Purabi Bose · Han van Dijk *Editors*

Dryland Forests

Management and Social Diversity in Africa and Asia

Springer

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In memory of Latika Bose (1942–2015)

Foreword

Dryland forests have long been an undervalued resource, though they contribute in myriad ways to the livelihoods of the millions of inhabitants of the drylands. Dryland forests have received much less attention from policy and research in comparison to humid forests. This has resulted in pervasive neglect of the livelihood challenges of poor people from socially diverse groups in the drylands, such as rural women, the youth, and the indigenous peoples living in and around the drylands and dependent upon its resources.

Drylands are in turmoil in many areas of the world, and dryland forest resources are pivotal under these conditions. Sustainable management of the forest resources on which people are dependent for their basic needs is being threatened by the increase in conflict situations and by more volatile political environments and ecosystem dynamics. These conflicts are part of the fabric of the current upheaval in the drylands of the world.

More knowledge about how people manage these resources is of great importance for more successful policy and practice. This edited volume *Dryland Forests* is thus a timely contribution to the study of drylands management in the context of social diversity.

One of the most neglected topics in the study of dryland forests is their ecological dynamics. Small differences in rainfall and topography have a great influence on the timing and availability of fruits and browse from trees. Though trees seem to be a relatively stable landscape element, the experience of the Sahel drought showed that drought can also have a dramatic impact on the condition of dryland forest resources. Millions of hectares of Sahel forests dried up, with severe consequences for its users. But they also subsequently recovered.

The authors of *Dryland Forests* take up the challenge of understanding these ecological dynamics as a point of departure to highlight the diversity of uses and users of dryland forest resources. They present a number of focused empirical studies on the local management of dryland forest resources in Africa and India. The social diversity in terms of different user groups is examined in these case studies: From pastoralist men and women in Kenya and India to beekeepers in the Cameroonian savannah forests, to competition between women and men in the use

of community forest resources in Senegal, to alternative land tenure systems for gum collection in Senegal and Ethiopia.

The book's introductory chapter on drylands management probes the challenges posed by the ecological dynamics in drylands in combination with the enormous diversity of users and uses. The variability in time and space of the availability of forest resources makes a tightly regulated and controlled management system very difficult to pursue. Dryland forest resources are managed under a wide variety of tenure regimes, as is vividly illustrated by the studies of the gradual transition from common to individual ownership by the Orans in Rajasthan and by the peoples in southwestern Ethiopia. The studies also highlight the problems associated with a growing interference by the state and outside agencies in these management systems and how this affects less powerful user groups such as women and pastoralists. They also emphasize the uneasy cohabitation of state-led tenure regimes with the local customary tenure regimes and management regimes that have evolved over the centuries. They elucidate the potential conflicts that are now contributing to growing political tensions between the local people and their governments. Indeed, in some cases, the more participatory approaches that have been fostered by NGOs may have the potential of creating greater conflicts by focusing only on specific categories of user groups.

This book makes an important contribution to the knowledge base that can assist the global community as it gears up toward achieving the sustainable development goals (SDGs) and to making the policy decisions needed to address future climate variability and change. In spite of the high degree of complexity that emerged from the differences among study sites, a number of critical findings have emerged. Readers will note the important lessons to be drawn from this empirical evidence and the larger implications of these lessons. The increasing complexity of the management and tenure regimes that is evolving needs to be considered more carefully against the background of increasing population densities and the possible adverse impact of climate change.

The cases presented in this book illustrate the critical importance of directing much more serious attention to resolving dryland forest management challenges, for they not only impinge upon the populations that are directly dependent upon these resources but increasingly on the broader context of national security and welfare as well.

(Nairobi, Kenya, May 2015) Dennis P Garrity
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Part I
Looking Forward: Dryland Landscape

> Dryland populations, at least 90 percent of whom live in developing countries, on average lag far behind the rest of the world in human well-being and development indicators. (Ref MEA 2005 Desertification synthesis)

Two decades (1994–2014) have passed since the United Nations Convention to Combat Desertification in those countries experiencing serious droughts and desertification, particularly in Africa, was adopted.

Every year since 1995 the 'World Day to Combat Desertification and Drought' is observed on June 17 to create public awareness. This has resulted in the more efficient use of water resources and decreasing incidences of large-scale food crises in some areas of the Sahel. Despite these successes, enormous challenges remain and new issues are emerging.

In the following chapter on Dryland Landscape we look forward and discuss few key points regarding why management, gender and social diversity issues of dryland forests and landscape calls for immediate global attention on the policy, practice and research.

Chapter 1
Dryland Landscapes: Forest Management, Gender and Social Diversity in Asia and Africa

Han van Dijk and Purabi Bose

Introduction

The aim of this book is to examine the management of dryland forests from the perspective of social diversity and the gender dimension. Globally, dryland forests have received much less attention from policymakers and scientists than permanent green forests in humid regions (Blackie et al. 2014). Yet, drylands occupy 41 % of the world's land surface and host around 2 billion people (MEA 2005). The majority of the rural people whose livelihood is dependent on dryland forests belong to marginal groups such as women, youth, pastoralists and indigenous people. In general, dryland areas are regarded as problematic because of the combination of low rainfall, fast-increasing populations and what has been labelled unsustainable land use technologies, which are all said to contribute to extensive land degradation and desertification. Moreover, private investment has been limited, and whenever there are interventions they rarely benefit the local population. Trees and forests are a major component of dryland ecosystems despite the image to the contrary. Dryland forests and trees fulfil numerous functions underpinning the livelihoods of rural people and are important sources of income and products such as wood, fuel, fruits, fodder, fibres, incense, honey and even insects (Bose 2015). These products

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contribute in a myriad of ways to local livelihoods, especially in times of drought and famine when agriculture and livestock-keeping become difficult.

Over the past decades, dryland forests, dryland landscapes and their management have received considerable attention from research, policymakers and environmentalists, so why this book? In the first place, the debate about dryland forest management has been marred by all kinds of prejudices stemming from the preoccupations of policymakers and researchers alike. Since the studies of French cultural geographers like Gallais (1975), Pélissier (1980) and Marchal (1983), which put trees, forest resources and their management squarely in the middle of how local people managed their landscapes, dryland forests have primarily been targeted as separate objects of policy and management. As we show below, this is an unproductive approach, since dryland forest management has mainly been defined in negative terms. Since the Sahelian drought and the alarm over the fuelwood crisis in India (Agarwal 1986), the debate about drylands and dryland forests has consistently been framed in terms of crisis, desertification and land degradation (Dregne 2002). The policy discourse about drylands has been dominated by terms like degradation, desertification, over-cultivation, overgrazing, scarcity and resulting socio-ethnic tension and conflict, and more recently dryland inhabitants' inability to adapt to climate change has become part of the conversation (MEA 2005). Consequently, local populations managing forest resources and trees have been defined as the enemy and the victim without any agency, whose unsustainable practices and ever-growing demand for forest products form the main threat to dryland forests.

A second characteristic of this debate is that it almost completely overlooks the socio-cultural diversity and gender aspects of dryland forest management, i.e. differences between pastoralists and farmers, men and women, high caste–low caste and class distinctions are ignored, as everyone seems to be subject to the same logic of the neo-Malthusian nightmare, framed by agro-ecological science, forestry experts and climate scientists. Moreover, political instability, civil unrest and lack of institutional development in the absence of state power are thought to contribute to the mismanagement of the remaining forest resources. Despite attempts by social scientists and some natural scientists to add more nuance to the debate and give back the inhabitants of drylands some of their agency by focusing on the way in which they manage their resources locally, the dominant paradigm in policy and applied science has remained the same because of the recycling of the message of doom and, more recently, of climate change.

In our view, this debate is largely unproductive in the sense that it depicts drylands as amorphous and homogenous areas, where an increasing number of marginalized people are overexploiting the natural vegetation and forest resources with inappropriate technologies and governed by dysfunctional social and political institutions. We do not deny that there are problems, but we think we can engage in a more fruitful debate about dryland forest management by defining a new point of departure. This point of departure should be rooted in local realities and empirical studies of how local people have managed and still manage local forest resources in the drylands in all their diversity, not only in the technological sense, but also in the institutional and socio-cultural sense. To allow for such diversity, we take a gendered approach,

gender being a metaphor to highlight differences in roles and obligations of men and women, but also to highlight differences across ethnic, caste, class and occupational identities as the roles and obligations of men and women also differ across these lines. The focus of the book is therefore on this diversity in the management of forests and forest resources across 'gendered' lines, through a number of case studies and lessons abstracted from them. The idea of initiating this book is to contribute to a new direction in the dialogue about drylands, compared to the previous two decades, 1990–2010. Now with the shift in attention towards the climate change agenda, there is an opportunity to redirect the dialogue on dryland landscapes and people and develop a fresh view on drylands. In particular, we need to address the following issues: what are the dynamics of drylands forests and landscapes, what are the different management approaches, and among all this how can the needs of all kinds of marginalized people such as women, pastoralists, the poor, indigenous people be addressed in such a way as to promote the sustainable use and management of dryland forests in a context of ecological instability, an increasingly volatile institutional context for natural resource management, and increasing population and urbanization with a growing demand for fuelwood and other forest products?

In the following, we first discuss why it is imperative to work on drylands and dryland forests. Next, we attempt to redefine our notion of *forest* to do justice to the way trees and forest resource management are integrated in the local management of natural resources. Then, we discuss a conceptual framework focusing on diversity at various levels. In the last section, we discuss how this approach can be applied to investigate the gendered management of forest resources and its implications for policy analysis. We finish with a brief discussion on how the different chapters fit into this framework.

The Significance of Drylands and the Need for a Holistic Approach

The exact proportion of global land surface classified as dryland depends on the way dryland is defined. According to the most common estimate, drylands comprise about 41 % of the earth's surface (White et al. 2002). The most accepted way to define drylands is as all terrestrial regions where there is water scarcity. In the *World Atlas of Desertification*, water scarcity is defined as an excess of long-term evapotranspiration (ETP) over precipitation (P) expressed in the aridity index P/ETP. If the aridity index is below 0.65, we call an area dryland, i.e. mean evapotranspiration is at least 1.5 times the long-term mean of rainfall (Middleton and Thomas 1997). If we accept this definition, tropical dryland forests comprise a little less than half of the forests in subtropical and tropical areas (Blackie et al. 2014). For dryland forest, different definitions are used. Dubois (2011) classifies dryland forests as a Global Ecological Zone, as forests that experience a tropical climate with summer rains, a dry period of 5–8 months and rainfall between 500 and 1500 mm per annum. Tropical dryland forests according to this definition occur mainly in Latin America,

South and South-East Asia, and Africa. In India for example, 60 % of all forest is then tropical dryland forest (Blackie et al. 2014).

An alternative way of defining dryland forests is to classify them from their appearance as a specific biome defined as savannah forest or not 'true' forest (World Bank 2007). Savannah forests can be defined as grassland and woodland dotted with smaller trees and shrubs. According to this definition, there are no dryland tropical forests in South Asia and much fewer in Latin America, and the bulk of the world's savannahs are located in Africa. In this book, we follow the FAO definition but expand its scope to include areas that have less than 500 mm rainfall per annum (Aridity index < 0.25) because in many places, such as the West African Sahel and Rajasthan in western India, periodic vegetation patterns with forest-like characteristics such as tiger bush occur below the 500 mm gradient (Deblauwe et al. 2008). Particularly in these areas, forests and trees play a crucial role in the livelihoods of the rural population.

Drylands are an important development issue. Tropical drylands make up 72 % of all the drylands in the world, and 87 % of all the people inhabiting drylands live in developing countries and are among the poorest in the world. One billion of the world's poorest live in tropical drylands. These areas pose the greatest global development challenge because they perform worst in terms of per capita income, food security, malnutrition rates, life expectancy and child mortality. Most dryland areas lack sufficient infrastructure for economic development, are remote from markets, and are not provisioned with adequate public services such as healthcare and education, thereby exacerbating the marginality of these areas and their populations. Moreover, many of the regions classified as drylands are the scene of (protracted) conflicts especially in Africa, the Near East and Central Asia. Drylands are also increasingly the scene of what can be labelled land-grabbing practices and militarization of control over land by powerful outside actors for purposes such as biofuel production, large-scale agriculture (Schoneveld 2013) and wildlife conservation (Fairhead et al. 2012)

Dryland ecosystems are inherently unstable and therefore unique and often rich in biodiversity – with flora and fauna indigenous to the region. Yet, drylands are regarded as economically less valuable, and little investment has been made in economic development and technological and agricultural innovation. As a result, the potential of drylands has not yet been fully exploited. If dryland forests were more properly valued and sustainably managed, they would be able to contribute more to food security and poverty reduction. At present, the contribution of forests and woodland resources to regional economies and livelihoods is not adequately recognized. This re-evaluation needs to be based on rethinking the role of various ecological and political risks and challenges and the socio-cultural diversity that are characteristic of drylands, not just at local but also at global level. Only by identifying and appreciating this ecological, political and socio-cultural diversity in our analytical frameworks can we work towards more sustainable management and address future and contemporary challenges such as encroaching desertification, increasing climate variability and climate change, political conflicts and emergencies,

the governance of smallholder versus large-scale agriculture and the continuing militarization of land management.

The framework focusing on socio-cultural and ecological diversity takes the following points of departure:

- Dryland management is about managing agro-ecological and socio-cultural diversity born out of an extremely dynamic non-equilibrium ecosystem.
- Because of volatile rainfall regimes in both time and space and small variations in soil properties, resource availability for different user groups is also varied in time and space.
- We do not assume that dryland forests are overexploited, degrading and declining in size. They are dynamic parts of the natural vegetation, increasing and contracting, in their managed and unmanaged state.
- Forests and forest resources must not be defined as a legal category only; rather, they have to be defined in a landscape context with trees and forests as part of agricultural and natural landscapes, providing different kinds of forest resources from wood to non-timber forest products (NTFPs), browse and fibres.
- These landscapes offer a plethora of agro-ecological niches providing a variety of opportunities for a diversity of user groups. Gender is an important – but often neglected – dimension of this socio-cultural diversity.
- Management and exploitation rules, as exemplified in customary and state regulations, are contingent upon this agro-ecological and socio-cultural diversity exemplified by gender, ethnicity and social hierarchy.
- Looking at trees and forests through a landscape approach is the best way to deal with such diversity

We discuss this framework first by highlighting the landscape approach, then by considering the management dimensions of highly dynamic resources and subsequently by looking at socio-cultural diversity in relation to access to forest resources.

