future policy emerge from this. First, there is an imperative need for a good evidence base to analyze and chart the outcomes of policy and to improve its formulation and workings. Such evidence has been used to good effect to analyze trends in wildlife populations and should continue to be gathered. However, evidence for progress on development in the ASALs exists only as patchy individual case studies, or as large-scale surveys so generalized (and, with respect to pastoralist households, so methodologically flawed) as to be hard to use reliably. More time and resources and above all careful qualitative understanding need to be put into developing the evidence base that will allow Kenya to evaluate

impacts of development policies in ASALs, using differentiated analyses which make clear the impacts for the poor as well as for the better off.

Second, the available evidence suggests that agricultural and livestock policies have been ill-suited to the more arid and semi-arid rangelands, as opposed to the higher-potential areas of Mau, Trans-Mara and Loitokitok, and have done little to aid the economic well-being of rural Maasai despite their increasingly acknowledged contribution to the national economy. The persistence of outdated policies is in part due to the slow rate at which new knowledge, insights and understandings may be taken up by government and other agencies. A number of organizations are engaged in awareness-raising, for example, WISP-net, IIED's and UN-OCHA's programmes, raising awareness among government officials on pastoralist ecology, economy and production, and empowering pastoralist communities to make their views heard by decision-makers (WISP, 2008). There are clear signs in the DNLP that these messages are beginning to get through. However, for those currently benefiting from the status quo, there may be little interest in acknowledging new approaches. This is harder to address, involving as it does working against vested interests, and encouraging controlling institutions to devolve power. Ultimately, the combination of pressure from community-based and civil society organizations pushing from below, and supranational policy-making and development agency networks pushing from above, may encourage both upward and downward accountability in ways which will foster better policies.

Thirdly then, international agencies, NGOs and entrepreneurs need to be engaged in their own processes of awareness raising and ensuring accountability. Codes of responsible practice (such as those emerging from the World Commission on Protected Areas taskforce on Protected Areas, Equity and Livelihoods) would foster evolution of representation and accountability, and would preclude the expedient shortcuts sometimes used by powerful players to achieve their own ends, disrupting local democratic processes in the short term, and jeopardizing environmental justice and sustainability in the longer term. Countering short-termism among donors and those they fund is a crucial part of this behavioural shift. Given the political economy of land markets, tourism revenues and global investors on the one hand, and of relatively poor rural communities and smallholders on the other, this will not be easily achieved. At the time of writing, Kenya is just emerging from serious disruption caused by conflicts of vested political interests, expressed through violence impacting mainly on the poorest of the poor. Similar events erupted in Kenya's Maasai rangelands in the recent past (Klopp, 2001; Homewood et al., 2004; Fratkin, 2008). Whatever the pressures contributing to Kenya's internal struggles over political power, it is possible for international agencies, NGOs and entrepreneurs to make choices that stabilize and foster inclusive representation, even if such choices appear to run counter to their own ends in the short term. Those who hold the power to dictate and shape policy – government, conservation NGOs, global investors – need to consider how their choices will foster or undermine environmental sustainability and poverty alleviation as well as economic development over the coming decades.

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Chapter 10
Staying Maasai? Pastoral Livelihoods, Diversification and the Role of Wildlife in Development

Katherine Homewood, Pippa Chenevix Trench, and Patti Kristjanson

10.1 Introduction

This book set out to explore Maasai livelihoods in a time of diversification and change. It presents a picture of Maasai life at the outset of the twenty-first century, and the continuities and transformations involved (Spear and Waller, 1993). Images of Maasai have been co-opted as international icons over the last decades: they are used locally and internationally to sell every type of product, from holidays and mobile phones to outdoor gear and fashionable shoes. The image of the Maasai warrior is exploited by politicians invoking an international rhetoric of indigeneity and indigenous rights (Galaty, 1993). The iconic Maasai stereotype encompasses numerous contradictions: a pastoralist tradition officially seen as backward and environmentally destructive, a way of life nationally held to be primitive and undesirable in a modern African state, a custodian of African heritage, an international tourist attraction, and a symbol of physical courage – an attributed characteristic which makes Maasai locally valued as security guards. None of these perceptions capture the solid practicalities or the environmental and economic rationales and realities of Maasai land use and livelihoods, nor the enduring capacity of Maasai society to assimilate new elements and adapt to change (Berntsen, 1976; Waller, 1993). The first and most general purpose of this book is to deliver a much-needed reality check to correct national and international perceptions of contemporary Maasai ways of life.

This concluding chapter begins with an overview and cross-site comparative analysis of the findings presented throughout this book on Maasai livelihoods. This overview is then used to explore two issues of overarching contemporary importance, each with wide ramifications in environment and development policy. First, the studies in this book have implications for our understanding of the nature, scale and continuing importance of change and socioeconomic differentiation in East African rangelands, the ecological, economic and political context of pastoralist poverty, and the nature and effects of rural diversification in East Africa. Second, this chapter explores the

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implications of the case study chapters for understanding the potential and actual contributions which wildlife conservation makes to livelihoods, their mismatch with national and international assumptions about the importance of that contribution, and the implications for the future of East African savanna wildlife. Within this context we also consider methodological implications of livelihoods studies for evaluating conservation and development intervention outcomes. This comes at a time when major debates are emerging about the ways in which impacts of conservation initiatives on poverty and development (and vice versa) should be rigorously evaluated (Adams and Hulme, 2001; Adams et al., 2004; Adams and Hutton, 2007; West et al., 2006; Brockington et al., 2006; Brockington and Schmidt-Soltau, 2004; Emerton, 2001; Igoe, 2007).

This book is intended to complement the many ethnographies that describe in great detail the social complexity and rich fabric of Maasai society. Maasai culture and identity is far more than the sum of what they do or how they do it. This volume is of necessity restricted to a specific focus. However, poverty and diversification on the one hand, and wildlife-related activities on the other, have implications for national and international policy on land use, livestock management and conservation. This comparative cross-site overview of Maasai livelihoods offers a basis for rethinking and reshaping current policies that, at the outset of the twenty-first century, appear to be undermining, rather than fostering, sustainable livelihoods and wildlife conservation across Maasai rangelands.

10.1.1 Summary of Approach

The overview and synthesis of Maasai livelihoods presented in this chapter draws together detailed research from three Kenyan and two Tanzanian study areas (Table 10.1) into a standardized framework allowing rigorous cross-border and cross-site comparisons, effectively delivering a meta-analysis of in-depth household-level data from across Maasailand. As seen in Table 10.1, the five sites represent very different circumstances, ranging from populations adjacent to very high-earning conservation areas (Mara), to others where newly designated (and low-earning) conservation areas are being carved out of former pastoral grazing lands (Longido), to areas where natural resource use is newly dominated by very significant but probably short-lived mining revenues (Tarangire). They include remote rural areas where local options to diversify beyond grazing, farming and wildlife tourism are few (Amboseli, Longido), and peri-urban populations (Kitengela) where land leasing, sale of produce to urban markets and off/non-farm employment are all significant sources of income. Finally, including both Kenyan and Tanzanian sites reflects national contrasts in economic prosperity, land tenure and other policies (such as hunting, banned in Kenya, state-licensed in Tanzania).

Building on a conceptual model that focuses attention on decisions at household level as central to understanding land use and livelihoods choices, the authors in this book set out to address four main questions:

– What are Maasai households doing?
– How well are they doing?

Table 10.1 Cross-site summary data

Site	Area (km^2)	Rain (mm/pa)	PA	Conservation/eco-tourism project	Number of hh (AU/hh)	TLU/AU (median)	Notes
Mara	6,500	400–1,200	Maasai Mara NR	Numerous WAs/tourism operations, etc.	219 (7.4)	13 (6.2)	MMNR: $15–20 million pa Most GRs subdivided Top 25% own 58% TLU (1998) dropping to 36% (2004)
Kitengela	390	<600	Nairobi NP	KILA	177 (4)	7.2 (5.8)	Urban effect: Land values >100,000Ksh/acre Milk sales=one-third income Population increase ×2.5 1989–1999 Pure pastoralists poorest Diversified agro-pastoralists richest Top 20% own 47% TLUs
Amboseli	8,400	350–600	Amboseli NP/R	Numerous small tourism operations	184 (8.9)	6.3 (–)	Top 10% own 45% TLU Poorest clusters = livestock only Richest clusters = 1. Livestock + wage earning 2. Diversified agro-pastoralists
Longido	9,220	300–600	None, but ringed by PAs	Enduimet WMA	229 (8.9)	4.2 (2.4)	Top 7% own 50% TLU Poor cluster = no income Richest = well off lowland agro-pastoralists
Tarangire	22,200	650	Tarangire Manyara NPs = 13% area	Emboreet CBC Manyara Ranch, etc.	26/194 (5.7)	4.1 (2.66)	Top 20% own 66% TLUs $4.5 million pa gate fees to LMNP/TNP $0.5 million hunting revenues 35% hh get mining-related remittances (include brokerage) 45% respondents involved in mining at some stage

– What factors influence people's choice of income earning activities?
– What factors influence how well they do?

In a multi-year collaboration between researchers, standard sets of income and explanatory variables were collected or derived for each of the study sites, despite site- and study-specific variation. Cluster analysis was used to identify common livelihood strategies within each area in an objective and statistically rigorous way. Regression analysis identified the factors explaining variation both in income levels across households and in livelihood cluster membership.

In addition to quantitative data, family portrait studies and analysis of institutional and policy contexts captured a qualitatively richer picture of livelihoods and livelihoods change in different areas. These contributions provide an important broader historical and social context, and the family portraits in particular allowed a deeper understanding of the role of the individual within the household in driving change.

Household samples were based on village or group ranch lists, supplemented by informant interviews. Each case study sought to encompass variation in wealth or poverty and also in environmental conditions. Although there were no formal sample frames in the form of up-to-date electoral rolls, and village or group ranch lists tend to be incomplete and out of date, the different samples represent a broad cross-section of Maasai residing in and using pastoral areas. It was not always possible to capture the richest, who are unlikely to be locally resident as they commonly have cosmopolitan bases and operate as absentee landowners and herd owners (with a disproportionately large influence on land use decisions). In some cases these studies will not have captured the poorest either, especially where they are socially invisible as dependents in other people's households, or as landless, stockless, sometimes homeless migrants in rural trading centres and urban slums.

10.2 Staying Maasai? Livestock, Cultivation and Non-farm work in Contemporary Rangeland Livelihoods

Case study chapters focused on the use of clustering techniques to explore livelihood strategies, and this chapter draws on a comparative overview of those analyses. However, cluster analyses are very site specific. In order to ensure the highest degree of comparability between sites within this volume, and also between the findings of the present volume and those of other studies (e.g., the PARIMA studies described in Little et al., 2008), the present chapter also draws together case study findings through simple descriptive statistics. Cross-site comparative findings are summarized by mean returns from different activities (averaged only across those households engaging in any given activity – Table 10.2) and by mean gross annual household incomes (averaging across all households, including those not engaging in particular activities) as well as income per person per year and per day (Table 10.3).

Table 10.2 Mean[a] value of income in $/household/year for households involved in these activities only (standard deviation in brackets)

	Mara (n = 219)		Kitengela (n = 177)		Amboseli (n = 184)		Longido (n = 229)		Tarangire[f] (n = 27; 192)	
	Mean income	Per cent households involved	Mean income	Per cent households involved	Mean income	Per cent households involved	Mean income	Per cent households involved[g]	Mean income	Per cent households involved
Salaries/ wages (±SD)	619	8	1245 (±1149)	38	672 (±750)	19	387 (±566)	29	728 (±2020)	24
Remittances[b] (±SD)	–	–	–	–	–	–	44 (±82)	6	254 (±387)	7
Wildlife-related (±SD)	601 (±691)	64	248 (±135)	14	691 (±706)	8	44 (±36)	3	974 (±1631)	8
Business (±SD)	279[e] (±263)	24	1119 (±1064)	53	502 (±584)	38	314 (±304)	19	619 (±598)	5
Petty trade (±SD)			308 (±244)	9	152 (±126)	13	40 (±28)	6	294 (±350)	3
Mining (±SD)	0	0	0	0	0	0	0	0	1035 (±1695)	32
Crops[c] (±SD)	52 (±105)	24	202 (±284)	68	390 (±496)	47	175 (±266)	67	405 (±705)	88
Land lease (±SD)	1593 (±763)	4	0	0	0	0	0		–	
Livestock[d] (±SD)	2079 (±2776)	94	1345 (±1810)	99	1025 (±1207)	98	753 (±1595)	95	1325* (±1612)	96

Dash signifies information not captured

[a]Average value calculated only for households engaging in that activity

[b]Data on remittance income only available for Longido and Tarangire

[c]Includes value of crops sold and consumed

[d]Includes value of live animals and milk sold, value of livestock slaughtered and sale of other livestock products (hides and skin)

[e]In Mara, petty trade and business were combined

[f]In Tarangire, livestock data based on n = 27, all other statistics, n = 192 Maasai households

[g]Per cent households involved include households who had livestock and/or cultivated but who did not get income or for whom crops fail

Table 10.3 Mean value of total annual gross income in $/household/year for ALL households sampled (±standard deviation)

Total gross income	Mara	Kitengela[a]	Amboseli	Longido	Tarangire (n = 26)
$/household/year (average)	2625 ± 2892	2511 ± 2497	1583 ± 1655	733 ± 1518	2317 ± 2150
$/household/year (median)	1627	2340	–	259	1759
Mean household size (people)	8.61	3.86	12.45	12.2	7.5
$average/person/year	305 ± 354	650 ± 647	127 ± 133	60 ± 124	309 ± 287
$average/person/day	0.84	1.78	0.35	0.16	0.85

[a]Income figures for Kitengela do not include milk income so as to be more directly comparable with other sites. Total income including milk sales average US$ 3205 ± 2743/household/year (Chap. 4)

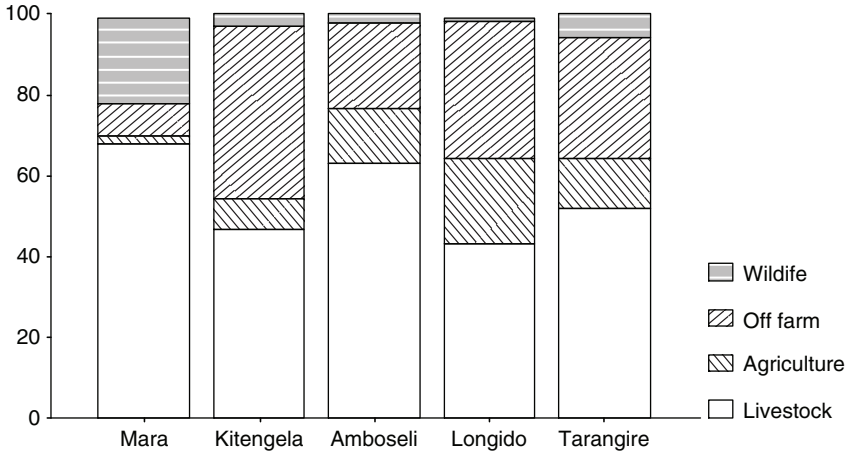

Fig. 10.1 Cross-site comparison of household income – proportion of income from different sources

Figure 10.1 gives a cross-site comparison of proportional composition of income as derived from different activities, averaged across all households in any one site. Figure 10.2 shows for each site the proportional contribution of income from different activities for different wealth and income categories. These categories are calculated as quintiles (from the poorest 20% to the wealthiest 20% of households) with the breakdown calculated both by wealth in livestock (Fig. 10.2a: wealth quintiles) and by gross annual income (Fig. 10.2b: income quintiles).

Despite very wide cross- and within-site variability, a number of patterns with respect to livelihood strategies and related earnings emerge across all sites (Table 10.2; Figs. 10.1 and 10.2a, b). First and most striking, emerging clearly from all the case study chapters, is the central importance of livestock in an overwhelming majority of Maasai livelihood clusters. This is borne out by the fact that livestock are consistently the single greatest income stream, both in the pooled results (Table 10.2; Fig. 10.1) and in the data disaggregated by wealth and income categories for each site

(Fig. 10.2a, b) Second, there are lessons to be learned from both the similarities and differences in livelihood strategies found in the different sites. When households are grouped using statistical clustering techniques, three out of four sites displayed a livelihoods cluster approximating a 'traditional/pure pastoralist' group and another equivalent to a 'wage earning/livestock producing' group. In Mara, comparable clusters included a significant element of wildlife-related activities. There are no cluster analyses for Tarangire. The relative roles of livestock, agriculture, wildlife-related income-generating activities, and/or non-farm income activities in defining clusters vary across the different sites, depending on local agro-climatic and economic conditions. The relative return to each of these activities in turn is explored below before looking at a comparison of overall incomes.

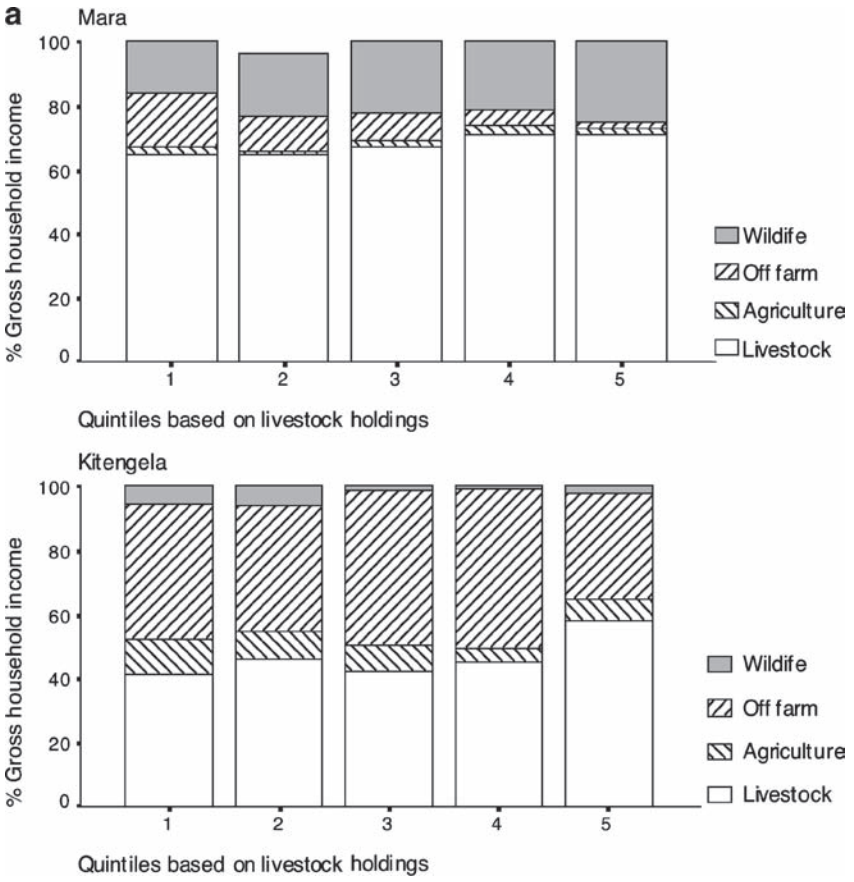

Fig. 10.2a Relative importance of different income sources across different wealth quintiles for each site – quintiles based on livestock holdings (*1* = least livestock, *5* = most livestock)

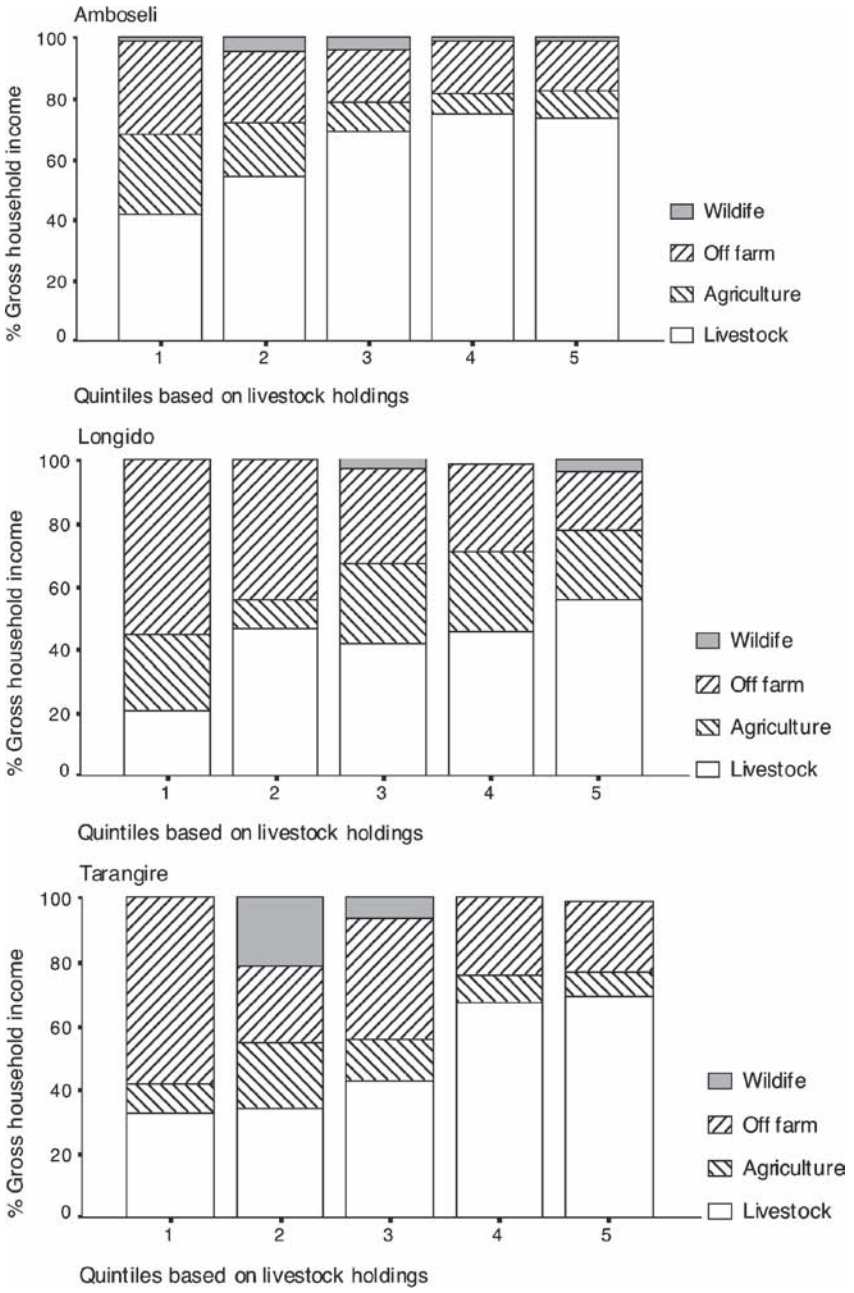

Fig. 10.2a (continued)