From Dryland Forest to Dryland Landscapes

As noted in the previous section, dryland forest is often difficult to define, because it often does not have a forest-like appearance. One of the crucial aspects of dryland forest is that tree density is dependent on rainfall in relation to soil properties and topography. One can find dense forestland in places where water collects because of run-off and topography, whereas on sandy soils tree density can be very low even in areas with relatively high rainfall. Cut-off points are difficult to define as forest resources and trees often occur in a patchy manner. Treating forest as a legal category does not solve the problem. On the one hand, this would mean not treating large areas of woodland in dryland areas as forest because they are not officially classified as such. Conversely, in many areas, officially designated dryland forests have been overexploited and have hardly any tree cover left. In addition, local forest management regimes over local trees and forests put in place by local communities

are often not recognized as legal by national governments. On the other hand, government legislation with respect to the use, management and conservation of individual tree species often extends also to trees and forests on private lands, and to land that is used for agricultural or other purposes.

From Forest to Forest Resources

In order to avoid this difficult discussion on how to define dryland forest, we propose a more generic definition of dryland forest, so as to include a broader range of tree and forest resources used and managed by local populations and the state. The term *dryland forest* encompasses therefore all kinds of forest resources inside and outside areas designated by state agencies or local and customary institutions as areas for the use and management of trees and forest resources; these resources are also actively or passively (conservation) managed by either government or private owners or customary authorities. So, this can apply to private land or land collectively owned by individuals or communities, land officially classified as forestland and unclassified land (e.g. waste land or open-access pasture land) that does not fall under a specific regime with the objective of managing trees and forest resources.

From Forest Resources to Forest Landscapes

An alternative model for looking at forest and forest resources has recently been proposed by Angelsen and Rudel (2013), who look at forest transitions and forest landscapes. They identify a number of stages in forest exploitation and management following an increase in population and pressure on the forest. They distinguish core forests, where pressure is low combined with low population density; frontier areas, where population increases and subsists largely by exploiting (and depleting) forest resources; and forest–agriculture mosaics, when population increases, demand for forest resources increases, and reforestation and conservation of forest resources gather momentum. Although Angelsen and Rudel developed this model for humid forests in the tropics, it might be interesting to apply this perspective to drylands as well and look at the use, exploitation and management of trees and forest resources in a more integrated way and from a landscape perspective. In dryland areas as well, we might be able to observe similar transitions from exploitation only, towards depletion with rising population pressure and conversely with people engaging in tree planting to make up for scarce forest resources. In each stage, trees and rules about access to trees assume different roles and meanings alongside the changing interaction between people and their natural environments.

A landscape approach, however, would imply that we are looking at dryland forests in a broader way than just from the perspective of forestry. Rather, we are also taking into account drylands that are primarily in use as pasture, where fodder

is the main forest resource exploited, and focusing on the relation between tree growing and management in agroforestry landscapes managed by small farmers in more humid drylands. Agricultural land in park landscapes in the Sahel, populated with trees like *Faidherbia albida*, can be regarded as a fine example of agriculture associated with tree management on land owned by local agriculturalists (Pélissier 1980). In better rainfall areas, these landscapes might develop into full-fledged agroforestry systems with a larger diversity of crops and trees.

Dryland Landscape Management

Climate and rainfall variability pose specific challenges for the use and management of resources because fluctuations in these resources pose a threat to food security and the survival of local populations and domestic animals. In this section, we highlight the contribution of forest resources in managing this ecological instability.

Climate and Rainfall Variability

Although dryland landscapes may seem homogenous ecosystems at first sight, they hide a tremendous diversity that has important implications for their management. This variety is born out of the volatile climate conditions characterizing drylands. Generally speaking, the drier the climate (defined in terms of mean annual rainfall), the more unpredictable this rainfall will be in both time and space (Ellis and Swift 1988; Scoones 1995). This variation in rainfall has enormous effects on the growth and composition of the natural vegetation to the extent that, in the more extreme cases, dryland ecosystems are more externally driven by rainfall and temperature than by internal feed-back loops within the ecosystem (Ellis and Swift 1988; Scoones 1995). This variation in conditions causes also temporal and spatial variation in species composition of annual species and survival rates of perennials (grasses, shrubs and trees). This, in combination with (small) variations in soil quality, hydrological situation and slope, leads to enormous variation in vegetation, productivity and possible uses of the land. This variation can be both a drawback and a resource to make use of, for example when we focus on cereal cultivation systems that exhibit the same variability and may lead to food insecurity (De Steenhuijsen Piters 1995; Gandah 1999).

As a result, dryland landscapes offer a variety of often patchy resources to its inhabitants. As stated, they are comprised of a rich diversity of agro-ecological niches providing a diversity of opportunities for a variety of user groups. No greater contrast is imaginable than that between small farmers exploiting minute pieces of land planted with wheat or date palms in the oases in the Sahara and the long-range camel pastoralism practiced by the Tuareg; or between Dogon cultivators at the Bandiagara escarpment in Mali growing onions in the dry season around wells and

small dams on the rocky outcrops alongside the cattle-herding Fulani (van Dijk et al. 2004). Some pastoralists even survive without any pasture at all, such as the sheep herders in Western Rajasthan whose animals survive on farmers' harvest residues (Kavoori 1999). In all these instances, trees provide a varied range of products and services to these populations in the form of browse, fuelwood, fruits, cover, fibres and construction wood (Le Houérou 1980; van Beek and Banga 1992; van Dijk et al. 2004).

The Degradation Debate: Dryland Forest Landscapes Are Extremely Dynamic

The climate factor has, however, given rise to a fierce debate about the direction of ecological change in drylands and the management of drylands. This debate centres on the role of drylands inhabitants in degradation of the natural vegetation and forest resources. Concern has been growing about the nature and extent of land degradation in dryland areas as a result of population growth, expansion of agriculture and climate change. Land degradation and desertification have been defined as a consequence of both natural and anthropogenic processes (MEA 2005) and are even mentioned as a possible cause of conflict and political instability (Homer-Dixon 2010; van Schaik and Dinnissen 2014).

Forest resources and the vegetation in general in drylands may fluctuate enormously with the vagaries of climate. Droughts may cause enormous changes in dryland vegetation. For example, in the Sahel zone of Africa, large tracts of forestland dried up during the drought of the 1980s (Helldén 2006). However, it is not so simple to attribute this present state of apparent degradation to anthropogenic factors such as overexploitation of natural resources and the natural vegetation. Degradation means that natural conditions deteriorate from a previous condition. It must, therefore, always be assessed in relation to an earlier situation. Often, these time series are unavailable. The well-known Global Assessment of Soil Degradation of 1991 was based on expert opinion and reported that 20 % of the drylands were degraded (MEA 2005). Another estimate from the early 1990s based on secondary sources concluded that 70 % of the drylands were suffering from soil and vegetation degradation.

In addition, it is difficult to establish what the precise causes of land degradation are. Available evidence points in different directions. Comparisons may be unreliable because of changes in methodology and detail, in that different definitions and variables are used over time. So-called land degradation can be a temporary phenomenon. For example, although there was alarm over land degradation after the great Sahel droughts of the 1980s, there was also evidence that the vegetation reestablished itself in subsequent years (Helldén 1991). Olsson et al. (2005) found an increase in the normalized difference vegetation index (NDVI) between 1982 and 1999 and in millet production per capita in Burkina Faso and Mali, despite the fact

that these countries were believed to be subject to large-scale land degradation and desertification. The most significant positive changes were found in the Northern Sahel, where grazing rather than cropping is predominant. Hiernaux and Gérard (1999) found that the vegetation dynamics of woody areas called tiger bush in the Sahel were largely dependent on rainfall, with massive dying off of trees in 1984 and subsequent re-establishment of trees afterwards. They found no influence of grazing except for small corridors (100 m wide) along major trekking routes. A model study of desertification in Sudan over 150 years showed that it is difficult to create irreversible degradation through human influence (Helldén and Tottrup 2008).

If land degradation is primarily caused by natural conditions because of low and variable rainfall conditions, high temperatures and wind erosion, the converse question is whether improved land and water management can have any effect on the maintenance and/or rehabilitation of dryland forest. Climate is a given that can only marginally be influenced by human intervention unless these conditions are caused by manmade climate change.

Agricultural Encroachment

A major problem for forest resources is agricultural encroachment. Forest and bush land have been taken into production for agriculture as a result of growing populations. In the semi-arid areas of India, village forests and grazing lands have come under increasing pressure (Singh, this volume). However, local institutions exist which protect village forests and grazing lands from encroachment not only as sources of biodiversity, but also as sources of sustenance and income for the poor. In many places, park landscapes and agroforestry systems have been developed, where trees form an intricate part of the agricultural landscape (Pélissier 1980). Yet, a lot of land has been cleared and is now in use for agriculture and is said to be degraded. However, it is difficult to distinguish anthropogenic from natural causes of this degradation. Most studies on soil and water conservation fail in this respect (Sietz and van Dijk 2015). There are also indications that human intervention has had quite a positive influence in some areas, such as the Central Plateau in Burkina Faso and in Southern Niger, in terms of tree planting (Reij et al. 2005). Others have reported a greening of the Sahel in highly populated areas, where the populations have actively engaged in soil and water conservation measures such as tree planting and the application of green manure (Sendzimir et al. 2011). Population density, coupled with water shortage and a conducive institutional environment, seem to be key factors here, but the evidence is far from conclusive (Sietz and van Dijk 2015).

This means that concepts like land degradation must also be used with caution. In the first place, given the variability of natural conditions, measures to determine land degradation such as NDVI exhibit a large variety, and much depends on the time and year of measurement. In fact, drylands and deserts often appear greatly

degraded in some years and much less in years with more abundant rainfall. Human influence on these conditions is very limited, since rainfall is the main determinant of vegetation growth (Ellis and Swift 1988).

Food Insecurity

When dependent on rainfall, the cultivation of crops is very risky, and yields may vary considerably from one year to another and even within a single village (De Steenhuijsen Piters 1995; Gandah 1999). For pastoralists, fluctuations in pasture productivity may be even higher (de Leeuw et al. 1993). As a result, populations living in the drylands are exposed to a wide range of threats. The social diversity of the population (race, ethnicity, class, gender) plays a major role in the way people adapt to the drylands. A large part of the population living there consists of marginalized communities such as pastoralists, indigenous people and conflict refugees with few or no land rights. Lack of secured access to available resources further imperils their survival. Yet, these marginalized groups have developed a wide variety of strategies to cope with various challenges over the past centuries. These measures include: strengthening indigenous strategies to cope with drought; supporting the development and adoption of resource management practices that will protect and improve productivity, thereby increasing the resilience of agricultural systems; reducing fluctuations in livestock and grain prices during drought periods by expanding market size and reducing transaction costs; developing a set of warning indicators; and setting aside drought grazing reserves or strategic water reserves (Øygard et al. 1999).

These high risks for cultivation and livestock-keeping are an integral part of living in the drylands, and food insecurity is a normal feature of life. Food insecurity makes the role of forest resources important as a buffer in times of hardship not only as a source of food, but also as a source of income. Fruit collection, of which we see several examples in this volume (Faye, Singh), contributes not only to food, but also to substantial amounts of cash income. In the Sahel, during famines people survive by collecting wild berries from *Boscia senegalensis* and a variety of other trees and shrubs with high protein and mineral content (Cook et al. 2000; Glew et al. 1997; Kim et al. 1997). In many savannah villages in West Africa, shea nuts are the major source of cash for local women (Elias and Carney 2007). In Rajasthan, trees species like *Ziziphus Mauritania, Prosopis cineraria, Tamarindus indica and Salvadore oleoides* are extensively used as famine foods (Bhandari 1974).

In most areas, wood is the major source of fuel and for some also an important source of income. In most cases, people collect only dead wood for fuel and fresh wood for building purposes. In the event of scarcity, they substitute wood with litter and dung (Nagothu 2001). The collection of wood and the burning of charcoal is for many a survival strategy in times of food insecurity.

Many of the major cities in dryland areas are still dependent on wood and charcoal for the provision of domestic energy, so there is an enormous task there to

manage these forest areas in a sustainable way because of the powerful commercial and political interests involved (for an example, see Ribot 1998). The productivity of dryland forests may be quite low, 1–1.5 m^3 per annum depending on rainfall, but under the right management regime productivity can be doubled and even tripled (Guesselbodi experiment). In addition, more long-term fluctuations of forest resources as a result of major droughts provide sources of income in the form of the collected dead wood that can be marketed or converted into charcoal. There has been a lot of debate about an impending fuelwood crisis, but according to some this has been exaggerated and problems can only be expected in specific areas such as around large cities (Arnold et al. 2006).

Trees and Forests as Pastures

In a similar vein, the fluctuation in the productivity of natural pastures for nomadic pastoralists, whose main source of subsistence is livestock-keeping, also poses big challenges. Here too, forest resources in the form of browse act as an important buffer in times of drought. In the midst of the fluctuations in annual resources, trees and forests make up a more stable source of browse. The most resistant livestock species in drylands, camels and goats, survive mainly on browse from trees. During the dry season when the crude protein content of annual grasses declines and their availability goes down, even grazers like sheep and cattle may depend up to 50 % on the fodder derived from trees and shrubs, with *Leguminosae* being the main source of protein (Le Houérou 1980).