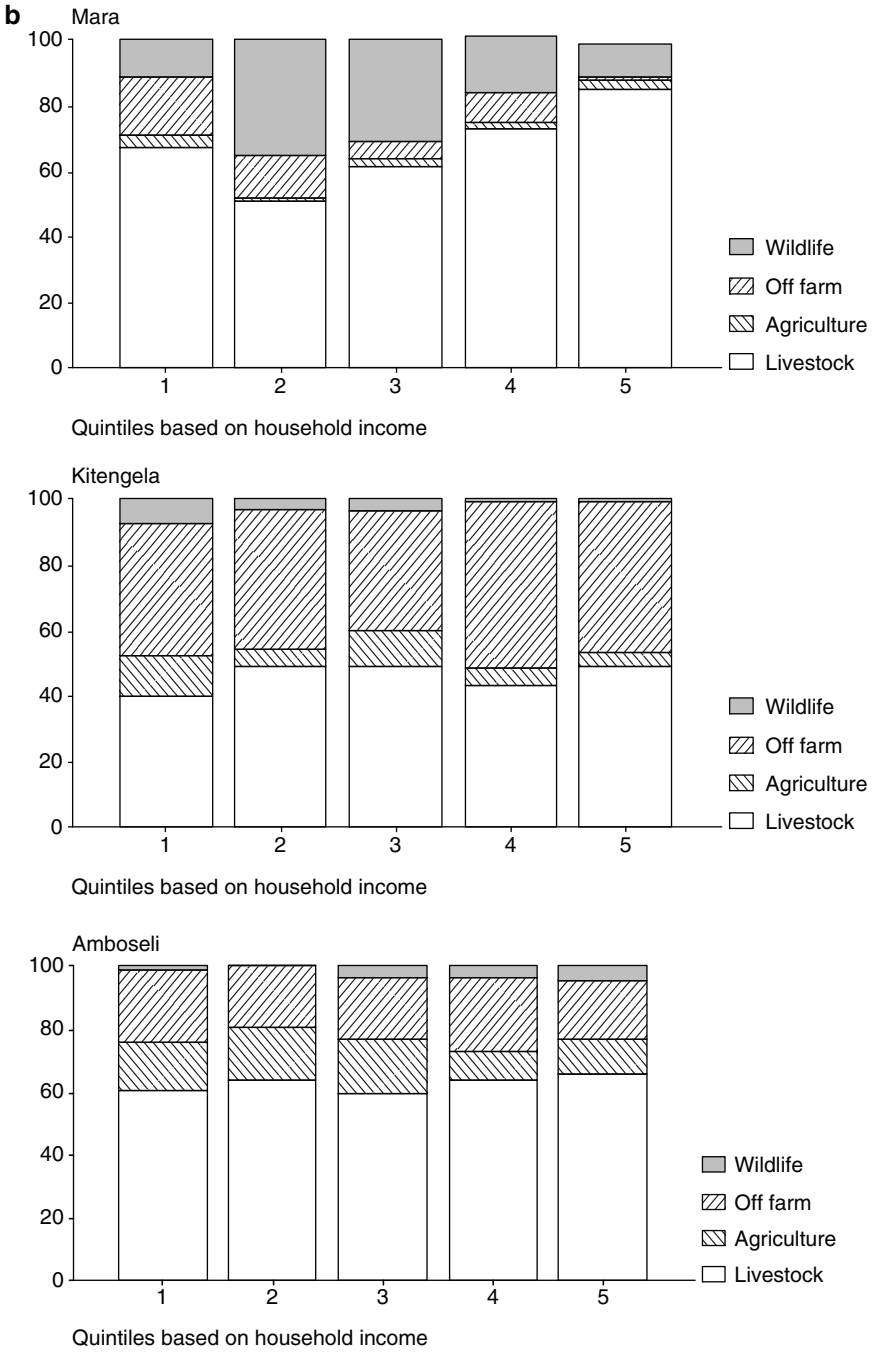

Fig. 10.2b (continued) Relative importance of different income sources across different wealth quintiles for each site – quintiles based on gross household income (*1* = least income, *5* = highest income)

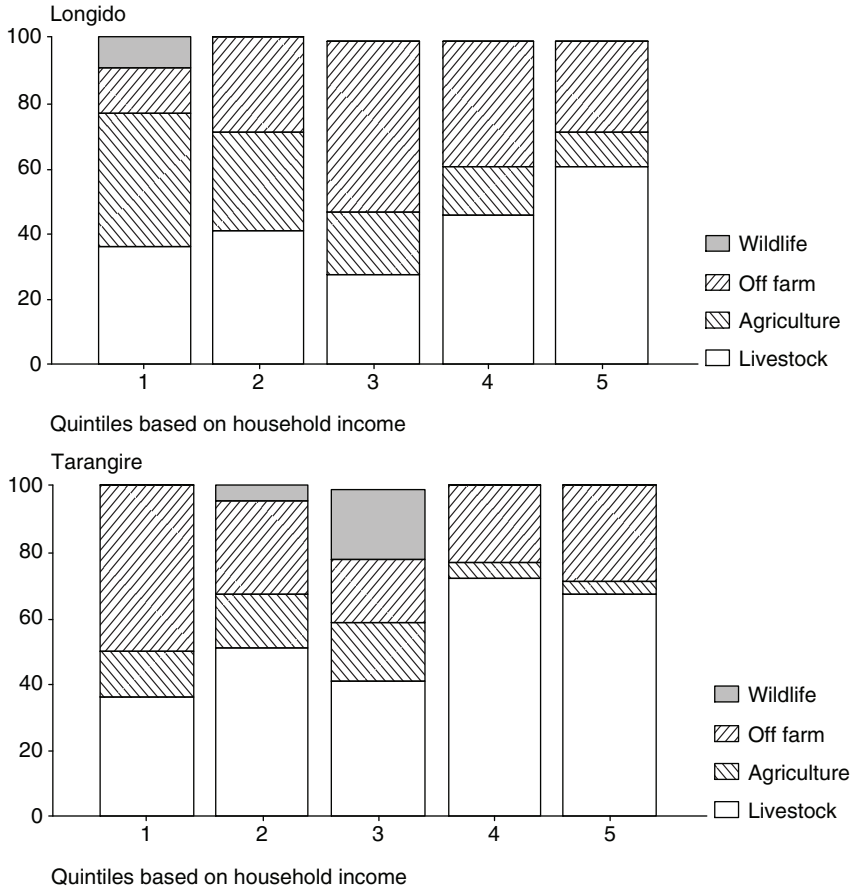

Fig. 10.2b (continued)

10.2.1 Livestock

Maasai households resident in the rangelands remain above all keepers and managers of livestock, and most households both rich and poor derive a very important part of their subsistence from their herd. The overwhelming majority of households have livestock (95–99% households across all sites: Table 10.2). Individual case study chapters showed that livestock account for upwards of half of all mean income in all clusters (other than for Longido's destitute and non-farm wage workers: see Chap. 6) and around half or more of all mean income figures for the pooled samples in each site (Fig. 10.1). Longido, with the lowest overall proportional contribution from livestock, nonetheless averages over 40% mean annual household income from this source. Livestock remain clearly central to Maasai livelihoods as the biggest single contributor across all wealth and income categories (Fig. 10.2a, b).

Milk sales were not fully captured in all sites and so the importance of income from livestock is if anything underestimated. Poorer households rely on livestock as a possible pathway out of poverty when things are hard. For example, primarily wage-earning clusters in Longido invest in livestock purchases despite their poverty (Chap. 6). Better-off households use livestock as a major part of their investment portfolios. Non-farm work, cultivation or income from wildlife-related activities are bound up with reinvestment in, continued use of, and reliance upon, livestock (see Family Portraits). These are all widely recognized pastoralist strategies (Dahl and Hjort, 1976; Mace, 1989, 1993; Homewood, 2008).

Depending on the site, sales of animals (e.g., Mara, Chap. 3) and/or of milk (Kitengela, Chap. 4) represent major income streams. As well as sales, livestock are cited as an important investment in all sites and for all wealth levels. However diversified, rural Maasai remain pastoralists and people of cattle. Livestock remain their most trusted and their most consistently sought after land use in the semi-arid rangelands.

At the same time, analyses from all case study sites described in earlier chapters made it clear that a significant proportion of households in all sites have too few livestock to fully support their members. Contrary to popular myth and official preconceptions, these are not egalitarian societies, livestock are unequally distributed (Table 10.1, last column) and the majority of Maasai are not livestock-rich. The preponderance of households with small numbers of livestock is emphasized by the way mean values of TLU per household or capita are consistently skewed upwards by the small number of very wealthy herd owners, making means much higher than the medians. Most livestock are concentrated in hands of a few, with the top 10–20% owning 45–66% of all TLUs across all sites (Table 10.1). Interestingly, it is the poorest site (Longido, Chap. 6) which has the most inequitable distribution of livestock (top 7% own 50% TLU), followed by Tarangire and the poorest Kenyan site, Amboseli. Mara and Kitengela, relatively prosperous Kenyan sites, have the most equitable distribution of livestock, with the top 20–25% owning around half all TLUs. Irrespective of site- and country-specific differences in equitability of livestock ownership, non-livestock income is a necessity for most, and especially for the poorest, quite apart from offering a potentially positive option for the few able to access high quality, well-watered farmland and/or able to secure relatively high-paying non-farm jobs in the private or public sectors.

It is also clear that those clusters relying primarily on livestock income are by no means the best-off in any site. On the contrary, the case studies made it clear that despite the very high variability within any one cluster, mean and median incomes tend to be highest for various kinds of diversified agro-pastoralist clusters who derive returns from livestock, non-farm work and rainfed cultivation, as well as in some cases from wildlife and from irrigated or upland farming. Staying Maasai may mean a continuing central reliance on livestock, but this by no means equates to a conservative dependence on pure pastoralism. Many Maasai say they cultivate – or carry out non-farm or wildlife-related work – so as to minimize livestock sales and to stay Maasai (cf. O'Malley, 2003). Aspirations over cultivation, education and off-farm work are integrated alongside, rather than replacing, customary values centred on livestock (Bishop, 2007; Sachedina, 2008).

10.2.2 Cultivation

Cultivation is widely practiced, despite the semi-arid nature of these rangelands, the high risk of dryland crop failure and the limited access of most households to more reliably productive irrigated, wetland or upland farms. Two-thirds of households in Kitengela and Longido farm; almost all households in Tarangire (88%) and just under half in Amboseli (Table 10.2). The exception is Mara, where only one-quarter of households interviewed in 2004 cultivated. Across Maasailand, maize is the predominant crop sown, despite the fact that the high water requirements of maize make it a risky crop in semi-arid environments. Where there is the possibility of irrigated cultivation, people grow tomatoes and other vegetables, as in the irrigated swamp areas around Amboseli, and along the Mara River. Some Maasai also grow beans where rainfall is adequate and where there is a ready market, as around Tarangire, but diversification of crops among the Maasai is generally limited. It appears that maize is the preferred crop due to consumption preferences, perhaps coupled with lack of access to seeds and information on more drought-adapted crops and farming strategies.