In India, 485 million animals, of which 285 million are of bovine origin, are dependent on forest and grazing areas (Roy and Singh 2013). Although dryland forests cannot meet all these challenges, the common opinion that they are degrading as a result of overexploitation does not hold, according to Roy and Singh, and fodder resources are commonly created outside the forest by growing trees and grasses on private land or cultivated by villagers themselves (Nagothu 2001; Mahapatra and Mitchell 1999). This underscores again the need not to look at dryland forests in isolation or as a legal category, but in connection with forest resources outside forests and on private land, and rather conceptualize dryland forests from a forest landscape perspective.

Socio-cultural Diversity

Mobility and Sedentarity

Throughout the literature on drylands and their use, a bipolar image emerges of how local people use and manage forest and other natural resources. Basically, they have two options. They can stay in the same place and invest their labour heavily in soil and water conservation and tree management to optimize the productivity of the

scarce resources at their disposal, such as by accessing permanent water resources in oases or constructing water catchment devices. Alternatively, they can choose to follow the rainfall and look for the best options in space through mobility, such as nomadic pastoralists, who follow the rains according to season and place. Many choose either one or the other, but may also opt for a combination of the two, giving rise to an enormous variety of organizational arrangements and networks across space and time (Gallais 1975). Therefore, a landscape approach to dryland forests and forest resources is very appropriate, because local users make use of different parts of these dryland landscapes. Drylands inhabitants view their landscape beyond the economic limits of the products they provide such as crops, forage, NFTPs (honey, gum) and timber. The majority of men and women living in the drylands are connected to the landscape for their livelihood needs, but also through the social relations that they maintain with one another as co-managers with overlapping rights to, and uses of, forest resources and their shared cultural and social values.

The Forgotten Gender Dimension

Gender, and diversity in general, have been neglected in the analysis of the use and management of dryland forest resources. For example, hardly any attention is given to the position of pastoral women in drylands, since the herding of livestock and the negotiation of access to fodder and browse from trees for animals is considered a male affair. However, in many cases, women own livestock and should have a stake in the management of pasture and trees. Likewise, women's access to the exploitation of NTFPs is often regarded as contingent upon their membership of their ethnic group or the kin group of father or husband and therefore secured. However, as often happens, if these NTFPs become commercially attractive and marketable products, men are able to appropriate these resources, such as was the case when shea nut became an attractive NTPF because it became part of a value chain for Western cosmetic products and likewise in tribal India tribal men claimed interest in agroforestry fruit trees managed by tribal women due to higher economic benefits. (Carney and Elias 2006; Bose 2015).

Gender, defined as the culturally defined roles of men and women and more generally identity – which also pre-supposes specific roles in social and political life – indicate who one is and determines to a large extent what kind of roles one can take, the activities one can undertake and the kind of rights one has with respect to forest resources. Even within one ethnic group, the same gender can have different roles. Among the Fulani in West Africa, women of the noble class, of pastoralist origin, are not supposed to collect fruit from trees even in the event of famine, in contrast to women belonging to the group of former slaves (de Bruijn and van Dijk 1995). In India, caste membership or belonging to, for example, a scheduled tribe entail different definitions of appropriate behaviour and engagement in the management of forest resources (Robbins 1998; Bose 2010a, b). Therefore, any analysis of gender in relation to access to, and management of, forest resources needs to take

other identity dimensions into account, such as ethnicity, class, age and caste. What is allowed or appropriate for people from one class may not be so for people of another class. In addition, local people are subject to state laws pertaining to their access to, and use of, forest resources. Their identities and membership of certain social categories and the way they organize people in social networks, power relations and categories are important for how people use and manage forest resources. They determine what kind of forest resources they are entitled to use and exploit, and under what conditions.

So, access and identity are intrinsically linked. In many cases, women are subsumed under ethnic or groups labels or are regarded as secondary group members. They are not part of the lineage of their husband, nor do they belong to their paternal kin group (patri-lineages in Africa). For example, in the literature on the use of pasture and browse in societies of nomadic pastoralists, they are often not even mentioned. Because this is the dominant mode of production, there is hardly any information available on the use of forest resources by pastoral women. In agricultural societies it is scarcely better. Land is managed by patri-lineages and the property of men. Collective forest resources are managed at the level of the community. Women are hardly represented there either.

Access and Property Rights

Access and property rights to dryland forest resources can be defined at different levels. Given the diversity of uses and the volatile character of dryland ecosystems, the low productivity and large variations in the productivity of the natural vegetation and forest resources, the management of drylands has to address a different set of parameters than tree and forest management in more humid areas and temperate zones. Products harvested from the forest and forest resources in drylands are often seasonal and are often required by different categories of users. In most drylands, the collection of firewood for domestic use is primarily a female affair. However, firewood collection for commercial purposes is often the domain of men, more particularly traders. Animal pasturing is often temporary and does not require permanent rights to trees and pasture given the variability of fodder resources in time and space. Therefore, we have to define not only the kind of rights-user categories (access, withdrawal, management, proprietor, alienation) in forest resources (Schlager and Ostrom 1992), but also the timing and spacing of these rights (van Dijk 1996). With spatial variations in rainfall, people may have to re-negotiate their rights in a different place to make up for scarcity in the place where they are.

This need for flexibility expresses itself in loosely defined rights to forest resources and the tendency to define these rights more at the level of communities (or even open access) to allow for population mobility and the re-negotiation of rights and access over time in view of volatile and evolving conditions of the vegetation and the needs of the population (van Dijk 1996). The variations in resource availability in time and space, and the ensuing mobility of the users of dryland for-

est resources, mean that who benefits from forest resources is best analysed through an access and identity lens. Access is best defined as 'the ability to benefit from things' (Ribot and Peluso 2003: 156). Ability here refers to sets of power relations between users and user categories that determine who is able to benefit from forest resources. This ability may depend on officially acknowledged rights, but may, in their absence, also depend on labour availability to exploit these resources, or knowledge about these resources, or the social relations one has with people who can control and mediate access (Ribot and Peluso 2003). Gender, power and social hierarchies play an important role here.

Legal Pluralism

Even before colonialism, states tried to get a grip on forest inhabitants and their use of forest resources, such as in Western India (Skaria 1999). Over the course of history, it is rare to find a single unified tenure regime in drylands. By conquest and with colonialism, tenure regimes were vested on top of local tenure regimes with respect to forest resources. This situation of legal pluralism (Griffith 1986) persists to the present day despite attempts to reform forestry codes, and leads to multiple ambiguities and conflicts about forest rights and management. The colonial states were mainly interested in the production of timber, and sometimes left the exploitation of minor forest products, pasture and fibres as a privilege to local users (Bose et al. 2012), and the exploitation of valuable species was regulated, sometimes through extending the forest regime over private lands to preserve these species, such as in French West Africa (de Bruijn and van Dijk 1995). These colonial tenure regimes often privileged certain uses and user categories (the state) over local users, thereby effectively dispossessing local people from their own forest resources (Bose et al. 2012). As these colonial administrations were not able to control the use and management of forest resources in remote areas, local use and management were left largely untouched. The result, however, was that legally forest resources were appropriated by the state, by appropriating vacant land as the property of the state or declaring all land that was forested as state land. Consequently, local populations were disowned on paper, opening the way for exploitation from outside for commercial purposes, which we see today.

Over time, with increasing population numbers and increasing demand for wood, the influence of the state at local level began to be felt. This is not confined to India, but is a recurrent theme in dryland forest management. In Senegal, outside traders, armed with government licences, are able to exploit village forests to produce charcoal, because these forests now belong to the *domaine privé de l'État* (Ribot 1998), although they are no longer permitted to prune valuable trees like *Faidherbia albida* on their own fields because they are a protected species under the *régime forestier*, which extends also over private land. In the aftermath of the droughts of the 1970s and 1980s in the Sahel, governments were determined to curb the grazing rights of pastoralists and their use of forest resources for browse, as they were held respon-

sible for the devastation by overgrazing and overexploiting trees (de Bruijn and van Dijk 1999). This meant more controlled grazing through pasture management projects that did little to improve the ecological situation and tended to benefit the powerful over the common pastoralists (van Dijk and de Bruijn 1995). With changing insights, attempts were made in several countries to safeguard and regulate rights of pastoralists to grazing through so-called pastoral charters. It is too soon to evaluate the results of these charters, although some have warned that they may turn out negatively for the pastoralists that are supposed to benefit from them because of the legalistic tendencies in these charters and their failure to take ecological dynamics into account (Hesse and Thébaud 2007).

In many countries, forest tenure reforms have been implemented to remedy this situation and give back some of the rights that local people lost to colonial and independent states. In tribal villages in Rajasthan, members of scheduled tribes lost their traditional forest rights to the colonial state. In 2006, the Indian government enforced the Forest Rights Act to give back collective and individual rights of tribal villagers. However, in practice, no collective rights were given back and the envisaged reform added another layer of institutions, which did little to help the villagers (Bose et al. 2012) and further discriminated women (Bose 2011).

Increasing Complexity

As a result of this instability of resource availability and the increasing multiplicity of tenure regimes, with several layers of reform on top of one another, the institutional landscape for managing dryland forests and forest resources is becoming increasingly complex and politicized. This institutional pluralism and reform does not always solve the problems it is supposed to solve. Instead, it creates in a number of cases a lack of clarity and manoeuvring space for powerful actors to manipulate rights and representation to the detriment of those at the bottom of the hierarchy (Bose and van Dijk, in prep). These tendencies increase the potential for conflict, as local people feel increasingly disenfranchised and threatened in their basic conditions of existence. This may be the real motor of conflict, rather than what has been called the myth of scarcity (Peluso and Watts 2001)

The Contributions to the Book

The different contributions to this volume first of all give a good picture of the importance of forest resources for local livelihoods. In a number of cases, rural households (men, women, farmers, pastoralists) derive considerable income from primarily non-timber products, such as fruits, gum, honey, incense (Faye; Mujawamariya and Burger; Ingram). In the other cases, forest resources provide essential functions for a myriad of users, from a multitude of resources (Kariuki et al.; Bekele et al.; Singh).

Often, these users do not have equal status and power. Women in general participate less in decision making and often do not enjoy ownership rights (Bekele et al.; Mujawamariya and Burger; Kariuki et al.), because these are vested in patri-lineages or the community at large, dominated by men. At the same time, women are sometimes the prime users of, and dependent on, forest resources (Kariuki et al.; Singh; Bekele et al.), also because they have no alternative to the resources that they derive from the forest. In the case where women are empowered (Faye), this leads to conflict with the male half of the population. The cases underscore the need for more detailed knowledge of local uses of forest resources to better map the possible consequences of changes in management and tenure regimes.

The case studies also provide insights into the increasing complexities of the management of dryland forest resources and show that resource tenure relations in these areas are quite dynamic and evolving from collective management towards private property and management, such as the exploitation of gum arabic in Senegal (Mujawamariya and Burger), and sometimes are even in a state of non-management, such as honey in Cameroonian Adamaoua (Ingram). This latter apparently unproblematic case shows that, as long as a particular activity (bee keeping) does not compete with other forest uses, conflict is absent. In other cases, such as semi-arid India, the line between state and community management is very unclear, and local people seem to operate in an institutional space that is hardly defined and is open to discretionary decision making by government officials (Singh). On the other hand, it leaves space for local people to partly manage the forest and grazing according their own rules. We can also observe that changes are taking place at local level. In Senegal, important changes in forest tenure and local exploitation are taking place in relation to gum arabic – changes that seem to be more related to the development of markets and increasing population pressure than outside intervention (Mujawamariya and Burger). In this case, we also see the (inverse) relation between the level of involvement in one activity, such as livestock-keeping, and the collection of gum arabic.

Relations with the outside world (the state, NGOs, international organizations) add to these complexities. Outside interventions play an important role in the case of the exploitation of fruits in the Senegalese case, although not in the way expected, and may even lead to conflict between different user groups (men and women) (Faye). Although the Maasai in Kariuki's case study strive to maintain autonomy over their own forest, the conflicts they face have repercussions for their internal organization (Kariuki et al.). However, some of these changes are coming from within the community, with changes in lifestyles, access to education and increasing population pressure. In the Ethiopian case (Bekele et al.), the role of the state is highly problematic because there seem to be two conflicting development models, leaving the local population dispossessed. In India (Singh), the state claims the leading role in the management of resources, but this does not necessarily lead to better or more sustainable management for the benefit of the marginalized.

All in all, there is every reason to take a fresh look at dryland forests, re-evaluate their value and take a closer look at their management. In the context of the multiple threats to forest resources due to large-scale dispossession, climate change and agri-

cultural expansion, there is need to look carefully at the pros and cons of the variety of uses made of dryland forests and landscapes (van Dijk et al. 2014). It may even turn out that the monetary value of modern industrial agriculture — deemed superior by governments and capitalist entrepreneurs — is not quite as high as the sum of all the uses made by local people. In this regard, recent policymaking in the light of climate change adaptation and mitigation through REDD+ policies must also be regarded with caution, as they may tend to have an exclusionary logic because they are oriented towards conservation rather than sustainable use of forest resources, and towards restrictions rather than participation and benefit sharing for local populations. We must also take a careful look at the social and political costs of dispossession, because at present primarily the marginalized depend on dryland forest resources. Increasing poverty and malnutrition levels may be the result of current trends in forest tenure relations and outside interventions. The unrest in many dryland areas bears witness to the fact that many people in the drylands feel marginalized and that they refuse to be in an unequal relation to the powers that be.

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Part II
Communal Land Tenure Governance

> In Africa, over the next 20 years some 60 million people are expected to move from the Sahelian region to less hostile areas if the desertification of their land is not halted… (Quote by the then Secretary General of the United Nations, Mr. Kofi Annan in the Statement by Hama Arba Diallo, Executive Secretary of UNCCD)

Decentralized communal land tenure governance concerns the control, access, management and use of resources. There is an urgency to ensure secured land tenure governance in the drylands to sustain and improve the livelihoods of marginal groups for the future. It entails transferring rights and strengthening the institutional capacities and decision-making powers of all partners and stakeholders.