The risky nature of farming in much of Maasailand is reflected in the high probability of total harvest failure as well as relatively poor returns from cultivation in relation to overall incomes (Figs. 10.1 and 10.2a). In Mara more than 50% of households that cultivated in 2004 had no harvest, compared to 25% in Kitengela and 11% in Tarangire. The risk of total harvest failure varied within sites as well as between them, depending on the availability of cooler, more productive upland areas or even irrigated swamp areas (as in Amboseli), as opposed to drier lowland areas where rainfall is lower and more subject to variation. Thus, in Longido 22% of households cultivating in the cooler upland areas failed to harvest any crop, while the equivalent figure for households cultivating in the lowland areas was 37%. In Amboseli, 19% of households farming lowland rainfed areas failed to harvest any crops, but some households were able to spread their risk by cultivating upland and irrigated swampland. In most sites there were areas or sub-villages in which households did not cultivate at all due to lack of reliable rainfall and/or the high risk of crop damage by wildlife.

The proportional contributions of cultivation to mean annual income were likewise highly variable within and between sites. Overall in Mara, even among the three ‘agro-pastoral’ clusters, crops contributed just 2–3% of overall income. In Amboseli, crops contributed 14% to gross annual household income overall (10–20% across different income categories). Households from the ‘irrigated and upland agro-pastoral’ cluster derived on average around 50% of their income from agriculture, but this represents less than 10% of the total population; only 22% of Amboseli households derived more than a quarter of their gross annual income from agriculture (Chap. 5). In Tarangire, 88% of households cultivated, but crop income among all households made up just 12% of total income on average. Of the two-thirds of households that cultivated in Longido and Kitengela, the value of crops consumed and sold by households accounted for a mean of 21% of overall

gross income for Longido households, but only 8% for the Kitengela households. Looking back at the case study cluster analyses, in Kitengela, the *maximum* mean gross annual income from cultivation among all clusters was 10% (Chap. 4), while in Longido, cluster means for annual income from cultivation ranged from none at all to around 50%, with household reliance on crops varying according to livelihood strategy.

Comparing agricultural income among households of different wealth (based on household income, not assets: Fig. 10.2b), agriculture consistently appears to contribute a greater proportion of gross household income among the poorer quintiles (1–3) than among the wealthier quintiles, although these figures hide considerable variation. This trend is less evident when comparing quintiles based on assets (livestock holdings: Fig. 10.2a).

Irrigated and upland cultivation are both considerably more reliable and also deliver considerably higher yields than does cultivation across the dry rainfed lowlands. However, riverine, swamp and high-lying, agro-ecologically more favoured lands are by definition rare in these arid and semi-arid landscapes. They represent key resources and drought refuges for livestock and wildlife (Woodhouse et al., 2000) and as such their conversion to agriculture entails a significant reduction in the number of livestock or wildlife that the much wider dryland area can support. In Amboseli and Loitokitok, where there has been long-term monitoring of land cover for decades, such sites have rapidly been converted to cultivation, and the potential for further intensification is very limited (Chap. 5; Campbell et al., 2003; Boone et al., 2006; Shompole swamp: Lambin and Mertens, 2001; Kimani swamp: Southgate and Hulme, 2000).

It is intriguing that so many households cultivate, despite generally poor returns and the negative impacts of agricultural conversion for livestock production. The threat of wildlife damage in specific areas within almost all study sites was enough to prevent cultivation by those households concerned, and agro-climatic conditions likewise prevented cultivation in, for example, Sinya in Longido (Chap. 6). But households were still cultivating in areas where the probability of total harvest failure was more than 50%. Some households, particularly in Longido and to some extent Amboseli, cultivate because of poverty and lack of alternative opportunities. Even for less constrained households, it is likely that the occasional harvest is still of value, reducing the need to trade out livestock for grain and contributing in a small way to food security and to protecting the herd. Also, there have been strong national pressures to adopt cultivation, with constant media and educational encouragement to farm, in Tanzania in particular (Bishop, 2007).

In addition to its potential (if limited) benefits for subsistence, cultivation can be of tremendous importance as a tenure strategy, both in Tanzania and in Kenya. In Longido and around Tarangire, Tanzanian villagers are losing land through deals that outside investors or organizations increasingly negotiate directly with the State (Igoe and Brockington, 1999; Igoe, 2007). Around Tarangire, households cite concerns over expansion of the protected area and conservation-related limitations on land use as a reason (or even a moral imperative) for cultivating in the Simanjiro Plains (Chap. 7; Sachedina, 2008). In both Kenya and Tanzania, it is still hard for herders

to demonstrate 'prior use' rights to open rangeland. The presence of cultivated fields marks at least a tentative claim to prior use, and makes possible a bid for compensation in the case of land loss. On former group ranches in Kenya, a permanent homestead site and associated cultivation have been one element in establishing legitimate membership on the land register, and of staking claim to land title for a specific location (Grandin, 1986). Around Mara, where land subdivision and titling is largely completed, cultivation may now be of less significance as a tenure strategy. This, in combination with high risks of crop failure due to agro-climatic limitations and wildlife damage, and the relatively good wildlife-related economic opportunities, may explain the low levels of involvement in agriculture by households resident around the Mara. By contrast, in Kitengela, although land subdivision and titling were completed two decades back, cultivation seems to represent a widespread, small but nonetheless useful supplement to the household, with relatively better prospects of a successful harvest.

The data presented in the chapters and summarized thus far are focused largely on small-scale cultivation undertaken by households or, in the case of Tarangire and Amboseli, through leasehold agreements on a relatively small scale. The main exception to this is around Mara where households were asked about income from land leased out for large-scale mechanized agriculture. While small-scale agriculture may be a significant driver of land use change in many cases, the impact of large-scale cereal farming and other horticulture industries on Maasailand cannot be overstated, particularly around the Mara and Tarangire. Large-scale cereal cultivation spread rapidly around the Mara during the 1980s and 1990s. The Mau escarpment, the TransMara Plateau and other agro-ecologically favoured areas are already largely converted, however, irrigated cultivation of high-value crops is still spreading along the banks of the Mara River, with implications for the whole ecosystem which are only now becoming apparent (Gereta et al., 2003).

Earlier work suggested that the conversion of land around the Mara was primarily driven by local elites (Homewood et al., 2001; Thompson et al., 2002), as well as by absentee landowners, national and international investors beyond the reach of the studies in this volume. These were also the main beneficiaries of wildlife revenues, and the evidence suggested that people earning the most from wildlife were likely to reinvest in cultivation rather than in conservation, driven by the economic logic of access to, scale and control of revenue (Thompson et al., 2002; Thompson and Homewood, 2002; Tarangire, Chap. 7). The results from the Mara case study (Chap. 3) suggest that large-scale cereal cultivation has in fact declined around the Mara, although irrigation along the Mara River continues to expand. Many of the first wave of (largely expatriate) outside investors appear to have withdrawn, due in part to the difficulties of negotiating with multiple individual landholders as opposed to striking deals with a single group ranch committee. Although other investors have in some cases taken their place, yields are thought to have become progressively less profitable due to soil fertility decline and climatic downturn (Chap. 3). These abandoned fields provide poor grazing opportunities due to land degradation and the predominance of non-palatable weeds, placing large areas outside of any sort of economic productivity.

By contrast, around Tarangire, large-scale maize cultivation continues to spread and its commercial as well as tenurial payoffs have become widely recognized (Chap. 7; Sachedina, 2008), with inevitable impacts on wildlife and on mobility and pasture access for livestock.

Given poor yields and the consistently low contribution to livelihoods, what are the prospects for more intensive cultivation in the Maasai rangelands? Some parts of Maasailand still have potential for irrigated cultivation, upland farming and large-scale commercial cultivation, whether by Maasai households or by absentee landowners and outside investors. Analyses of land use change have not only plotted the rapid conversion of higher potential sites (Loitokitok: Campbell et al., 2003; Kimani and Pickard, 1998) but have predicted continuing conversion driven by economic incentives (Norton-Griffiths, 2007). Government policies and plans for such intensification (and extensification: see, e.g., Kabubo-Mariara, 2006) also have important implications.

10.2.3 Non-farm Activities

Non-farm income includes returns from petty trade, business activities, wages or salaried income, and remittances from temporarily absent household members. Chapter 2 lists the wide range of non-farm activities recorded in the case studies. Other researchers have developed similar catalogues for Maasai (Coast, 2002; May, 2002) and for other East African pastoralist groups (Little et al., 2001, 2006, in press). For the purposes of the studies in this volume, 'non-farm income' *excludes* earnings derived from conservation dividends and tourism-related activities, such as craft sales, or employment as a tourist guide or in a lodge. Given the scale and importance of wildlife conservation in Maasailand, wildlife-related income streams are treated separately so as to make clear the contribution of wildlife and conservation-related activities to Maasai household income. They are addressed in a later section.

It is clear that non-farm diversification is of extreme importance for many Maasai households. Non-farm income accounts for 8% of overall income in Mara, 20% in Amboseli, 30% of income across all income categories in Tarangire, 34% in Longido and 43% of overall household income in Kitengela (Figs. 10.1 and 10.2a, b).

While governments and outside observers tend to assume that there is a natural trend from pastoralism to agro-pastoralism, the findings of case studies in this volume suggest that in terms of contribution to household income (Fig. 10.1), in terms of the proportions of households involved and in terms of engagement across the full range of livelihood strategies and of wealth categories, non-farm work is considerably more important than is cultivation to the majority of rural Maasai, and second only to livestock in its contribution to mean household incomes. The main exception to this is in the Mara, where wildlife-related income streams are more important than off farm income. Most Maasai are not so much agro-pastoralists as wage earning (or entrepreneurial) pastoralists. However, just as it is important to be aware of the major distinctions between those cultivating upland and/or irrigated land versus

those cultivating rainfed dryland, so it is important to recognize the major distinctions between the returns from casual unskilled work and those from high-earning regular jobs (see, e.g., Chap. 3, Amboseli and Chap. 6, Longido), as well as from windfall work (e.g., mining-related brokerage in Tarangire, Chap. 7; and brief windows of land-leasing for mechanized cultivation around Mara in the late 1990s, Chap. 3). For example, while mining remittances may have been far more lucrative than farming and critical for rebuilding household herds in Tarangire, they were perceived as being secondary to farming in importance for the overall household economy due to their unreliability (family portrait – Tarangire; see also Sachedina, 2008). It is striking that in the two Tanzania sites the households that are poorest with respect to livestock holdings are by far the most dependent on off farm income compared to their wealthier fellow households (Fig. 10.2a). This trend is not so apparent in the Kenya sites, suggesting greater opportunities for higher earning off farm activities in Kenya. However, in the poorest site (Longido) and the poorest wealth quintile (based on income), agriculture becomes more important than off farm income – with all options available to such households being poorly rewarded and risky (Fig. 10.2b).

Finally, in Longido, the poorest area included within this collaborative study, occasional remittances, mainly from grown children working elsewhere, were the only source of income for the very poorest households sampled. As set out in Chap. 2 (Methods), there is a degree of overlap and potential confusion between remittances (which were not recorded as such by all studies) and non-farm earnings. This was complicated by the fluid and flexible nature of the household, with some household members moving to and fro as labour migrants, or between pastoral, agricultural and/or urban bases of multi-local households. Where they could not easily be disaggregated, remittances were rolled up with off-farm earnings. In order to identify more clearly the contribution of wildlife conservation and tourism to livelihoods, any remittances or off-farm earnings from this source were separated out where possible and appear as a discrete category (cf. Chap. 2, Table 2.6). It is unfortunate that data on remittances were incomplete in some sites. The significance of such income, and of food aid, is an important area for further study and analysis.