The next two chapters highlight the key challenges with regard to drylands communal land tenure governance. Bekele et al. discusses the diminishing status of land rights of communities in dry lowland areas and its implications in Ethiopia. Gaudiose and Burger in their research chapter explore the dynamics of gum Arabic collections with a focus on the gradual transition of private towards communal tenure systems in Senegal and its consequences

Chapter 2
Diminishing Status of Land Rights of Communities in Dry Lowland Areas and Their Implications: The Case of Ethiopia

Melaku Bekele, Habtemariam Kassa, and Christine Padoch

Abstract Dryland areas occur in both the highlands and the lowlands of Ethiopia and cover over 60 % of the country's land mass. They support pastoralist, agro-pastoralist and hunter-gatherer communities, and their long-standing institutions to manage local resources on a fairly equitable basis. However, this autonomy has been significantly eroded by successive governments' policy of agricultural expansion and modernization, driven by the growing global demand for food and fuel. By reviewing historical trends and current statuses, this study attempts to identify the driving forces behind this fast-changing land use and its impacts on communities and resources. The review shows that government's generous land leases to national and global investors, encroachment by smallholder farmers from the highlands, state-initiated settlements of poor households, and individualization of the commons by some community members themselves have further undermined the already weakening customary tenure arrangements (which were never as clearly defined in the lowlands as in the highlands). The problem, however, needs to be seen against the constitutional rights of all citizens who want to be farmers to get land anywhere in the country. Unless these issues are addressed, indigenous communities will continue to be exposed to expropriation and unable to assert their rights in the face of more powerful actors. The chapter concludes by stressing the need to formulate and enact policies and legal frameworks to ensure the livelihoods of dry lowland communities in light of the mounting interests of multiple actors and of other stakeholders' rights and responsibilities as stipulated in the Ethiopian Constitution.

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Introduction

This chapter describes the trends and current status of customary land rights of communities in dry lowland areas of Ethiopia, and how external and internal factors have affected informal institutions in determining access to, use, and management of dry lowland resources, as well as the impacts of those changes on livelihoods and on natural resources. Various studies have been conducted on the fast-changing land use and land tenure systems in the Ethiopian highlands (e.g. Rahmato 1984) and on the influence of tenure on the tree-planting behaviour of smallholder farmers (e.g. Kassa et al. 2011). It appears evident from the literature (e.g. Lemenih et al. 2012) that these changes in tenure might have negatively impacted resources like forests, pasture and water in the dry lowlands, and communities' livelihood systems. Little is known on how tenure is changing the dry lowland areas, the drivers of these changes, and the impacts of those changes on livelihoods and the resource base. Therefore, it is timely to examine the situation and draw the institutional, policy and practical implications of these findings for communities in the dry lowland areas in order to inform policymakers. This study was conducted to contribute towards this end.

The next section provides some relevant background on tenure, resources in the dry lowland areas, customary management of these resources and the role of women. The third section presents a brief account of the history of tenure in the highlands and in the dry lowlands in Ethiopia, and of the major drivers of land tenure changes in the dry lowlands. The fourth section discusses the consequences of changes in tenure regimes and also the impacts of communities' declining rights on the resource base and on livelihoods. Finally, the major conclusions and implications for policy and resource management in the dry lowland areas are presented.

Background

Tenure Security and Customary Rights: An Overview

Land tenure arrangements are dependent on countries' political history, economic policies, cultural settings and, in many cases, ideological orientation. Nevertheless, there are basic concepts of what the institution of land tenure constitutes, and in most societies this includes the institutionally (formal/informal) granted bundles of rights to access and use resources (in this case land), and the responsibilities and restrictions attached to the freedom of access and use. Rights usually come in

bundles (Schlager and Ostrom 1992) under complex institutional arrangements. Rights to land or other resources cannot be explained only by the general category they fall under: common, private and public (state). Whatever the property regime might be, rights over land constitute three components: *use rights:* rights to use the land for production of goods and/or services; *control rights:* rights to make decisions on how the land should be used; and *transfer rights:* rights to alienate the land to a third person (FAO 2002). As Schlager and Ostrom (1992) and Agrawal and Ostrom (2001) noted, tenure right is understood as having bundles of rights of access, withdrawal, management, exclusion and alienation. A management right is 'the right to regulate internal use patterns or transform the resource' (Agrawal and Ostrom 2001: 489). Land tenure is commonly considered to be secure if it guarantees holders of such rights that their privileges will be free from expropriation, encroachment or forced eviction (FAO 2002).

Land tenure is commonly categorized under three major regimes: private, state and common (and under certain circumstances a fourth category is suggested where property is partly present as open access). The reason for such division is to minimize management or transaction costs, and ultimately, as Milgrom and Roberts (1992) noted, to generate socially efficient outcomes. In each case, land tenure – as it is one of society's essential establishments – describes the system of institutions concerning ownership, use rights, management responsibilities, and general obligations and constraints on how land is owned and used (FAO 2002). Even without full ownership, individuals and groups may enjoy access rights to a resource (Mwangi and Dohrn 2008). A good example is the case of pastoralists who graze their animals on fallow lands that belong to individual farmers in Ethiopia's Central Rift Valley.

Rights over a piece of land arise from both statutory and customary laws (Maxwell and Weibe 1998). State or customary laws governing tenure define how property rights to land are to be allocated within a community. Customary land tenure reflects the accepted practices and norms of a society in traditionally acquiring, using and distributing its land (Falloux 1989). Customary land tenure systems do not consider land as a commodity that can be traded for personal gain (de Soto 1993). Individual land rights are restricted by community ownership and/or institutions. User rights are shared – often on the basis of informal rules (Oskam and Feng 2008). Rakai and Williamson (1995) divided customary rights over land into formal customary land tenures, referring to those officially sanctioned by government laws and regulations; and informal customary rights, those without formal recognition, but used under collective ownership. Most often, however, when it comes to legal matters, customary land tenure falls into a grey area.

The Western view of land ownership is based on the thoughts of the English philosopher John Locke (1632–1704) who viewed private land ownership not only as a stabilizing factor for human existence, but also as a fortress against dictatorial rules (Gringer 1996; Griffith 1997). The most commonly emphasized justification of private land ownership, however, is the question of economic efficiency and low transaction costs. The other extreme notion concerning land tenure is that of the Marxian view which discouraged private land ownership and criticized the advocates of such rights as disguising the original fact of conquest under the cloak of

natural right (Marx 1869). Mill (1848) also entertained the view that no man made the land, and hence it is the original inheritance of the whole species and should not fall under private ownership.

The arguments favouring private ownership of land, and also the Marxian preference of state title, have left little space to consider customary tenure as a viable alternative to avoid the excesses of private ownership and maladministration of land under state control. Given the necessary legal and administrative backing to develop through their own dynamism, customary land tenure arrangements need to revitalize their capacity to contain the unnecessary intervention by the state and to ensure social justice.

Customary land rights have long remained a point of debate, particularly whether they represent a better and more efficient arrangement of resource allocation for economic growth than private property rights. Demsetz (1967) argued that individual title allows an efficient and vibrant land market to thrive as land is freely alienable and serves as collateral for access to credit. He noted that communal ownerships are unappealing as they have greater incidence of externalities. This view is upheld by many who believe that a formal (private) system of property rights facilitates transactions and access to credit.

Customary rights often secure access to common or privately used resources in more sustainable and equitable ways, although this may not apply to gender aspects. What is mainly important is not the type of property regime, but what each (property regime) holds as rights to allow holders to maximize their future benefits on a sustainable basis. Property rights over natural resources are key assets on which rural people build their livelihoods. The rural poor are often those with inadequate property rights; thus, secure rights over land, water, trees, livestock, fish and genetic resources are important mechanisms for reducing poverty (Di Gregorio et al. 2004).

The argument that customary land rights are a hindrance to economic growth and rural transformation should be critically examined. Writings on common property resources, including those under customary tenure, focus on how informal (local) institutions can be efficient and equitable and facilitate sustainable resource management. However, according to Agrawal (2001), it is important to include in the analysis those external social, physical and environmental factors that impact the institutional resilience of customary rights and also the poor and landless segments of society. This study attempts to focus on this issue, taking the dry lowland areas of Ethiopia as a case in point.

Ethiopia's Dry Lowland Resources: Importance and Current Status

Drylands in Ethiopia are found in both the highlands and the lowlands and cover about 60 % of the nation's total land area. According to some studies (Abdullahi 2004), 93 % of the population in these areas is engaged in pastoralism and agro-pastoralism, with the remaining 7 % occupied in other activities (hunting, petty trade, mining and so forth). The total number of pastoralists in Ethiopia is estimated at about 13 million, and they make up nearly 14 % of the total population. Pastoralists

live in more than 133 districts and belong to about 29 ethnic groups. Somali, Afar and Oromo pastoralists form 87 % of the total pastoralist population in the country (PFE, IIRR and DF 2010).

The dry lowland areas offer significant potential for socio-economic development. Pastoral production, for example, makes important contributions to the national economy by comprising 40 % of the cattle, 75 % of the goats, 25 % of the sheep, 20 % of the equines and 100 % of the camels (Yacob 2000). The total direct economic contribution of pastoralism to the Ethiopian economy (through the production of milk, meat, skin, hides and so forth) is estimated at US$ 1.53 billion and accounts for about 6 % of agricultural GDP per annum (Adinew and Abdi 2009).

Although dry lowland ecosystems offer huge potential, they are caught in a spiral of deforestation, fragmentation, degradation and desertification due to various human-induced and natural causes (FAO 2010). In the past two decades in particular, these areas have been turned into national parks, private and state-owned companies, concession areas, large and small-scale agricultural schemes and so forth (Kassahun 2010). Demographic pressure within and from outside settlers, investment pressure from both local and global capital, unregulated grazing, and excessive fuel wood and gum resin extraction are resulting in rapid changes in land cover and land use (Eshete 2002; Abiyu et al. 2010; Bongers and Tennigkeit 2010; Mengistu 2011; Woldeamanuel 2011).

Dry lowlands host diverse vegetation types that include dry forests, woodlands, bush land, thickets and wooded grasslands (Chidumayo and Emmanuel 2010), and are also known to be in biodiversity hotspots. They are closely linked to people's livelihood portfolios as they provide wood (for poles, fuel, simple furniture and utensils, and so on) and non-wood products such as livestock feed, medicinal plants and wild foods including honey, bush-meat, edible insects, mushrooms, fruits, leafy vegetables, edible herbs, roots and tubers, wild cereals and grains, seeds, nuts and kernels (Grosskinsky 2000). In addition, dry lowlands are sources of raw materials like gums, resins, tannin and fibre used in various industries that help generate additional income. Honey-bee products from these areas tend to be relatively important in eastern and southern Africa (Walter 2001). All this is in addition to the various ecological services that forests offer, such as reducing erosion and providing windbreaks, shade, and various amenities and cultural uses.

Livestock in the lowlands depend almost entirely on dry vegetation for their feed. A study conducted in Somali Regional State concluded that, in a normal rainfall year, browse from trees supplies approximately 20 % of feed for cattle, 25–40 % for sheep, 45–60 % for goats and over 90 % for camels (Somali Regional State 2003). It is estimated that browse from trees provides nearly 28 % of the total energy requirements of pastoralists' livestock. In drought years, this proportion can rise considerably, and thus browse provides a safety net for livestock in drought years (Somali Regional State 2003).

Acacia, *Boswellia* and *Commiphora* species, known to produce gum arabic, frankincense and myrrh, respectively, are found in most parts of Ethiopia's dry lowlands. Over 60 gum and resin-bearing species are known to exist in the country. The total areas of oleo-gum resin bearing woodlands is about 2.9 million ha, represent-

ing an estimated production potential of 300,000 metric tons of natural gums (Tadesse et al. 2007). In Somali, Borana and South Omo, individual pastoralists collect gums and resins for sale to buyers in local markets. Afar pastoralists also collect incense for household consumption. In the northern and western lowlands, hired tappers do most of the collecting. Natural gum tapping and collection create seasonal employment opportunities for thousands of poor rural youths and urban women.

Households' incomes from charcoal, firewood and other forest products have also been increasing over time, as they move away from pastoralism because of resource depletion (Mamo 2007). A study conducted in Borana (southern Ethiopia) by Elias and Abdi (2010) showed that charcoal making and trading is practiced by some 14 % of the poorer pastoralists around major urban centres such as Yabello and Negelle. The trade often increases during droughts. Although additional studies may be needed to substantiate the data, the FAOSTAT database shows that Ethiopia is among the major charcoal producing and consuming nations, producing over 32 million tons of charcoal between 2000 and 2009 (FAO 2010). Unless these high extraction levels and rapid rates of land use change are regulated, sustaining incomes and services from dry forests may prove difficult.

Various biophysical and socio-economic studies (Eshete 2002; Abdullahi 2004; Bongers and Tennigkeit 2010; Abiyu et al. 2010; Mengistu 2011; Woldeamanuel 2011) show that Ethiopia's dry forests and woodlands are under huge pressure from a range of factors. Probably the most serious challenge for dry forests and woodlands comes from the rapid and unfettered expansion of small and large-scale commercial agriculture. Crop farming, particularly large-scale agriculture, involves the quasi-total clearance of trees from the field. In the past few years, Ethiopia leased out over 2.8 million ha of land to national and international investors, and these figures are expected to continue to increase in both humid and dry forest areas (Friis and Reenberg 2010). Major population movements contribute to these trends, including smallholder farmers coming from nearby highlands and settling in the dry forests and woodlands, and state-sponsored settlements. Together with large-scale commercial agriculture, these changes cause major land use shifts which in turn reduce the area under forests and woodlands, and increase the area of individually owned farming plots. Individualization of rangelands and woodlands also seriously limits the seasonal mobility of pastoralists and reduces the availability of grazing lands and browse resources for livestock. As rangeland resources decline, pastoralists are forced to overgraze the remaining land and are pushed to use marginal lands, further aggravating the problem of resource degradation. Such actions are also causing degradation of multipurpose trees and shrubs like the *Yicib* (or yeheb nut, *Cordeauxia edulis*) in the Somali region and intensifying soil erosion and flooding (PFE, IIRR and DF 2010). Some studies (e.g. Lemenih et al. 2012) have concluded that, if uncontrolled land use change and resource exploitation continues, dry forest resources will be totally depleted, with imminent and far-reaching consequences for the more fragile dry lowland ecosystems and community livelihoods.

Customary Management of Resources in the Dry Lowlands

Pastoralist communities have developed knowledge and institutional capacity to manage rangelands, including trees, sustainably and fairly. The *Heera* of the Somali, the *Gada* of the Borana and the *Finna* of the Afar are traditional institutions of pastoralist communities in the country known for their role in the regulation of resource utilization, conflict management and administration of their respective social affairs.

The Somalis, for instance, are prohibited from cutting trees and offenders are punished. The fines are paid mainly in livestock, with the species and number varying depending on the extent of the damage and on previous records (PFE, IIRR and DF 2010). In the Borana Zone of Oromia, forests were previously governed by the Gada customary institution, and within Guji communities trees are well protected for their economic and cultural values (Flintan 2007). Afar pastoralists require permission from the clan leaders to cut trees. Although they do not plant trees, they do not cut them down either. Browsing trees, or trees that provide edible fruits for humans, are not cut, but the branches are trimmed or pruned immediately before the start of the rainy season to feed animals as other sources of feed dry up. Making charcoal is forbidden, because many believe that it results in childlessness (PFE, IIRR and DF 2010). Likewise, Hamer elders (in the South Omo Zone of southern Ethiopia) take time to advise the younger generation of the advantages of taking care of trees. In the Metama area (northwestern Ethiopia), people protect trees like *P. lucens* for healing emaciated animals (Desalew et al. 2010). To summarize, communities in the dry lowland areas have developed and use institutions to regulate access to, and ensure equitable use and responsible management of resources.

The Position of Women in the Use of Dryland Resources

Among most Ethiopian dryland communities, family and kinship relationships are organized along patriarchal lines. The patriarchal family structure in Ethiopia's dry lowlands is founded on men's domination and control of most of the productive assets of the household, although women are responsible for the gathering and processing of natural resources used for consumption and sale. According to Yacob (2000) and Flintan (2007), traditional pastoralist institutions in Ethiopia are based on a deeply gender-based division of labour, and most economic activities are managed along gender lines (Table 2.1).

Mamo's (2007) study in Borana (southern Ethiopia) shows that the husband controls all household property; and, most significantly, when the household head (husband) dies, it is his male kin who take control of the property and not his wife. Yibabe (2001) argues that the decline in time spent preventing livestock raiding, hunting and livestock herding in pastoralist areas has not resulted in men becoming more engaged in other productive work and in sharing women's work load. In some

Table 2.1 Division of labour by gender among Boranas in southern Ethiopia

Women	Men	Both
Planting[a]	Land preparation/ploughing[a]	Taking livestock to watering points
Transporting harvests[a]	Buying and selling livestock, particularly cattle	Weeding[a]
Building pens for calves	Herding and watering livestock	Crop harvesting[a]
Fetching water and firewood		Making and transporting charcoal
Collecting feed		
Milking cows		
Churning milk to produce butter		
Selling butter		
Selling firewood		
Making mats and baskets		
Dismantling and erecting tents/shelters during migrations		

Source: Adapted from Mamo (2007)

[a]In the case of agro-pastoral communities

cases, women are even taking up traditional 'men's' roles, as is the case with the Hamar where young wives are increasingly taking on herding activities.

In many dry lowland areas, women play an important role in the use and management of natural resources, and hold knowledge of indigenous production methods, plant species and their various uses (including medicinal uses). However, women own hardly any of these assets (UN 2011). Resource depletion in these areas puts additional pressure on poor women who are more dependent on natural resources (PFE, IIRR and DF 2010). The dependence of poorer members of communities, including women, on natural resources such as forests is direct and evident. The poor, including women, are more dependent on free biomass goods and common property resources than better-off households. They, as primary gatherers of biomass goods, are engaged in the processing, storing, use and marketing of free forest goods. In general, women users of the dry lowlands' natural resources have little ability to influence decision making, and thus their needs and interests are often given lower precedence in development policies. Mwangi (2009) noted that women, youths and poorer members of communities (herders, hunter-gatherers) are often excluded from decision making, or their claims and rights go unnoticed.

Tenure Regimes: History and Drivers of Tenure Changes in Ethiopia

History of Tenure

Tenure in the Highlands

Unlike many other African countries, Ethiopia's land tenure system evolved out of its own internal strife and feudal production systems and territorial expansion, rather than through colonial construction. As indicated in Fig. 2.1, until the mid-1970s, the country had differentiated tenure forms.

(i) ***Rist***: Rist is a local name that represents a complex tenure system based on kinship/village tenure. Its geographical extent is represented by the lightly shaded area in Fig. 2.1 and was common mainly in the northern half of the

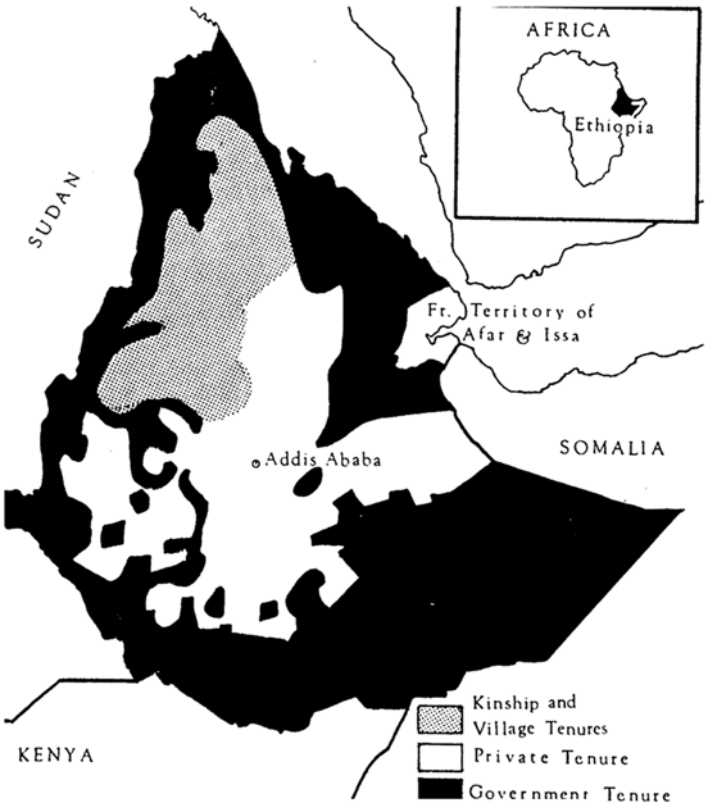

Fig. 2.1 Major categories of tenure in Ethiopia prior to 1975. Note: *The figure shows only a broad geographic distribution of land ownership in Ethiopia before the rural land proclamation of 1975 which put all land under state ownership* (Source: Cohen and Weintraub (1975))

country until the mid-1970s, when land was nationalized by the then Marxist government. This kinship/village-based ownership was founded on the first occupation of land by an individual family. With the natural growth of the original family, the title to the land passed from an individual family to a collective where all the descendants of the first occupant had the right of joint ownership. Rist rights were inheritable and tradable in the form of rent, but could not be sold or mortgaged. The right of the state in rist system was limited to extracting taxes in kind from the land through a complex toll system arrangement. In later years, paying levies in kind was abandoned, and taxes were paid in cash. Even the strongest kings did not have the power to deny the ownership rights of any one person except in very special circumstances, such as treason (Woldemeskel 1957; Pankhurst 1966; Woldemariam 1972; Cohen and Weintraub 1975; Gilkes 1975; Rahmato 1984).

(ii) **Common (Customary) Tenure:** This form of tenure, shown in the black area and described as 'government' tenure in Fig. 2.1, was found in regions of the country where predominantly customary land tenure existed. With some minor variations here and there, the black areas represent lands under customary tenure arrangements in predominantly pastoralist areas. In the southern half of the country, land tenure systems largely remained under common (customary) ownership until the territorial expansion of the northern feudal system into the area in the second half of the nineteenth century. Under the Oromo (the largest ethnic group in the southern half of the country), the Gada administrative structure prevailed, and land was not considered private property and was not subject to exchange. Individual privileges were confined to use rights only (Pausewang 1983). According to Mohammed (1990), the Oromo recognized ownership rights of the first occupier during periods of expansion and resettlement in new areas. Early settlers seized the land as their *Qabiya* (holding), and then passed it to their descendants. In such cases, ownership remained with the clan. At that stage, the system resembled the rist system of the north. Through time, however, most lands under common property regimes in the southern highlands turned into either state or private holdings, until 1975 when all land was nationalized and became the property of the state.

(iii) **Private Holdings:** The private ownership of land was common in the white areas in Fig. 2.1. This situation arose because of the change in the communal ownership system after the northern feudal territorial expansion as mentioned in the section on customary tenure. Lands temporarily allocated to royal family members, dignitaries, civil servants and soldiers in return for their public services and positions slowly turned into private holdings. The practice expanded widely after the end of the Italian occupation of the country in 1941, when land began to be considered a commodity to be bought and sold (Cohen and Weintraub 1975; Bekele 2003; Toulmin 2008). Thus, in southern Ethiopia, private tenure was fully established particularly after the Italian eviction in 1941. Moreover, most private owners resided in cities and towns. Those who tilled the land under various arrangements turned into tenants and remained as such until the 1975 land nationalization by the Military government.

Land Tenure in the Dry Lowlands

As mentioned earlier, in the lowlands of Ethiopia where a lot of the drylands are found, communities' livelihoods are dependent on pastoralism, agro-pastoralism, and hunting and gathering. Thus, land has been occupied and used by the tribe/clan or the community. Customary land rights offer access to land and other resources and security of tenure to all community members, including poor households. Access to grazing lands, water and forest resources is based on clan membership, managed through customary tenure systems. In the case of pastoralists, grazing land is divided among clans and sub-clans in conformity with the customary law in which one clan is not allowed to use the resources of another without consent. In times of difficulty however, clan resources are often shared, resulting in a strong principle of mutuality (Tefera and Flintan 2007), although conflicts within and between clans occasionally happen.

Such tenure regimes in these areas received no legal recognition that would protect the traditional institutions through which land, pasture, water and forests were owned and managed. Where customary use rights continued, this was more due to the incapacity (both institutional and organizational) of the state to fully impede these traditional practices rather than because of deliberate tolerance (Bekele 2003). As Helland (2006) noted, pastoral land use and pastoralist communities are not covered by the national legislation that ensures secure tenure.

After the incorporation of the southern half of the country into the empire during the second half of the nineteenth century, pastoral lands were granted as fiefs to feudal lords in return for their services. Feudal privileges in the pastoralist areas were based on the number of people who were expected to pay taxes, rather than on land size or amount of production (Helland 2006), as was the case with the highland tenants. Land possession and ownership in the dry lowlands remained unattractive to the Ethiopian feudal elite.

Although the 1975 land proclamation nationalized all lands, in theory it granted pastoralists rights to pasture. In reality however, allocation of land for parks, state farms and resettlement schemes undermined community interests. In contrast to the highland farmers who were liberated from feudal obligations, the reform did not enhance the land rights of pastoralists. The change of government in 1991 did not bring much change in ensuring the land rights of communities in the dry lowlands. In fact, the expansion of commercial agricultural investment in these areas in recent years has further undermined the customary rights of communities in dry land areas.

Drivers of Land Tenure Changes

The Urge for Rapid Economic Growth: 'Land to Investors'

Poverty and food insecurity put political pressure on African governments to promote development programmes that could potentially lead to conversion of forests, woodlands and grasslands to other – presumably more economically efficient – land

uses. Some countries and private companies find the continent attractive because of its relatively low population density (Chidumayo and Emmanuel 2010). The unfortunate misconception of African lands as un-owned, vacant, idle and available (Jung-a et al. 2008; Cotula et al. 2009; Wily 2011) has in the past few years been driving investors to the continent. Therefore, lands are increasingly considered a prospective factor of production for growing global demands for biofuels, food crops and minerals (Friis and Reenberg 2010). An additional driver was the world financial crisis of 2008 that led to significant rises in food and fuel prices globally, which in turn created new interest in investing in agricultural lands. This tendency, as Smaller and Mann (2009) noted, is encouraged by the expectation that future value and power will lie in the rights to land and freshwater.

Ethiopia is among the three countries in Africa where large-scale land acquisition for commercial farming is taking place (Schoneveld 2011). In Ethiopia, access to, and use of, land by investors is governed by two important proclamations (FDRE 2005a, b) relating to rural land use and expropriation of land holdings for public use. The country's investment policy is seen as attractive for large-scale agricultural investment. The reasons why Ethiopia is considered investment-friendly include: the price per hectare of land, which Rahmato (2011) called ridiculously low by any standards; a low investment capital requirement; and the ease of access to large areas of farmland. The government has, amongst other things, exempted foreign agricultural investors from paying customs duties and taxes on imports of capital goods (Blas and England 2008; Vidal 2010). There are also no employment limits on foreign staff (Friis and Reenberg 2010). The FAO STAT data show that land deals as a percentage of agricultural area amount to 8.2 % in Ethiopia. Table 2.2 presents relevant figures on the purpose and extent of land deals in some African countries.