10.2.4 Diversification and Wealth

10.2.4.1 Factors Influencing Livelihood Wealth or Poverty Outcomes in Maasailand

The results from across Maasailand show significant levels of diversification among Maasai households, but few correlations between what people do at the broadest level (as represented by cluster or livelihood strategy) and how well they do (as measured by gross annual income or wealth in TLU). In the individual case studies, there was little correlation between livelihood strategy and income (see Chaps. 3–7). Variability in livestock assets and gross income within each of the livelihood clusters

was so high that very few differences between clusters in mean annual income were significant. There is similarly great variation underlying the overall mean values shown in Fig. 10.2a and b: within any one wealth or income category, household livelihood strategies included a range of combinations of activities, and the proportional contributions of those activities to a household's overall income also varied. This variation reflected the range of opportunities open to individual households, whether in terms of, for example, access to higher potential agricultural land (e.g., Amboseli and the Kimana swamps vs. Mara), access to livestock and milk markets (e.g., Kitengela vs. Longido and Tarangire) or employment opportunities (e.g., Kitengela vs. Longido).

Households clustering as diversified agro-pastoralists, often with several non-farm activities, generally seem to be among the most well-off, but they were not exclusively so. Despite the close relation between livestock holdings and other dimensions of wealth, pure pastoralists were commonly less well off than diversified agro-pastoralist households, and in Kitengela and Amboseli they constituted the poorest clusters. The poorest households of all (in Longido) have no livestock, and either derived all income as casual unskilled wage earners, or were effectively destitute, with no income and reliant on food aid or charity.

Regression analyses were used in all sites to explore the factors that determine what people do, and how well they do at it. Where individual case study chapters have given the detail of individual regressions, this overview summarizes patterns across sites, with Table 10.4 displaying factors that emerged as significant in determining gross annual income. Livestock holdings remain the strongest and most universal predictor of income, showing up as significant predictors of gross annual income across all sites (Table 10.4). The number of off farm activities in which a household is engaged overall is a significant predictor in Kitengela and Amboseli. The statistical models suggest low and variable impacts of other explanatory factors, such as education, NDVI (indicator of pasture potential or greenness) and location (with respect to settlements or to protected areas), in predicting either livelihood strategy or income (Table 10.4). Poor households may gravitate toward settlements where casual work may be more easily found, while households with large livestock holdings are more likely to be based at some distance from trading centres. There is some indication in a number of sites that, as might be expected, better-off households are associated with better eco-climatic/agro-ecological conditions (as expressed through NDVI and/or herbivore biomass – livestock or wildlife). The exception is Kitengela, where wealthier households, and their larger herds, are associated with drier agro-ecological zones, found further from trading centres. In this case it would appear that the premium of space and access to land trumps differences in agro-ecological potential. Among other confounding factors, peri-urban land values in Kitengela are increasingly uncoupled from agro-ecological potential (Norton-Griffiths and Said, in press).

The overwhelmingly consistent message from these analyses is that livestock emerge as not only central to the great majority of livelihoods for residents of the rangelands, but that those livestock are an essential part of broader livelihood strategies across the range of wealth and income. They play key roles in pathways out of

Table 10.4 Cross-site summary of factors determining gross annual income

	Assets		Income variables			Household socio-demography			Agro-ecological		Spatial	
	TLU or logTLU	Land	Per cent income from TLU	Per cent income from off-farm	No off-farm activities	hh size	Education	Age household head	NDVI/ CV-NDVI	Wildlife/ livestock biomass/ density	Distance to town	Distance to water
Mara	**	–				–	–	–	–	**	**	–
Kitengela	**	–			**	–	**	–	**		**	
Amboseli	**	**			**	(*)	(*)	**	–	–	–	–
Longido	**	(*)	**	**	–	(*)	–	–	–	–	**	–
Tarangire	Comparable analyses not available for Tarangire											

** denotes significant in final model
(*) denotes either significant, but drops out of final model; or correlates significantly with significant factor
– denotes NS

poverty for the most vulnerable, in robust livelihood strategies that protect against poverty and in investment portfolios representing relative prosperity for the well-off.

10.2.4.2 Poverty, Development and Diversification in Maasai Rangelands

How do these cross-site comparative findings contribute to our understanding of poverty and diversification among Maasai? The overall findings reported in the case studies and policy review chapters describe poverty acting on Maasai households in qualitatively different ways. We summarize these here as structural, conjunctural and life cycle poverty.

Iliffe's distinction (1987) between structural and conjunctural forms of poverty is of special relevance to pastoral populations including the Maasai of Kenya and Tanzania (Baxter and Hogg, 1990; Anderson and Broch-Due, 1999; Little et al., 2006; Little et al., 2008). Structural poverty in Maasailand, as elsewhere, has arisen from long-term marginalization (Galaty and Bonte, 1991), associated with peripheral geographical location and culturally distinct identities; with historical exclusion from central processes that have constructed the state in colonial and post-colonial times; with geopolitical circumstances that have divided pastoralist ethnic groups between adjacent and often unfriendly neighbouring nations; and with difficulties of access, infrastructure and provision of health (Randall and Otieno, 2006), education (Bishop, 2007) and economic opportunities. Other factors include a degree of official bureaucratic suspicion and hostility toward people and lifestyles often misperceived as backward, alien and unproductive (Tenga et al., 2008; WISP, 2008; Oxfam, 2006). These issues are dealt with in depth in Chaps. 8 and 9 for both Kenya and Tanzania, as well as within the context of the livelihood analyses in Longido, Amboseli and Tarangire in particular.

By contrast, conjunctural poverty represents relatively short-term crises precipitated by drought, epidemic and/or disruption due to violent conflict. Arid and semi-arid rangelands in East Africa as elsewhere are by their nature prone to extreme biophysical events (Homewood, 2008; Stige et al., 2006). Kenya and Tanzania Maasailand, while politically relatively stable compared to prominent hotspots of African conflict, have had their share of political upheavals and local violence (Klopp, 2001; Homewood et al., 2004; Fratkin, 2008). Long-established coping strategies have in the past made it possible for the conjuncturally poor to regain their position once the immediate crisis is past. These strategies were customarily built on social relations, risk-spreading and reciprocity; on mobility; on the resilience and reproductive potential of small stock as a stepping stone back into livestock production; and on a vigorous regional trade allowing rapid restocking. Broch-Due (1999) examined in depth the impact of changes in how people manage social relations on entitlements to social support, essential in re-establishing households and livelihoods after such crises. Changes in land use, most significantly for conservation or large-scale mechanized farming, have likewise impacted on mobility and access across Maasailand. In Kitengela, one of the main conditionalities of the land leasing scheme has been to ban fencing, thereby safeguarding both wildlife and live-

stock mobility. Around the Mara, one outcome of the creation of new Conservancies has been for households to relocate part or all of the family group and their activities, including their herds and farming, to different areas – it is too soon to gauge the impacts of these changes, although parallels may be drawn with the grazing schemes in northern Kenya which resulted in surrounding pastures being heavily overgrazed. In Amboseli, many households have developed new forms of social and economic networking to capitalize on the privatization of irrigated swampland while maintaining herds in the drier areas west and north of the national park. Those who fail to manage their social networks well, or who are perceived as profligate, may ultimately sacrifice their chances of recovering from conjunctural poverty. The family portraits show the range of strategies individual households have used to recover from drought and disease outbreaks and, most significantly in the context of this book, the growing importance of diversifying the household economy as a means of coping with periodic shocks. Models of climate change suggest arid and semi-arid areas will experience greater climatic fluctuations and more frequent and severe droughts in future. Where crises are widespread and long lasting, the impact across whole groups make it difficult or impossible to recover, as in the 1890s rinderpest and trypanosomiasis pandemics, still remembered as a time of catastrophic disaster (*Emutai* – Waller, 1988).

In addition to structural and conjunctural poverty, it is important to bear in mind the issue of life cycle stages and the way individuals and households pass through phases of relative poverty or prosperity. Young households may have high dependency ratios and limited capital, and may simply not score on conventional indicators of wealth (house structure, vehicle, livestock holdings and status). As they mature, they may build herds, establish land holdings and accumulate possessions, while their dependents in turn become productive workers. Livelihood correlates of this life cycle shift, from relative poverty to relative wealth, were explored in the Amboseli case study (Chap. 5), where BurnSilver shows the way individuals move through changing patterns of engagement with different activities as they mature and age. They are also evident across the different family portraits.

10.2.4.3 Poverty Datum Lines and Thresholds

Complementing these qualitative understandings of the different possible dynamics of poverty in pastoral rangelands, official national and international evaluations of poverty and poverty trajectories focus on datum line approaches (CBS, 2003, 2006, World Bank indicators online). These approaches, based on universal standards, offer the potential for comparability, though they cannot deal with the complexity of root causes and trajectories, site-specific contexts and the dynamics of change. Datum line approaches rely on the validity of quantitative poverty data (which can be problematic: Randall and Otieno, 2006; Randall, 2008). In earlier poverty mapping exercises, the paucity of data for large pastoral areas of countries like Kenya in some cases led to rangeland populations being omitted from final listings, or represented by data for urban populations bearing little resemblance to those of the rural pastoral rangelands, but the most recent GoK surveys, analyses and reports are based

on better coverage across all of Kenya. The qualitative context and drivers of poverty in Kenya and Tanzania Maasailand were set out earlier in this volume, with a general overview (Sect. 1.1, Chap. 1), site-specific contexts of poverty (Chaps. 3–7) and the workings of local, national and international institutions in constraining people's livelihoods in the rangelands (Chaps. 8, 9). Here we compare the case study findings in this book with other datum line literature on poverty in the rangelands.

The Millennium Development Goals set clear targets for reducing, in a narrow window of time, the numbers of people living below poverty datum lines, whether international (global poverty line $1/person/day; global 'ultra' poverty line $0.50/person/day) or national (e.g., Kenya's official rural poverty line is around $0.53/person/day; Tanzania's rural poverty line is roughly $0.33/person/day, although in both countries these official national thresholds are currently being revised using new welfare monitoring survey data).

The income analyses in this book confirm first that Maasai rangeland populations are generally poor by both national and international standards (Table 10.3). Per capita income in Mara and Kitengela is above Kenya's official rural poverty line, but only in Kitengela is it above international poverty lines. While Mara and Kitengela households have similar gross income at household level, the larger household size in Mara mean that income per capita is less than half that in Kitengela. Similarly Tarangire households exceed the Tanzanian national rural poverty line but are below the dollar a day threshold. In Longido and Amboseli, the average falls well below both national and international poverty levels.

Second, the case study chapters confirm that these rangeland populations illustrate a patchwork of varied experiences. While average annual gross incomes are remarkably similar across some sites, these average values are skewed sharply upwards in each site by a few relatively well-off households (reflected also in the large standard deviations in Table 10.3). Even in those sites where the average income is above the poverty level, significant proportions of the population remain well below the datum lines in each case: poverty in the rangelands is deep, as well as broad (cf. Kenya CBS, 2003; Thornton et al., 2006, Little et al., 2008).

The Amboseli and Longido income estimates are in the same range as those calculated for pastoralists in Kenya's northern rangelands (ranging from $0.26 to $0.56/day/person, and averaging $0.37/day/person: Little et al., 2008). Incomes in Tarangire and Mara are roughly twice, and in the case of Kitengela four times, those found in northern Kenya, reflecting the greater opportunities for off farm income generation, whether due to greater general access to markets as in the case of Kitengela or due to specific income opportunities provided by wildlife and mining income in Mara and Tarangire, respectively.

10.2.4.4 Qualifying Diversification

Diversification is clearly widespread, and in many cases essential to survival, but it is not always profitable. The studies in this volume inform our understanding of diversification among Maasai pastoralists in a number of ways, with respect to

cultivation, non-farm work and wildlife-based activities. Previous sections have made clear the scale and importance of these non-pastoral activities for households from different sites (Fig. 10.1), livelihood strategies (Chaps. 3–7), and income and wealth categories (Fig. 10.2a, b). Individuals, households and communities of different levels of wealth all engage in livelihood diversification strategies, but the implications vary depending on their circumstances (Table 10.5).

Among poorer households, small herd size and poor harvests combine to create the necessity to find off-land income, even if this is low-paying and opportunist. Where returns are insufficient to invest in rebuilding household assets, households may experience a downward spiral of poverty and, bit by bit, have to resort to selling off livestock and/or land, as illustrated in a number of family portraits.

The poorest, those who have lost all access to land and livestock, or have been affected by catastrophic drought, epidemic or violent conflict, diversify by necessity, often less by strategy than through crisis response. In such cases, diversification may better be described as *fragmentation* of livelihoods (Chap. 6, Longido). Commonly, poor individuals and households resort to a wide range of occupations (column 2, Table 10.5). These tend to be sporadic, insecure, unskilled and low paid (cf. Iliya and Swindell, 1997), often dependent on processing and sale of products from common pool natural resources. Alongside the examples detailed in case study chapters, the wider literature confirms these include gathering honey and plant medicines (Brockington, 2001), brewing and selling beer (Coast, 2002), gathering and selling firewood, making and selling charcoal, or hiring oneself out as casual day labour (*kibarua*) for farm, herding or construction work. Poor Maasai women sell milk if they can, even in areas remote from lucrative urban markets, rather than using it for family consumption, so as to make the most of the calorific terms of trade (cf. Grandin, 1988; Talle, 1988, 1990; Sikana et al., 1993). Some of the poorest people may live as dependents, working for their keep within more viable households in the rural rangelands; others become the under-employed poor in urban slums and shanty towns (column 1, Table 10.5). Unemployed Maasai sons migrate out to find risky, poorly paid, unskilled, casual work as night watchmen or labourers in trading centres and urban settlements (May, 2002; Coast, 2006). Household economy data from sites such as Longido (Chap. 6) confirm the low and unreliable returns from such occupations. Such urban migrants are usually seeking ways to re-establish themselves in the pastoral or agro-pastoral economy, but their efforts may lead away from any future security, be it in terms of livestock or agriculture. Despite strong Maasai cultural identity (May and Ole Ikayo, 2007) they may cease to be pastoralists, at least in economic terms. As well as lack of opportunities, perceptions of shame may constrain unsuccessful migrants from returning to their natal home.

The combination of lack of familiarity with the national language, lack of literacy (let alone educational qualifications) and cultural divides make livelihoods at the margin particularly precarious for poor Maasai and other pastoralists. Trading centres and urban settlements in pastoral areas are sinks for individuals and families who have dropped out of the agro-pastoral economy and who for lack of land and/or livestock are unable to re-establish themselves (Little et al., 2006, 2008).

Table 10.5 Trajectories of diversification among Maasai households according to wealth and assets

POOREST ⟷ WEALTHIEST			
ASSETS			
Livestock			
No livestock	Few smallstock	Median TLU (smallstock & cattle)	>>100 TLU
Cultivable Land			
None	Some, poor quality	Some high land or plenty rainfed lowland	Commercial cropping land
Pasture/grazing land			
None	Smaller holdings, poor quality/high risk	Larger holdings, limited dry season grazing	Large holdings, dry season grazing and water
Labor			
Very small families – including widowed household heads with no labor	V. large unskilled with high dependency ratio (many children too young to provide labor/wages). Reliant on voluntary work parties for cultivation	Average, some skilled labor, some herding labor. Older working children.	Large families provide labor for livestock herding/ farming, alongside employed/skilled children. Cash to hire workers for cultivation and herding
Physical assets			
None	Hand hoe, plough	Plough/oxen; bicycle, small shop	Tractor, car, hotel
RESOURCE ACCESS			
Communal land/resources only			Access to private and communal dry season resources
NETWORKS			
None – not even to find local employment			Strong (traditional/modern) – access to best land during subdivision, employment networks, government/development schemes, wildlife associations
EMPLOYMENT			
None (remittances/food aid only)	Few/none; sons migrant, low paid, casual unskilled work	Some – regular low paid salary, skilled labor (herding, trading)	Major income

Nonetheless, where such households manage to find more regular waged work they may begin to see their own aspirations and their children's future as outside pastoralism, because the only alternative within pastoralism is insecure, poorly paid work as a hired herder (Heffernan et al., 2001).

Maasai women have customarily been treated as juridical minors, have little or no control over the sale of animals nor the use of the proceeds and as a rule are effectively structurally poor throughout Maasailand (Talle, 1988; Hodgson, 1999). They carry out petty trade, selling milk and hides in local trading centres, purchasing small quantities of tea or sugar and selling on those purchases from the homestead (e.g., Chap. 6, Longido). Where there is the possibility of tourist sales, women purchase beads for commercial craftwork as well as for personal and social use. Women from poorer households may gather medicinal plants and travel long distances to sell their remedies. Other studies have shown these women can be responsible for generating the main household income, however small (Brockington, 2001).

Not all the poor inevitably spiral downward. With social networks offering some support, with opportunities for non-farm work and with a combination of luck and good judgment, individuals and households may build or re-build herds, starting from a couple of animals, often small stock (e.g., Family Portraits – Longido and Amboseli). The long tradition of livestock trading (exchanging different species and age/sex classes of livestock; livestock, milk and other pastoral produce for grain or for cash) readily translates into other forms of trade (from petty vending to gemstone brokerage). Poor families use the time-honoured strategies of working the markets by small-scale livestock trading, buying cheap and selling dear, especially where cross-border price differentials offer special if unofficial opportunities. They may seek wage labour, investing the proceeds in small stock that they can then breed up and in due course trade on for cattle. These potential pathways out of poverty can be seen working in several of the poorer clusters of the case study chapters, where wage earning and other households are purchasing livestock, as well as either selling livestock for income or accumulating them as investment (Chaps. 3–7). Young men, life cycle poor rather than structurally or conjuncturally poor, use these strategies in order to establish themselves with enough animals so as to be able to marry (requiring bridewealth and a milch herd) and/or in order to pursue other business opportunities. In Tarangire, young men able to find work in wildlife tourist enterprises, or as middlemen in the gemstone trade, invest their earnings in acquiring land and in mechanized farming (Sachedina, 2008).

Better-off households of medium wealth also diversify to earn and invest (column 3, Table 10.5). However, they are more likely to be diversifying strategically for risk management than opportunistically from urgent necessity. They diversify as a way of buffering food shortages, price fluctuations and other recurrent but unpredictable reversals of rural life in sub-Saharan Africa. They commonly seek to develop multi-local households whose reciprocal urban and rural branches are able to complement each other's production and employment opportunities and constraints. These better-off households frequently engage in livestock trading and may get rents from property or land, remittances from educated sons with regular jobs, or non-farm earnings from resident household members with local teaching, government,

business or other employment. They exchange goods and services with related but urban-based households, which care for schoolchildren and for the sick and provide a base for jobseekers. Other multi-local households operate separate branches in pastoral and agricultural areas (as well as, or instead of, in urban settlements: see Amboseli Family Portraits).

Finally, the wealthiest diversify as a means of investing wealth for profit maximization, using their investment, knowledge and networks to establish successful diversification (column 4, Table 10.5). While results from across these studies are highly variable, the wealthiest households are commonly those with a livestock-based economy supported by activities that supplement livestock income and investment with income from skilled, secure, regular employment and from high-yielding upland or irrigated cultivation. Some individuals in Tarangire have built great wealth from mining and brokering opportunities (Chap. 7 and Portrait of Mako, Tarangire). Often the wealthiest households develop major political interests, standing for election to positions such as district councillor or Member of Parliament, deploying their wealth through social and political networks as much as in business investments.

10.3 Tourism and Wildlife in Maasailand

So far, the discussion in this chapter has looked at the role of livestock, cultivation and non-farm work in Maasai livelihoods, and their implications for poverty and diversification. We now turn to the role of conservation in development in Maasai rangelands. Wildlife-based tourism and conservation are widely expected to subsidize sustainable development across East African rangelands, and particularly across Maasailand. Government policies (URT, 2002, 2005; MTW, 2007; UNDP/UNEP/IIED/IUCN/WRI, 2005), conservation NGO projects (AWF, 2005), entrepreneurial initiatives (Nelson, 2004, 2007; Lewa Wildlife Conservancy: www.Lewa.org), and numerous research publications (Pearce and Moran, 1994; Hutton et al., 2005) all promote wildlife-based tourism as the basis for sustainable development in East African rangelands. However, the land use decisions made by rural people across Maasailand are not obviously consistent with these national- and international-level assumptions about the benefits of wildlife and tourism.

Across Kenya, wildlife populations of most species monitored by regular aerial and/or ground census have declined drastically (50–80%: Homewood et al., 2001; Ottichilo et al., 2001; Western et al., 2006) over the last 30 years (Chap. 9), driven by a number of factors, including the spread of large-scale cultivation (Norton-Griffiths, 2007; Norton-Griffiths and Said in press; Homewood et al., 2001) as well as increasing land area under settlement and small-scale cultivation (e.g., Lamprey and Reid, 2004). Livestock numbers have fluctuated about a steady mean, while national and regional livestock offtakes have increased year on year (though statistics are complicated by the lively unofficial cross-border trade bringing animals from Tanzania and Somalia to feed Kenyan urban demand – Zaal

et al., 2006; McPeak and Little, 2006). Although wildlife tourism enterprises have proliferated, and many if not most are marketed under the label of community-based conservation and ecotourism, the studies in this volume suggest it is only under rather special circumstances that these deliver significant income to Kenyan Maasai households (as opposed to outside investors). It is not clear whether even under such favourable circumstances the returns influence rural people's attitudes to and decisions over wildlife to a significant extent. Around the Mara and Tarangire, there was evidence that those earning the highest returns from conservation were also those investing in large-scale cultivation driving wildlife decline (Chap. 3; Thompson et al., 2002; Thompson and Homewood, 2002; see also Sachedina, 2008).

However, the evolution of the Kitengela Landowners Association, and the lease payments they receive for refraining from fencing and not killing migrating wildlife, suggest that relatively minor returns affecting a minority of households may swing attitudes in favour of conservation (Chap. 4; Nkedianye, 2003), at least where such income, accompanied by conditionalities, out-competes the potential returns from alternative land use strategies.

In Tanzania, there have been comparable wildlife declines around Tarangire, and to a lesser extent in and around other protected areas in Maasailand (Stoner et al., 2007). Tarangire Maasai (even those with wildlife-related jobs) express a clear commitment to convert land to cultivation for tenurial and economic reasons (Sachedina, 2008), in the face of land loss to conservation. At the same time, the abuse of hunting quotas by resident and tourist hunters around Tarangire, facilitated by corrupt practices among government employees and tour operators, is a major factor driving wildlife declines, alongside land fragmentation and conversion to resident and in-migrant farms (Sachedina, 2008). Thus, both the rural residents, who are supposed to benefit from community-based conservation, and the entrepreneurs whose businesses centre on wildlife, are using these resources in ways that drive wildlife decline.