Ethiopia is among the few countries in Africa where a large number of land deals are actually taking place with international investors (Schoneveld 2011). Investors in the lowland areas of Ethiopia include private businesses and governments from about eight countries. Indian companies appear to be the biggest investors. Investments in the agricultural sector have increased from USD 135 million in 2000 to USD 3500 million in 2008 (Friis and Reenberg 2010). In addition to foreigners, over 8900 domestic investors have received licenses for commercial farming in Ethiopia since 1996, mostly for food, oil crops and biofuel production. The total land leased for private investment is about 2.8 million hectares (Friis and Reenberg

Table 2.2 Purpose and extent of land deals in some African countries

Countries	No. of deals	Purpose/use of the land			Extent ('000 ha)	
		Food production	Biofuel	Industrial	Min	Max
Ethiopia	26	8	15	1	2892	3524
Madagascar	24	3	16	3	2745	–
Sudan	20	11	2	–	3177	4899

Source: Adapted from Friis and Reenberg (2010)

2010). The purposes of investment include production of sesame, cotton, wheat, barely, pulses, rice, vegetables, jatropha, sugarcane and sunflowers.

Cotula et al. (2009) observed that most African land leases were decided by the government, including 100 % of recorded cases in Ethiopia, Mali and Mozambique, and the vast majority of cases in Sudan. Although in Mozambique the interests of communities are legally recognized and consultation was made mandatory in the land transfer process, execution of such requirements is often incomplete or unsatisfactory, according to Cotula et al. (2009). In Ethiopia, although customary rights over land are constitutionally given, they are not supported by any enforceable legal instruments, and no consultation with concerned communities has been taking place during the processes of land allocation to investors.

Government-Initiated Resettlement Programmes and Individual Encroachment

Land use changes in the dry lowlands are also linked to the resettlement of highland farmers in traditionally pastoral and agro-pastoral areas of Ethiopia (Lemenih et al. 2012). It has been the long-standing policy of successive Ethiopian governments since the second half of the twentieth century to resettle people from degraded highland areas to lowlands areas that are considered underutilized, although it is evident that most of these areas are occupied by forests, woodlands and grasslands that support millions of pastoral and agropastoral people.

Many African countries have used resettlement programmes as a response to dealing with land/resource degradation that resulted in landscapes that could not support their inhabitants (Stellmacher and Eguavoen 2011). In Ethiopia, governments believed that resettlement would help in the long term to solve the food insecurity problems of the rural poor (Woube 2005). Individual and family-based migration resulted from private decisions, whereas large-scale resettlement was/is organized following government decisions. The first large-scale government-initiated resettlement programme took place in the 1960s when people were moved from north Ethiopia to the southern and south-western regions following the Third Five-Year Development Plan (1968–1973) of the Imperial government (Kassa 2004).

Shortly after the 1974 revolution, it became government policy to accelerate resettlement. Following the 1984–1985 famine, the government resettled more than 600,000 people in three settlement areas. More than 250,000 went to Welega (Oromiya), about l50,000 settled in Gambela, and over l00,000 went to Pawe resettlement areas (Wolde Giorgis 1989). The present government envisaged resettlement of a total of seven million people, starting in the year 2000. Between 2003 and 2005, some 180,000 households with a total of about a million people were resettled (Stellmacher and Eguavoen 2011). Besides the formal government-led resettlement programmes, individual farmers descended from the highlands and spontaneously settled in the lowland areas, carving out farm plots with few restrictions (e.g. in Metema district in north-western Ethiopia). Vast areas of woodlands with fertile

soils and a favourable climate for the cultivation of cash crops like sesame and cotton have been attracting thousands of spontaneous migrants from various parts of the country (Lemenih et al. 2012).

Individualization of Communal Lands: Community Response to a Land Rush

As already noted, customary tenure rights, although constitutionally recognized in Ethiopia, are supported by the equivalent of individual agricultural land rights where each farm plot is registered and its holder is certified and protected against eviction. Havnevik (1997) argues that the tragedy of the enclosure occurs when commonly held and used property is transferred to state or individual ownership by overriding customary rights and long-accumulated local knowledge. As a direct response to the ever-shrinking land area under customary tenure, the tendency among pastoralists themselves has been to establish private enclosures on communal lands, as indicated by our observations in the Rift Valley areas of Ethiopia and reported by others (PFE, IIRR and DF 2010). Pantuliano and Wekesa (2008) noted growing competition over land that is threatening both traditional natural resource management institutions and efforts to look for alternative ownership patterns to reduce the risk of losing traditional rights altogether. These threats to the common tenure system in the lowlands originate not only from international and national investors, and smallholder settlers from nearby highlands, but also from the groups themselves.

In the Somali region, individualization of the commons began as early as the 1970s in Harshin district (PFE, IIRR and DF 2010), driven by several factors. First, there was an attempt to stop agro-pastoralists from settling or farming on pasturelands. Wherever farmers advance, pastoralists are forced to encroach upon their own rangelands by putting up enclosures. The second push for private area enclosure was the introduction of fattening programmes by government and some NGOs. Third, land area enclosure was undertaken to protecting crop and vegetable farming from livestock and wildlife interference. Fourth, community members who lost animals during conflicts at times responded by fashioning their own enclosures to protect themselves and their remaining livestock. In Yabello district (southern Ethiopia) for example, land use and land cover trends showed a dramatic decline of pasture, whereas cropland increased five fold between 1973 and 2003 consequent to recurrent droughts and major losses of cattle when people turned to crop farming (Mesele et al. 2006). In the Hammer areas of southern Ethiopia, both local communities and government are involved in the creation of enclosures to provide a place to feed weak animals that cannot travel over long distances. Such enclosures are not privately owned however. In Afar, enclosure is clan-based, even though the resources are open to other needy clans. Enclosures may not be established near water points to avoid conflict. It can be observed in Afar that Somali and Borana area communities set aside their own enclosures for the dry season and search for grazing land elsewhere (PFE, IIRR and DF 2010). Individualization of the commons could be

seen as a major change in land tenure and land use practices in the dry lowland areas,

Enclosures provide dry season feed sources, in particular to sustain the production of milk, which is vital for household food security. Households without herds use the enclosed area to sell grass through a *cut and carry* system. In another arrangement, payment is made so that the herd may graze or browse in the enclosure: grass is becoming an important source of income (PFE, IIRR and DF 2010). Individualization of the commons is showing mixed results. According to Tefera and Flintan (2007), in the Somali region, in some cases it is protecting some important dry time fodder trees from being used for charcoal. On the other hand, Tesfaye (2005) argues that, in areas where the climate is hot and dry and individualization of land is not cost effective, a collective institutional arrangement of land tenure might constitute a better option.

Consequences of Change in Land Tenure Regimes

Statutory Intrusion into Customary Land Rights

The first written and modern constitution, enacted in 1931, contained no clauses about the status of natural resources, including land in general. However, the Emperor retained all the traditional kingly rights to dispose of land or other resources as he found necessary. The 1931 Constitution stated: '*the Emperor has the right to establish personal estate*' (GoE 1931). The Revised Imperial Constitution of 1955, on the other hand, was more explicit and more assertive about the status of '*natural resources*,' including land. Art. 130, paragraph (a) of the 1955 Constitution declared all natural resources to be state domain. According to paragraph (b) of the same article, natural resources were to include: water, forest, land, air, lakes, rivers and ports…which were declared as '*sacred trusts for the benefit of all*,' including the unborn. In paragraph (d), state domain is to be limited to properties '*not held or possessed in the name of any person, natural or juridical…*' (GoE 1955). The implication of this sub-article for the lowlands seems obvious. The land occupied by pastoralists and other communities in the dry lowlands is denied constitutional recognition, because it is not registered in the name of *any person, natural or judicial.*

Furthermore, according to the 1960 Civil Code, the right to claim land titles could only exist if it could be proved that land taxes had been paid for successive years. As there have been no mechanisms to collect taxes from pastoralists and other local communities in dry lowland areas, these land users had paid no land tax and this was enough excuse for the state to deny recognition of ownership over the land upon which they survive (Nicol 2000). Consequently, lands under traditional customary management began to be appropriated for the purposes of commercial farming and resettlement programmes from the 1950s onwards (Rahmato 2007).

The second major event, which was even more disruptive of traditional dry lowland resource use patterns, was the nationalization of all rural lands in 1975. Although the land reform terminated all feudal obligations of tenants to landlords and distributed land to each rural household free of charge, it did not bring much improvement in the customary tenure rights of communities in the dry lowlands. The tenure insecurity over agricultural plots during the Military regime emanated from the government's continuous re-distribution of holdings, villagization programmes and huge resettlement schemes. The 1975 land reform, however, legally ended the undefined, but 'tolerated' customary institutions that governed dry lowland resource management and utilization by communities.

After the change of government in 1991, state control of rural and urban lands continued, although tenure security improved in the latter period in respect of farm lands (Rahmato 1997; Hoben 2000) thanks to land registration and land use certification to individual holders of agricultural plots. Proclamation No. 456/2005 specifically identifies the government as the owner of land and provides the people with '*holding rights*' only. The 2005 landholding expropriation legislation of the Federal government gives power to district authorities to expropriate rural or urban holdings for public purposes; this includes land to be leased to investors. The law permits compensation, not for the land as such, as the land belongs to the state, but for property situated on the land and for permanent improvements made to the land. The law again is problematic in its implementation in the case of pastoralists or other non-farming communities in the dry lowland areas as they hold no certificate and pay no taxes, and therefore it is impossible for them to claim compensation from the government.

Misconception and Security Considerations

The Government of Ethiopia has been reluctant to provide customary right holders legal protection over communally used grazing lands and forests as they do to holders of individually managed agricultural plots. The reasons for this policy may include one or more of the following.

(i) In the 1940s and 1950s, Ethiopia's official land use classification commonly categorized forests and pasture lands as *te'f meret*, which literally means waste or un-productive land. This classification continued for a few more decades, and converting forest and pasturelands to crop fields served to assert ownership and to privatize them. The ill-fated utilization of forests started when, by design or naiveté (probably more by the latter at least initially), forests and grazing lands were denied a place among the official land use categories (Bekele 2003). One cannot be certain whether an ancient perception that *there is no virtue in untamed nature* does not linger among some policymakers today. For instance, in Ethiopia even at the present time, according to the IIED

(2009), all land allocations recorded at the national investment promotion agency are classified as involving 'wastelands' with no pre-existing users.

(ii) Beginning in the 1970s, development policies and programmes in relation to rangeland management in Africa have been directed by the two dominant discourses of *land degradation* and the *tragedy of the commons* (Rohde et al. 2006). These narratives have led governments to look at pastoralism, hunting and gathering, and shifting cultivation practices as non-viable resource use patterns that must be transformed. Fratkin and Mearns (2003), in their review of East African and Asian dryland policies, concluded that development programmes in dry areas have one view in common: that rangelands were suffering from degradation caused by overgrazing, and that adoption of technologies to solve the problems are constrained by pastoralists' traditional social systems. This argument pushes governments to opt for individualization and controlled stocking. According to Fratkin and Mearns, these approaches did not stop depletion of resources, and the number of livestock did not decline. In the Ethiopian case, pastoralists' mobility for example, as noted by Abdullahi (2004), is not recognized by policymakers as a time-tested and self-contained system of livelihood. Mobility enables the continuation of pastoral and agro-pastoral production systems as viable livelihood systems in harsh environments. It enables efficient use, in a timely manner, of temporarily available grazing lands and water points scattered over wider areas. Reducing mobility and promoting sedentarization are seen as a way out of the tragedy of the commons in the dry lowlands.

(iii) The third reason is the political uncertainty (unreliability) of the lowlanders – pastoralists in particular whose mobility gives them relative autonomy from control by central governments. They are thought to have *divided loyalties*. Sometimes nomadic pastoralists move their herds across international borders in search of new grazing lands and also to trade livestock. Cattle rustlers and in some cases so-called liberation movements often locate themselves along borders of neighbouring countries (e.g. along the Kenyan, Somalian and Sudanese borders). For political or economic reasons, settled agricultural occupation is considered the solution, as Rahmato (2003) concludes.

Diminishing Rights to Resources and Livelihoods: Cases in Point

Down the centuries, communities have built social institutions and local knowledge through which their cultural and social identities are manifested and resources are managed. There is much evidence that extensive land leases for international and domestic commercial agriculture, resettlement schemes, private encroachment and individualization of the commons from within have undermined community access

to, and control rights over, resources and the vitality of customary institutions upon which they depend for resource and conflict management.

Weakening of Informal Institutions

The purpose of both formal and informal institutions is to regulate behaviour among individuals and between individuals and the state to minimize transaction costs in society (Lin 1989). The rule systems of informal institutions are shaped by long-term community experiences developed through constant modification. Internal institutions tend to be more stable and predictable than are formal rules. Nevertheless, governments commonly look at community institutions relating to customary tenure rights as obstacles to economic growth (Fratkin and Mearns 2003) and deny them legal protection. Even in some countries where communities have clearly enforceable rights, governments continue to forcibly evict them (Graham et al. 2010).

Legal documents addressing the protection of indigenous peoples' customary rights are not absent in Ethiopia. Two stand out. The first is the 1995 Federal Constitution (Article 40, sub-article 5), which confirms that '*Ethiopian pastoralists have the right to free land for grazing and cultivation as well as the right not to be displaced from their own lands. The implementation shall be specified by law*' (FDRE 1995). One may safely assume that the above statement also refers to those communities whose livelihoods are based on other non-sedentary activities and include hunting and gathering and shifting cultivation. The second is the 2007 UN Declaration on the Rights of Indigenous Peoples to which many African countries, including Ethiopia, are signatories. Article 32, sub-article 1 of the declaration states: '*Indigenous peoples have the right to determine and develop priorities and strategies for the development or use of their lands or territories and other resources*.' Sub-article 2 of the same article requires the state to obtain the free and informed consent of communities prior to the approval of any project affecting their lands or territories and other resources, particularly in connection with the development, utilization or exploitation of mineral, water or other resources.

Traditional institutions of natural resource management in Ethiopia (those of the Borana, Afar and Somali people for example) have remained outside the state legal structure and have long been denied any significant protection. The impact of this exclusion is reflected in the mismanagement and decline of grazing land resources, and poor documentation and under-utilization of indigenous knowledge of resource and conflict management.

Depletion of the Resource Base

Although the environmental impact of large-scale commercial farming has not been investigated in Ethiopia, studies in other countries indicate that the practice negatively affects the biodiversity of an area. According to UNEP (2007), since

commercial agriculture is characterized by mechanization, mono-cropping and the use of chemicals, it could widely affect high biodiversity areas. The business of large-scale plantations for the production of liquid agro-fuels, for instance, may endanger the wild plant species that grow on these lands (Graham et al. 2010). Commercial farming weakens soil functions and adds to bigger loss of fertile lands, creating an over-dependence on chemical means to maintain land productivity; and intensive cropping, mono-cropping and the over-use of agrochemicals often increase the build-up of soil-borne pathogens (disease carrying organisms), pests and weeds (FAO and World Bank 2009).

In the case of rangelands, the decrease in pasture will necessarily lead to over-grazing of the remaining lands. This in turn prevents regeneration of some important tree species. Tsegaye's (2010) study in Afar pastoral areas reports recruitment failure of the important food and fodder plant, *D. glabra.* The study showed that, although adult *D. glabra* trees can be seen scattered in the grazing areas, seedlings and saplings are rarely observed. This also holds true for *Boswellia papyrifera* (frankincense producing tree) as various studies in Ethiopia show (e.g. Lemenih et al. 2012). Scoones et al. (1993), who studied the land tenure rights of the Mursi people in southern Ethiopia, concluded that the most deep-seated risk to the Mursi pastoral livelihood comes neither from disease nor from drought, but from their lack of secure rights to vital territorial resources that they use for grazing at various times of the year. Mursi grazing lands are held in common and are therefore prone to be legally classified as public (Turton 1995).

The main pressure on pastoral land rights in Africa, according to Lane and Moorehead (1994), has been in dry season grazing areas. Herders can make efficient use of more marginal areas during the wetter seasons and come to more productive grazing lands (often used by resettled farmers for agriculture) during the dry seasons. The loss of access to key grazing areas during the dry season will put entire pastoral systems in jeopardy. In the Mursi area, the establishment of the Omo and Mago National Parks represents the principal threat to these key pastures. The boundaries of these parks also include the best agricultural and pastoral resources of the Mursi: flood-retreat land on both banks of the Omo and dry-season grazing land in the Elma Valley. The process has made the Mursi 'illegal' squatters on their own land (Turton 1995).

Increased Vulnerability and Conflict

Lands taken over by large-scale state-owned or private companies, government-sponsored resettlement schemes and spontaneous smallholder settlers that come from the highlands, as well as lands enclosed by individuals from within the community, are, or were, all important sources of livelihoods for the local communities. These lands are often used for grazing, shifting cultivation and resting livestock in transit to different grazing areas. They are also areas for people to collect fuel wood, water, wild food (vegetables, roots, fruits, nuts, mushroom, game and so forth), medicinal plants and forest products such as gums, resins and so on. Some of the

lands allocated to investors in the Benishangul Gumuz and Afar regions were previously being used for shifting cultivation and dry season grazing, respectively (Cotula et al. 2009). Some users of these resources (e.g. women, youths and poorer community members) are often at the lower end of the power structure to influence decision making, and their claims and rights go unnoticed (Mwangi 2009).

On the basis of a study involving 400 households in Kereyu and Borana (Oromiya), Elias and Abdi (2010) reported that 100 % and 79 % of the respondents perceived loss of grazing lands and watering resources, respectively, mainly for wildlife conservation and commercial agriculture. Over 90 % of respondents from Kerreyu, according to the study, indicated that they had lost major migration sites for their livestock and perceived increasing incidences of border disputes with neighbouring communities. In the Borena area, 60 % of respondents confirmed that they had lost rangelands because of the establishment of state and private ranches, which during the study were estimated to cover some 33,000 ha of land (Elias and Abdi 2010). Moreda's (2013) study on land leases in Benishagul Gumuz regional state concluded that the land transfer process underway in the region was based neither on the mapping of existing land uses nor on genuine participation of local communities and authorities. As a result, communities felt disposed and some are being displaced from their villages and cultivated lands. The author noted that the power relations between local communities, local, regional and federal governments was not balanced and the Federal and Regional governments were exercising hegemonic power over the allocation of land in the interest of commercial investments.

Stellmacher and Eguavoen (2011) pointed out how resettlement in Ethiopia created a state of what they call *legal pluralism* in resettlement areas, as most of new settlers come with privately organized usufruct rights as opposed to the pre-existing customary tenure in the area. Thus, resettlement is not only causing resource degradation, but also weakening the relatively effective traditional institutions of resource management in the resettled areas.

The decline in the importance of customary institutions has also weakened communities' ability to manage conflict. Although conflict over resource access and use has always been part of the lives of people in the dry lowland areas, the incidence and intensity of the conflicts have greatly increased in recent years (Mkutu 2008; Kassahun 2010). The decline of the resource base has undermined coping strategies, starting with mobility, and has aggravated conflicts between neighbouring groups in the Afar and Somali regions (Pantuliano and Wekesa 2008). Conflicts have been reported in Benishangul Gumuz in western Ethiopia between the Gumuz community, which depends mainly on hunting and gathering, and settlers coming from the highlands and dependent on farming, and also in southern Ethiopia between the Mursi and new settlers (World Bank 2004). Conflicts are also reported in Oromiya, although settlers and hosts are both from the same ethnic group. Besides resources, differences in religious and cultural practices are said to have contributed to tensions between these groups (Hammond 2008). In the Ngangatom area of South Omo (southern Ethiopia), conflict arises in the dry season grazing areas between the Dasenech (Ethiopia) and Turkana (Kenya) communities, and such con-

flicts take on international dimensions as they involve cross-border conflicts among communities. Clashes are also regularly reported between the Omo National Park authorities and communities surrounding the park during prolonged drought periods, because pastoralists enter the park in search of pasture and water (World Bank 2004). Even more frequent problems are reported in the media between Awash National Park and the surrounding communities.

Conclusions and Implications

Over the last 100 years, Ethiopia's political economy could not have tolerated the parallel existence of autonomous institutions in one area while total control was exercised in another. The absolute monarchical rule (before the mid-1970s) and the dogmatic socialist economic policy (between mid-1970 and the early 1990s) would not have allowed the flourishing of customary tenure systems. As already noted however, customary tenure rights probably survived for so long in Ethiopia because of the inability of state authorities to do otherwise, rather than because of a deliberate policy of tolerance. Currently, those elements, which until recent years 'protected' pastoralists and their habitats from external intrusion, seem to have become weakened as a result of growing demand for agricultural lands, improved infrastructure and much reduced protection of customary rights.

Economic liberalization and the formal rules that follow this principle are less inclined to include the interests of marginalized and less powerful actors. Issues of equity and fairness are not the maxims of neo-liberal economics. The informal institutions that evolved in villages, and that are generally but not always based on values of impartiality and fair distribution of resources, could not withstand the new global and national forces that came with a more dynamic economic drive towards profit making. Because of the country's long tradition of statehood, many villagers also have long ago lost their customary rights and power to make decisions about the management of, and benefits from, local resources. Kasanga and Kotey (2001), writing about customary land tenure of Ghana, noted that the superimposition of state management has stunted customary tenure institutions and made local communities unable to effectively manage their lands. Open access situation is created when institutions lapse (Bromley 1991). In Ethiopia, as in many other developing countries, customary tenure rights lack enforceable formal (legal) support, and the informal institutions that previously enforced customary rights have continuously been weakened by superimposed state structures. In this regard, the following conclusions can be drawn about Ethiopia.

– The long-standing state structure and different governments' development programmes provided little space for traditional institutions and customary rights over resources. From a legal viewpoint, those communities with constitutionally recognized rights over their customary lands should have no difficulty in retaining their rights. After all, community rights are recognized in the 1995

Constitution. Realizing legal and legitimate rights should not be a matter of choice, but a constitutional responsibility on the part of the state. In practice, however, the most important entity concerning land, i.e. the state, does not seem to play by the rules of the game when it comes to changing ownership of land in dry lowland areas.[1]

- The internal and external economic and political pressures on the government to push for rapid economic growth and open land for foreign and private investors further undermine the already weakened structure of informal/customary community institutions.
- Apart from the lack of legal recognition of local communities' customary rights,[2] new settlers from nearby highlands with individualized tenure practices that differ from those of the host population are creating what Stellmacher and Eguavoen (2011) called *legal pluralism*, further complicating the existing tenure situation.
- Apart from external drivers, disruptions such as the individualization of the commons from within are also undermining the viability of the customary system. What should be a matter of concern at this point may not be the unfortunate situation into which customary land rights have fallen, but the uncertainty that is taking its place. Probably the strongest challenge to the customary land tenure system is the participation of community members in the race for land as a response to the situation developing around them. Lin (1989) argues that, as an economy grows, some of the informal rules will become archaic as advantages of new arrangements become apparent. Although individualization of the commons is a rational internal response to external stimuli, it will fundamentally change the future structure and substance of long-standing traditional resources in the dry lowlands of Ethiopia that allowed fairly equitable access to them for community members.
- The pressure from external factors and the fading internal dynamism of customary land rights are likely to negatively impact even more the already disadvantaged groups in the community and the resource base, such as grazing areas, trees and water.
- Traditional institutions and customary land rights are in transition and are facing many serious challenges in Ethiopia. Unless some measures are taken to legiti-

[1] The constitutionally accepted customary land rights are not supported by legal and administrative arrangements for their realization. In fact, the 2005 Land Administration and Land Use Law, Article 5, sub-article 3 reads: '*Government being the owner of rural land, communal rural land holdings can be changed to private holdings as may be necessary*.' The question here is how it can be possible for the lower law to refute the rights provided in the constitution. The government's economic rationale of employing what is thought to be 'open' land for more 'productive' use should not be a point of argument to justify state action. If economic development necessitates expropriations, a regulation that governs such measures through proper compensation should be put in place in the context of pastoralist holdings.

[2] Apart from their lack of legal recognition, common pool resources (CPR), because of their size, present challenges to introducing regulated resource utilizations. Excluding or restricting potential beneficiaries can be challenging because either the sheer size of the CPR makes fencing expensive or traditional norms of equity and customs may make exclusion undesirable (Ostrom 1990; McKean 2000).

mize, democratize and empower these institutions, they may fail to adapt to new realities and demands.

The Ethiopian government is officially committed to its ambitious development programme in the Growth and Transformation Plan (2011–2015) (FDRE 2010). Added to this is an actual need to create more job opportunities for the growing urban and rural unemployed and to accommodate the global quest/demand for more investment space in Africa. All these factors may further push the government towards an even more aggressive policy of allocating land, despite protests from community and environmental groups. As Stroup and Baden (1979) put it, we must compare realistic alternatives with the imperfect status quo, instead of an ideal (but unattainable) alternative with the imperfect status quo. Writing about similar situations in West Africa, Lavigne-Delville et al. (2002) suggest that the only way forward is to achieve at least some degree of understanding between legitimacy, legality and actual practice. Even if customary land tenure rights remain without formal and operational support in Ethiopia, the legitimacy of resource use by local communities cannot be questioned; and this needs to be evaluated against the rights of other segments of the population to land and the country's legitimate right to develop its resources for inclusive socio-economic development.

The central question at this point is not whether or not the government needs to fully reinstate customary land tenure systems and provide them with enforceable and explicit legal protection. This is unlikely to happen given recent history, the failing (internal) dynamism of the system and current policy trends. The critical issue that future researchers need to raise is whether, short of fully reviving customary land tenure, there are viable policy options to ease the pressure on communities and the resource base by providing them with the necessary legal incentives to share benefits from the 'spoils'? What long-term policy should the government adopt to effectively handle the inevitable socio-economic and cultural changes that lowland communities are experiencing and to help them better cope? What legal steps and development measures should the government and non-governmental agencies take in view of the overriding individualization of the commons by private households in the dry lowlands? What policy options are available that can accommodate the apparently 'conflicting' objectives of the economic development agenda of the state, the livelihood requirements of forest-dependent communities, and society's long-term needs for responsible use and conservation of natural resources in the dry lowlands?

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Chapter 3
Private Versus Communal Tenure Systems in Gum Arabic Collection

Gaudiose Mujawamariya and Kees Burger

Abstract Communal management systems for acacia stands are still prominent in semi-arid gum producing areas. Competition over plots leads to lower quantities per household and, compared with private access systems, the gum collected is of lower quality. These communal systems also decrease the collectors' incentives for tree management, may lead to overexploitation and even be sources of conflict over resources. Private systems are emerging either at individual level or through companies; in a gradual transition, mixed systems are found in which privately owned properties and communal forests coexist in villages where gum is collected in the Sylvopastoral Zone and Eastern Region of Senegal. This study investigates factors that influence the currently observed transition from communal to private collection systems at village level, briefly focusing on gender relations. With data from 53 villages in Senegal, a probit model is used to analyse the choice of organizing collection in communal systems. Mixed systems are preferred if markets are developing, labour for collection is available, competition for the resource is high, forests where gum is collected are located near the village or market prices are high enough to attract occasional collectors who reinforce the effect of competition.