The second overarching question addressed by this concluding chapter is therefore the extent to which wildlife tourism is performing well for poverty reduction or local livelihoods. The assumption that it is doing so underlies national and international policy and practice, while the evidence, in terms of people's land and resource use choices, challenges that assumption.

In comparison to livestock, farming and non-farm work, wildlife earnings contribute to the incomes of a very small proportion of households in most sites (3–14%), except in Mara where a clear majority receive wildlife-related returns (64%). Averaging across all households, income from conservation or wildlife-related sources is low in most sites, contributing 1–6% of mean annual income (Kitengela, Amboseli, Longido, Tarangire: Fig. 10.1). By contrast, wildlife-related earnings constitute an important 21% of mean annual income for Mara households (Figs. 10.1 and 10.2a, b). Overall, few households in the case studies in this volume earn from wildlife, and the sums they make do not begin to compare with main income streams coming from livestock, crops and non-farm sources. Nonetheless, the Mara case shows that where land-owning households are located near top-end conservation areas, there can be significant benefits.

These results challenge the conviction, widely held among governments, conservation NGOs, international donors and tourists, that community-based wildlife initiatives are improving livelihoods across Maasai rangelands. There are clear benefits in very specific circumstances; elsewhere, despite the large revenues known to be actually or potentially generated by wildlife, household-level studies show few, if any, of the benefits anticipated or claimed by community-based conservation initiatives are reaching the rural Maasai population (see also Sachedina, 2008).

Furthermore, these results provide detailed evidence backing up a growing body of social and economic research that is questioning the efficacy, equity and even human rights implications of conservation initiatives in East and Southern Africa. Other independent studies have found evidence that 'community-based' initiatives commonly lack self-sufficiency and show a high level of dependence on outside funding (Murombedzi, 1999; Mapedza and Bond, 2006). Broader socio-political analyses have been critical of the inequitable ways in which 'community-based' conservation and natural resource management initiatives play out in practice (Blaikie, 2006; Menzies, 2004; Ribot, 2006; see Sachedina, 2008 for a detailed account of this in Tarangire). There are published reports of dissidence and dissatisfaction being ignored or suppressed, and of destructive backlash protest actions (Sachedina, 2008; Sullivan, 2003; Alexander and MacGregor, 2000). More recently there has been a rapid rise of private conservancies leasing or simply buying up the land for tourism concerns (c.f. Nkwame, 2007). These deliver financial returns to state and entrepreneurs, and conservation outcomes to wildlife NGOs, but may replace rather than sustain local livelihoods, driving knock-on social and environmental effects elsewhere. Such private conservancies are becoming well established across East Africa. It remains to be seen whether they can deliver solutions that are at once economically viable, environmentally sustainable and socially equitable (Chap. 9). The long-term declines of wildlife and of rural livelihoods in conservation-related areas in Kenya and Tanzania, reviewed in Chap. 1 and seen repeatedly in the case studies presented in this volume, suggest that to date the currently espoused models of 'community-based' initiatives are not working either as incentives to conservation or as green development contributing to poverty alleviation.

Why is there such a wide gap between the results presented in this book and the widely held expectations (and, in some cases, the claimed successes) of community-based conservation in Maasailand? We believe there are three aspects to this question: the way that impacts of community-based conservation are measured; the way in which benefits from CBC are distributed; and the way in which the Maasai pastoral production system is commonly perceived and valued (Tenga et al., 2008; WISP, 2008).

10.3.1 Livelihoods Studies in the Evaluation of Conservation Impacts

There is a rise in interest in documenting the nature, scale and importance of community-based conservation efforts as well as conservation-related displacement

or restriction (Brandon and Wells, 1992; West et al., 2006; Brockington, 2002; Brockington et al., 2006; Brockington and Schmidt-Soltau, 2004; Adams and Hutton, 2007), and in quantifying their impacts (e.g., Wilkie et al., 2006; SSWG, 2006). However, many investigations into the impacts of community-based conservation, whether positive or negative, are being carried out by conservation scientists or social scientists coming from within the conservation industry. This has significant implications:

1. Where the formulation of research issues emerges from a primarily conservation perspective, it may miss non-conservation issues prioritized by local people, and therefore the impacts most significant to them. Approaches that engage with people's broader livelihoods without assuming a specific conservation focus may lead to a more balanced view of local concerns and priorities. In this volume, researchers built on their own long-term familiarity with individual study areas, making explicit use of citizen science (community facilitators and family portrait methods: Chap. 2; Reid et al., in prep.; Nkedianye et al., in prep.).
2. Past studies suggest that a focus on conservation returns can play down estimations of costs, particularly opportunity costs associated with alternative resource and land use patterns, biasing estimates of whether benefits are commensurate with, or exceed those costs (e.g., Emerton, 2001; Brockington et al., 2006). Studies in this book make clear the degree to which a majority of households are reliant upon access to and use of natural resources of grazing, cultivable land and gathered resources in order to get by. For example, in Longido (Chap. 6), restrictions on natural resource use associated with establishing a Wildlife Management Area must be factored into any evaluation of conservation impacts, alongside the measurement of direct returns, particularly given the already pitiably low incomes and precarious livelihoods to be found there.
3. Studies have tended to focus on community-level returns and to estimate benefits to households or individuals on a *pro rata* basis. This does not allow for distinctions between community-level and household- or individual-level benefits, nor between winners and losers within communities. Differentiated household and individual-level analyses suggest that returns at the community level are neither available nor valued in the same way as returns that flow to the individual or household (Chap. 6, Longido; see also Sachedina, 2008). A differentiated analysis is important both in evaluating social justice and in understanding the potential long-term sustainability of conservation interventions. It may not be possible to please all the people all of the time, but unless broad equitability is achieved, the actions and choices of even marginalized groups may have significant adverse impacts on the outcomes through the 'weapons of the weak' (Scott, 1985).
4. Research that focuses directly on local people's attitudes to, and perceptions of, conservation, risks operating at face value, without taking sufficient note of the problems constraining discussion of sensitive issues in a political context. A long history of colonial and post-independence interventions, which have often been felt as detrimental by local people, has commonly resulted in mistrust

of vested conservation interests. Inequalities of power, conflicts of interest and second guessing of possible implications of research, very commonly combined with the fact that interviewees/informants are (tacitly) involved in activities that conservation has criminalized or seeks to restrict, may all compromise data quality for studies focusing directly on conservation-related issues, attitudes and perceptions. Meaning is embedded in cultural, social, political, historical and linguistic context, and may therefore be hard to capture by an outsider working through interpreters, particularly where that outsider is seen as associated with a specific set of vested interests which are anything but neutral with respect to local power struggles.

5. Financial and time constraints placed on conservation organizations have led to a degree of dependence on rapid and 'participatory' methods to investigate community-level priorities and perceptions and the social impacts of conservation. These methods, while pragmatic, are subject to significant problems. Many tend to operate very publicly, and as such are poorly designed to deal with sensitive issues of power and control over resources. They take little account of the fact that in very hierarchical societies, marginalized people cannot simply state their views. Focus groups constituted with the aim of encouraging equitable representation (e.g., women; youth, poor) will still be constituted on hierarchical lines perhaps not apparent to the researcher, but nonetheless sufficient to constrain free expression. They are thus prone to play into the hands of elites, and open to manipulation by political interests not apparent to the uninformed researcher, yielding few insights into inequalities. These methods have important uses, but are demonstrably problematic unless conducted by researchers who are well-informed on local context and issues as well as socially, culturally and politically attuned and sensitive in their approach (Sachedina, 2008; Paudel, 2005).
6. Finally, sampling issues among individuals, households and communities are complex and require careful approaches to avoid excluding the poorest as well as keeping in view the (often absentee) wealthiest, and to avoid being unduly influenced by local informants with vested interests in biasing the results.

In this volume we have sought to put the detail of livelihoods studies (Chaps. 3–7) into the context of political and institutional structures (Chaps. 8, 9), rather than focusing directly on costing the impacts of conservation and conservation policy analyses *per se*. Studies in this volume put considerable thought into methods (Chap. 2) using broader income/expenditure data across the full range of livelihood activities. Income and expenditure are in themselves potentially sensitive issues, but they are relatively neutral with respect to conservation impacts and conservation politics per se and the researchers were not at the time associated directly with any conservation organization.[1]

We believe this makes it possible to estimate in more reliable ways the real costs – both political and economic – of conservation set-aside, and the relative importance of wildlife-related compared to other income streams and interventions.

[1] But see Sachedina 2008 for details of involvement with NGOs around Tarangire

Independent studies such as those described in this volume have an important role to play in validating conservation interventions' outcomes for local people.

10.3.2 Power and Politics of Wildlife Tourism: Distribution of Wildlife Returns and Governance

The family portraits from Mara, Amboseli and Longido sites (Chaps. 3, 5, 6) reveal a common concern that community projects are not clearly benefiting individual households or even villages, a perception supported by data in most sites with the possible exception of Mara. Tracing the extent to which revenue is captured by central government, by tourism cartels or other investors and even by local government, as opposed to village, households and individuals, helps explain negative local perceptions of conservation, and land use choices which are poorly compatible with wildlife (Norton-Griffiths, 2007; Thompson and Homewood, 2002; Sachedina, 2008).

Where revenues initially accruing to the State or administrative unit are intended for onward distribution, there will be leakage at every stage as funds flow (or fail to flow) to successively lower levels. In Kenya, the Mara area seems to represent the closest to a win/win situation for conservation and local communities, with two-thirds of households earning something from wildlife-related activities, and with one-fifth of household incomes on average coming from such activities, irrespective of wealth category. Does this represent a win/win outcome for conservation and development, including poverty reduction?

It is first necessary to disaggregate revenues to MMNR from those going direct to Mara wildlife associations or private enterprises, including local landowners' ownership of or shares in campsites and conservancy payments. Leaving aside the lion's share of wildlife earnings captured directly by the private sector, the Maasai Mara National Reserve sets aside 19% of its gate revenues for the reserve-adjacent populations. The onward chain in distributing those gate fees involves the district council, one or more central tour operating coordinating agencies and wildlife associations before any revenue reaches individual households (Chap. 3, Mara). In practice, at each level some funds are legitimately diverted either as overheads or to other projects legally subsidized by, but unrelated to, the original source area. Funds are also not uncommonly lost through corruption, embezzlement, inefficiency and other non-legitimate interventions (Mara: Walpole and Leader-Williams, 2001; Tarangire: Sachedina, 2008). It is also necessary to disaggregate income that comes from wildlife associations, from privately owned enterprises and from employment in the wildlife industry. As Chap. 3 shows, the final amount reaching households from wildlife associations is neither consistent between households nor anywhere near the amount originally released for 'local communities'. The top 25% capture 60–70% of wildlife returns overall, as compared to the 5–15% of total wildlife income flowing to the poorest 25% (Chap. 3, Table 3.16). In the period 1998–2004, the proportion of households earning wildlife association and/or campsite share income fell from 54% to 41%. (Chap. 3, Table 3.10). Finally, those households and

individuals earning the most from wildlife are also those most likely to be investing in large-scale cultivation – a phenomenon also observed in Tarangire.

In Tanzania, any income relating to wildlife resources, including those linked to a Wildlife Management Area, is now channelled through the State, whence a proportion is meant to pass to the District, who then in principle passes a proportion to the multi-village association of the WMA, with individual village governments, and potentially individual households theoretically benefiting as a result. There are signs that this theoretical flow is simply not working in practice (Chap. 6, Longido; Chap. 8). In Tarangire, lack of trust in the government or conservation interests has driven households to protest against a proposed Wildlife Management Area, and to invest increasingly in conversion of rangeland to agriculture as the only means of asserting rights over land (Chap. 7; Sachedina, 2008).

Some distributional effects of CBC projects are indirect and invisible to straightforward income analysis. For example where conservation-related funds contribute to locally prioritized projects (such as the construction of schools or clinics that would normally depend at least in part on local finance), they often replace a wealth-related cess. Replacing that cess benefits better-off households disproportionately (cf. Chap. 6, Longido). A supposedly pro-poor community benefit thus becomes effectively neutral to poorer households and a subsidy to better-off households.

Distributional effects shape political as well as economic dimensions. Conservation and development initiatives operate in partnership with local groups through gatekeepers at local, national and international levels. Systems of planning, implementation and resource flows often operate in parallel with (or may diverge from) government structures. To outside organizations, this is an essential step toward 'getting things done'. However, this alternative hierarchy, and the plural channels of power and decision-making it establishes, can distort the operation of local systems of representation and government – systems that are already complex given the widespread condition of negotiation between customary and national frameworks of power and authority (Ribot, 2006). Choices made by outside organizations (such as conservation agencies) as to which local institution to work with have far-reaching implications, determining which voices are heard or conversely silenced, and undermining or empowering different trajectories of governance, from exclusionist (based, for example, on indigeneity) to inclusive (such as those based on residence: see Chap. 9; Sachedina, 2008; Ribot, 2006). These apparently simple pragmatic choices can lead to major political consequences, fostering democratic representation on the one hand or exclusion and conflict on the other.

10.3.3 Value of Maasai Pastoralist Production

The Tanzanian government maintains an official view that pastoralist livestock management (mobile transhumance on unfenced rangelands, unmodified other than by burning and grazing) is both unproductive and environmentally damaging (e.g., URT, 1997; see Liganga, 2007 for current 'national anti-livestock policies' in

Tanzania; also Tenga et al., 2008). Though Kenya's draft National Livestock Policy (MoLF, 2006) begins by acknowledging the scale and importance of pastoralist production, it rapidly moves to a focus on settled smallholder livestock keepers in high potential areas. In both Kenya and Tanzania, government and NGOs back wildlife-related activities and farming as environmentally and economically preferable alternatives to pastoralist livestock husbandry. This is despite the fact that farming and wildlife are incompatible, and that cultivation gives very limited returns in semi-arid areas.

National policies toward livestock and agriculture in both Kenya and Tanzania are predicated on the idea that even in arid and semi-arid rangelands it will be possible to produce more by developing and intensifying cultivation than from rearing livestock (e.g., Kabubo-Mariara, 2006). This volume's findings and simulations based on data from these and other case studies (e.g., Boone et al., 2006) make clear how limited are both the current returns from agriculture and their potential for further extension and intensification. National policies have already driven the conversion of key resources to cultivation, resulting in some cases in severe pollution and degradation, diminishing pastoral potential for the sake of marginally and locally increasing crop outputs. Now the possibility of leasing out concessions in rangelands for growing *Jatropha* and other biofuel crops holds out strong appeal, for example to the government of Tanzania, despite growing international concern as to both the environmental and also the poverty implications. This new pressure on availability of grazing will only further undermine pastoral livestock production as a perennially undervalued but genuinely productive land use in the rangelands (WISP, 2008; Tenga et al., 2008).

In addition to absolute pastoral livestock production values being regularly underestimated due to chronic sampling biases, there are extremely important dimensions concerning seasonal patterning on the one hand and ability to control the means of food production and food security on the other. For example, DeLuca (2004), evaluating the response of Loliondo Maasai to a series of conservation enterprises, showed major concerns around increased vulnerability of food security due to replacing livestock production and other natural resource-based activities with tourism-related earnings less clearly under people's control.

10.4 So What? Lessons for Policy

The findings set out in this volume underline the lasting importance of livestock across Maasailand to local livelihoods. Although we focus on panel data rather than longitudinal studies, the fact that households across the spectrum of wealth and livelihood categories, even those with few or no animals, are continually investing in livestock purchases confirms the importance of livestock, both as pathways out of poverty and as wealth storage/accumulation strategies, alongside the need (and the incentives) to diversify into non-livestock activities. Livestock holdings represent the single strongest measure or indicator of other dimensions of wealth

and income in all sites. These findings make clear the lasting economic importance and resilience of pastoral livestock production, not as some romanticized throwback to an earlier age, but as a robust and vital component of twenty-first century livelihoods in Maasai rangelands.

At the same time, experienced observers of pastoralist development trajectories tend to see diversification away from natural resources-based livelihoods as ultimately the only way of managing growing populations and dwindling resource access in the rangelands (e.g., Sandford, 2006). Non-farm income is a very significant component of present-day Maasai livelihoods, but this broad category embraces a wide range from poorly paid, insecure and often dangerous work (miners, watchmen, sex workers) through to well-paid, secure jobs with wider political and economic prospects (teachers, MPs). The better off may secure relatively high-paying jobs in the private or public sector. For the poorest, non-livestock income represents the only means to achieve food security and the only hope of rebuilding the herd. In practice, however, returns to marginal agriculture and irregular unskilled work and petty trade are so low that many such households commonly end up drawing down on their assets rather than building them up.

Again in contrast to national policy maxims (Kenya: draft Wildlife Bill – MTW, 2007; Tanzania: Poverty Reduction Strategy "Mkukuta" – URT, 2005), the findings in this volume demonstrate the generally disappointing performance of wildlife for livelihoods. While it can deliver significant returns to landowning households living adjacent to top-end wildlife eco-tourist destinations, wildlife brings very limited returns to most Maasai households, including those directly affected by wildlife leaving the protected areas and using rangelands for much of the year, and by the knock-on effect of conservation restrictions. Communal-level returns from conservation initiatives in many cases do not work to good effect, particularly where such returns simply replace what should be government services (such as building a local classroom or water supply), or are co-opted by the best-placed households. Other than for a small number of well-placed households, the returns from wildlife do not begin to compensate for the loss of mobility and of access to or control over important natural resources, which 'community-based' and other forms of conservation often entail (as with Tanzanian WMAs), particularly when added to losses through conversion of other key resources to cultivation.

The Kitengela case study suggests leasing and other ecosystem services payment schemes have promising possibilities in terms of livelihood improvements due to reliable and regular payments at critical times (such as when school fees are due), but these benefits have had limited scope and impact to date. Work remains to fulfil the promise of the many community conservation initiatives that currently do not benefit the majority of residents. Allowing them to go on failing has serious implications for the continuing decline of wildlife and for continuing impoverishment.

With such a wide range of livelihood strategies now being pursued, 'pastoral policy' needs to take better account of the situation evolving on the ground in order to be effective. First and foremost it needs to take account of the central nature and resilience of livestock production in the rangelands, and to embrace and foster pastoral production, supporting mobility, access to key resources, veterinary

provision and marketing infrastructures. These issues are raised but not convincingly addressed in Kenya's draft National Livestock Policy. Rather than dismissing pastoral production as backward, unproductive and as failing to contribute to the national economy, Kenyan and Tanzanian national policies need to recognize the actual worth of this form of land use (c.f. Mortimore, 2005). Tanzania's current 'national anti-livestock policy' has no place in any economically and ecologically rational or socially just land use plan (WISP, 2008).

Second, governments need to be more realistic about the potential for, and impacts of, intensifying or extending cultivation across the rangelands. Few key resource hotspots remain to be converted: every one that is converted to cultivation subtracts from the rangelands' potential for supporting a much wider-reaching production system and its associated livelihoods, including wildlife. Irrigated cultivation around swamps and riverine areas in Maasai rangelands is demonstrably impacting on the hydrology of much wider ecosystems and causing levels of pollution harmful to wild and domestic animals as well as people. Cultivation is an important strand of dryland livelihoods, particularly for poor residents of the rangelands, but also as one component of multi-local household economies and as a potential investment for the better off. However, it is unrealistic to envisage a major increase in food production from cultivation in arid and semi-arid rangelands, given the agro-ecological limitations both of water availability and of soil fertility (see, e.g., Thornton et al., 2006; Boone et al., 2006). Large-scale conversion of rangelands to agriculture, be it for food crops or biofuels, may bring revenues to government and investors but removes vital dry season pastureland from livestock production, with all the associated economic and livelihood implications.

Third, governments need to foster potential for non-farm employment, both through encouraging rural industries and also through supporting better education and skills provision for the rural populations of the Maasai and other pastoral rangelands. Governments need to appreciate the extent to which those rural populations are engaged with national labour markets, and to which they depend on and contribute to all types of non-farm employment. Contrary to perceptions of pastoralist conservatism, the present book shows the extent to which Maasai have where possible seized opportunities to diversify into off-land activities. Maasai have demonstrated a rapidly growing uptake of education (Coast, 2002). However, there are significant costs to their production system in terms of labour availability (Bishop, 2007). There is also concern about sending children to schools in the context of an education system which focuses on agriculture and is rooted in the belief that pastoralism is a backward and inefficient use of rangelands (Bishop, 2007; WISP, 2008). The need to recognize the validity of pastoralism is a systemic issue and needs to be addressed as such, and not purely within the realms of natural resource management. The potential which pastoralist livestock production offers for integration alongside other activities, and for supporting the aspirations of rural populations for better food security and standards of living, will only be realized with better educational provision, better rural diversification opportunities and acknowledgement of the importance of pastoral livestock production.

Finally, governments and conservation NGOs need to rethink their understanding of the contribution of wildlife conservation to rural livelihoods. The structure of the tourist industry needs to change to allow landowners in Kenya to capture more than the 5% of revenues they are currently estimated to capture (Norton-Griffiths, 2007). The 2007 ruling by the Tanzanian Government that all revenues to wildlife management areas must go to the State is disastrous for the communities concerned, for the wildlife it professes to conserve and ultimately for the economic potential of tourism in the country. Such policies simply accelerate land conversion, wildlife loss and rural impoverishment. Conservation organizations and government need to take note of the central livelihoods activities of populations of the Maasai rangelands, and make more reasoned estimates of the impact and costs of setting aside land, whether as wildlife management areas, as community-based conservation estates, as private conservancies or as national protected areas. In evaluating the implications of conservation for local people, they need to take a broader view encompassing local knowledge of the focal issues; consider more appropriate methodologies more sensitively applied; sample so as to capture winners and losers and be able to distinguish between the two; quantify not only benefits but also costs.

All of these lessons are important for policy and practice now, but become even more important given predicted ecological trends. If climate change proceeds along broadly expected lines (Stige et al., 2006), East African rangelands will experience a warming, a decline in rainfall and in plant available moisture, and an increase in frequency of extreme climatic events, both drought and also torrential rains associated with el Nino events. Under these circumstances, cultivation across most of Maasailand will become even more unreliable and less productive, while mobile livestock production is likely to remain viable and productive so long as institutional and tenurial conditions allow for movement and for access to key resources in response to patchy and fluctuating conditions. Against this backdrop of environmental and economic change, better livelihoods, environmental conservation and economic development will mean integrating livestock production with off-land activities, improving education, and supporting rural-urban linkages within and between households. It is time for policies, attitudes and action that support the adaptability demonstrated by communities across Maasailand, and that acknowledge the strenghts of the ecological and economic versatility that lies at the heart of their staying Maasai.

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