Keywords Resource governance • Evolution • Transition • Gum arabic

Introduction

Theories of transition in farming systems suggest, on the one hand, that the shift to agriculture/animal husbandry has resulted from decreasing productivity in hunting and gathering production systems (Grigg 1974; Jones 2001). The causes of decreasing productivity include increased population pressure and sedentism, and the

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resulting overexploitation of the environment. Technological progress is hence regarded as pushing the shift to agriculture (Grigg 1974; Myers and Marceau 2006). Environment is also among the recognized factors of change. Layton et al. (1991), for example, suggested that climate change pushed the shift from hunting and gathering to intensive husbandry. The interplay between population pressure and technological sophistication in explaining the adoption of agriculture was suggested by Baker (2008), following the theories developed by Boserup (1965). According to Baker, societies that practice agriculture are indeed more technologically sophisticated, have greater population densities and operate in environments that appear to be richer and more amenable to agriculture. Specific to animal husbandry, besides the influence of the above factors, animal domestication has been driven by the need to preserve and maintain natural resources (Alvard and Kuznar 2001). Resource conservation was also one of the main reasons for domesticating forest trees, but their morphology could constrain its adoption, especially for thorny trees such as *A. senegal* (Mallet et al. 2002).

Changes in farming systems, animal husbandry or tree domestication have almost always been accompanied by a change in resource governance from open to exclusive property rights systems. North and Thomas (1977) confirmed that the private system provided a direct incentive for innovation in order to improve efficiency. According to Ruttan (1989, 2002), the change in governance systems originates from both the demand for, and the supply of, institutions. On the demand side, changes in factor productivity and product demand, and on the supply side, the distribution of political resources, the cost of achieving social consensus and cultural endowments (e.g. ideology and religion) could explain the change in institutions. Ruttan (2002) gave examples of the enclosure movement in England during the fifteenth and sixteenth centuries, whereby the expansion in the export demand for wool required the conversion of open arable and common lands into private pastures. Also, an increase in the demand for rice in Thailand in the nineteenth century made investments in land development for rice production profitable. This induced a demand for the reform of property rights. Note that authors like Cohen and Weitzman (1974), however, disputed the wool trade story as a factor for enclosures, arguing that the opposite was the case. What is important here is to realize the contribution of market developments to the dynamics of transition by adding value to the resource and motivating decisions to enforce property rights, which are necessary to give individuals the long-term incentive to invest in resources and use them efficiently (Demsetz 1967; Alchian and Demsetz 1972; Behnke 1997). Another source of institutional change includes land scarcity: agricultural production can be increased by expanding the land area through deforestation; this, however, reduces the stock of natural resources; and, as continued population pressure constrains the availability of land, a formalization of land ownership becomes a requirement in order to undertake investments to increase the land's productivity (Ruttan 1989; Quisumbing and Otsuka 2001; Grimm and Klasen 2009).

Similar to farming, market developments and higher demand or prices provide incentives for increasing the production of non-timber forest products. According to Belcher and Schrekenberg (2007), higher production can be achieved through

intensive or extensive harvesting or by intensified management. Intensive harvesting to obtain more products per area unit may lead to over-exploitation of the species and a decline in the resource base, depending on the resource tenure system and the reproductive capacity of the resource. In conditions of open access and common management, increased value leads to uncontrolled competition for resources, inefficient and damaging harvesting through the pressure to harvest immature product or harvesting beyond sustainable levels on the pretext that otherwise someone else would harvest the product. Marshall et al. (2006) agreed that, in such circumstances, harvesters' profits are pushed to the minimum. Hence, intensive production is possible and profitable where producers have access to individually held land or trees, or if the resource is held under communal tenure with clear management rules. Young (1994) and Oates (1999) confirmed that harvesting levels increased when a resource was exploited for cash incomes expected from market integration and market demands.

Extensive harvesting implies the possibility of extending the area under collection. This can happen when competition for the resource and hence pressure on the resource is low. In situations where the resource base is limited and competition among harvesters is too high, intensified management (such as cultivation or tree domestication) is the only option for increasing the quantity of production (Wiersum 1997). Intensified management can also give better quality products and more control over the timing of production. Hence, as demand or prices increase, the rewards for intensified management also increase.

From the above review, private property is always presumed to be efficient and to increase production, whereas open resource management is found not only to decrease producers' incentives for resource management, but also to lead to overexploitation and cause conflicts over resources (e.g. Hardin 1968; Dafinger and Pelican 2006). Note that common property systems are not always doomed to failure, nor are private property right systems always successful. On the one hand, Agrawal (2001), synthesizing the works of Wade (1988), Baland and Platteau (1998) and Ostrom et al. (1999), showed that, when resource system characteristics, user group characteristics, institutional arrangements and external arrangements are clearly defined and implemented, common property systems succeed. On the other hand, as argued by Feeny et al. (1990), private property systems are not always sufficiently precise to solve exclusion problems and have shown high enforcement costs that limit their applicability. Yet, the question remains as to why, if private property is recommendable, there are still several cases where communal and open systems are preferred. In other words, it is pertinent to understand the reasons behind the slow transition to private property. To answer this question, a framework is needed whereby the influence of factors such as population pressure and market and resource availability (land or trees) on resource governance systems can be investigated. Gum collection in the drylands of Senegal provides a relevant case: the currently observed slow transition from communal to private collection systems helps us to analyse why communal systems continue to exist despite the fact that competition may intensify in communal plots and decrease the individually collected quan-

tity; and despite the fact that these communal systems have direct negative consequences on the quality of gum collected.

As gum is mostly collected by tapping (the collector makes a cut in the tree and returns to the tree several days later to harvest the gum that has exuded), the collector should hold certain ownership or user rights to the tree and/or property such that he has certainty of finding the gum; hence, private collection systems would generally emerge together with tapping. These private systems also provide an incentive to plant and manage trees as suggested by the agroforestry literature (e.g. Fortmann 1985; Wiersum 1997). In Senegal, however, even though tapping dates back to the eighteenth century, the communal system of management of acacia plantations still predominates. Yet, as the studies conducted by the current authors have shown, competition in the plots leads to lower quantities per household, and, compared with private access systems, the gum collected is of lower quality (Mujawamariya et al. 2012a, b). Private systems are slowly emerging in some gum-producing villages where collectors or companies (e.g. Asylia Gum Company) can have ownership of forest plots.[1] In such a gradual transition, mixed systems are found where privately owned properties and communal forests coexist. We examine factors that may explain the transition in gum collection systems.

In the next section, the historical evolution of the gum arabic collection systems in Senegal is presented. A methodology section then follows where we present an empirical strategy for analysing factors that influence the choice of collection systems. Subsequently, the results are presented. In the last section, we discuss these results, and present conclusions.

Historical Evolution of Gum Arabic Collection Systems in Senegal

Gum collection was practiced in West Africa as early as the fifteenth century when Muslim merchants (Trarza emirs in Southwest Mauritania) used to send slaves into forests to collect gum either as organized slave groups or as part of their daily labour; these emirs tightly controlled the trade with the Djolof region (an area which is part of the current Sylvo-Pastoral Zone in Senegal, see Fig. 3.1) (Freudenberger 1993a; Webb 1985, 1995). Until the eighteenth century, wild collection prevailed in Djolof, and it was only during the nineteenth century that the black Maures (from Mauritania) introduced tapping and developed the use of bush fires to induce higher yields from *A. senegal* trees. During the colonial era, the French administration built an infrastructure of roads, wells and railroads in an effort to draw Wolof cultivators and Fulbe pastoralists into gum collection: villages were coerced to collect gum through debt peonage by European merchants, whereby villagers were required to

[1] A distinction was not made between land rights and tree rights because it is not evident that they are substitutes (see for example Bruce and Fortmann 1999, for cases when tree rights substitute for land rights).

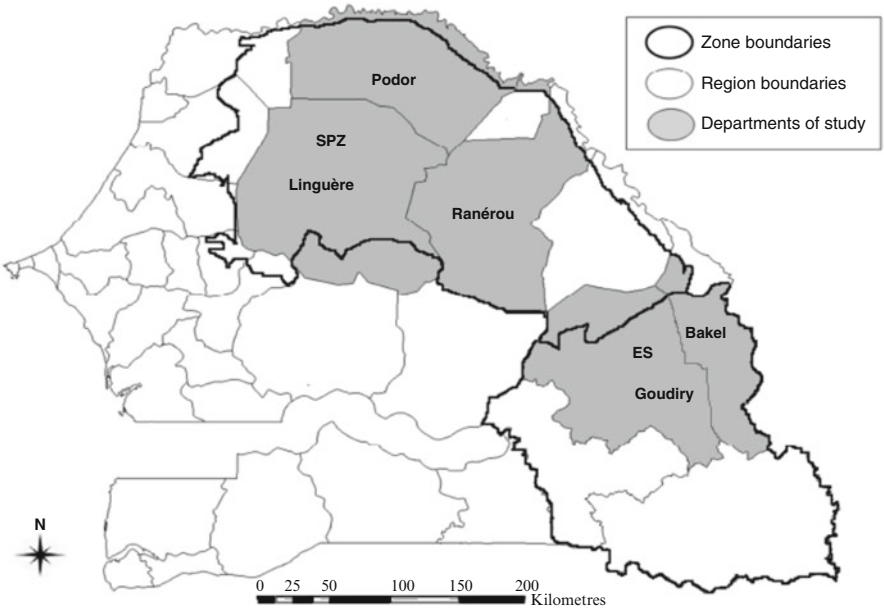

Fig. 3.1 Map of Senegal and study area (Source: Edited in line with World Food Programme et al.'s (2011) livelihood zones of Senegal)

pay back their loans – granted at usurious rates – in the form of gum arabic. By the 1910s, gum arabic had become one of the principal cash crops exchanged for overvalued imported items such as fabrics. Hence, *A. senegal* rapidly evolved from being a user-value species, long employed by the Fulbe and Wolof for livestock forage and timber, into an exchange-value species highly esteemed for the readily marketable gum (Webb 1985).

According to Freudenberger (1993a), the expansion of the market for gum arabic stimulated a transformation in labour relations and in the tree tenure systems that determined access rights and resource management practices. The *Bourba* (king) Jolof distributed rights as follows: Wolof nobility were granted access to the areas with the densest concentration of *A. senegal* and hired the black Maures to harvest gum and transport it to the market centres; the Wolof farmers collected gum in a second zone found primarily around the villages in the Senegal River Valley. Here, lineage heads received gum collection rights from the chief and then allocated subsections to relatives and dependents. Surprisingly, the Maures were also granted access to the forests in the far north-eastern part of Djolof through seasonal collection rights. This was achieved through the intervention of Muslim clerics who in turn received tithes in the form of collected gum.

In the 1930s, French hydrologists discovered the Maestrichian aquifer, which enabled the construction of boreholes in this inaccessible area. As a consequence, pastoralists changed their transhumance patterns in the dry season and settled around these boreholes. Their presence in the zone attracted them to gum collection:

young Fulbe herders could furtively collect gum nodules after the Maures had tapped their trees (Freudenberger 1993a, b; ISRA/BAME 1999). Moreover, whereas pastoralism by transhumant Fulbe previously complemented gum collection by Maures along the seasonal patterns, competition over gum resources eventually ensued, especially as the settled Fulbe also began to collect gum. The competition increased even more during the Great Sahelian drought of 1968–1974 that decimated the livestock; pastoralists took to gum collection as a coping strategy (Adriansen 1999; Wane et al. 2006). Conflict over the forest areas followed, and the state forestry service granted the Fulbe collection rights on trees found within the immediate vicinity of their scattered encampments. Maures migrated to the southeastern part of Linguère (in the Sylvo-Pastoral Zone) where they pioneered gum collection. There, they were in competition over land with Wolof agriculturalists. The continued mobility of collectors in search of trees and land led to the further spread of gum collection, to eastern Senegal. However, the decrease in international prices for gum arabic in the 1990s resulted in a decline in gum collection to a marginal activity, used as a survival strategy (Freudenberger 1993a; Adriansen 2006).

No known research study has focused on gender relations in the gum arabic sector. Rather, the historical overview of gum collection in the Sylvo-Pastoral Zone elaborately reflects the involvement of different ethnic groups through their establishments and economic activities, differences in collection rights and market pressures. There have also been problems associated with competition over resources-induced changes in collection systems, based on ethnicity and movement. Boxes 3.1 and 3.2 illustrate such processes of change towards the current collection systems where we observe not only the traditional communal collection but also a trend towards privatization by division of the area into individualized family plots and formal acquisition of private plots.

Box 3.1: Louguéré Thioly, Sylvo-Pastoral Zone

The village of Lougéré Thioly was established around 1920 by migrant Fulbe pastoralists who found a water pond and pastures and camped in the area. In 1950s, with the construction of a borehole (DPS and World Bank 2004), the pastoralists were joined by Wolof agriculturists. The borehole facilitated a sedentary way of life; occasional livestock migrations occur only during the dry season towards the southern Fouta. Cultivators who grew millet during the rainy season were the first to discover the importance of *A. senegal*, using its bark as ropes for tying their sacks of millet. In decorticating the tree of its bark, these cultivators noticed the gum oozing from the tree. They collected and sold it to traders (of livestock and other commodities) who passed by the village in search of water. The gum attracted the attention not only of agriculturalists, but also of pastoralists, and later of the Maures who were professional gum collectors. The Maures settled there and they would go into the forest, tap trees and collect gum until the end of the season. Although the forests were open to collection by anybody, either men or women, gum

(continued)

Box 3.1 (continued)
collection remained a man-specific activity. Women were involved in other activities including vegetable growing and collecting baobab fruits (*Adansonia digitata*) or jujube (*Ziziphus jujuba*). With respect to gum arabic, the increased number of collectors led to the division of forests into individualized plots according to family size. In this division, markings were made on trees such that each mark would be associated with a single family; a family could have several plots. Such markings ushered in privatized systems with clear distribution of plots and recognized exclusion rights. Cases of theft were referred to authorities. Land remains the property of the state; the markings, however, confer seasonal, or at most lifetime, usufruct, whereas permanent use could only conferred by legal registration. Nevertheless, as competition over land use is not excessive, the need for such registration has not yet arisen. (Recorded in Louguéré Thioly, 15 March 2010).

Box 3.2: Kadiel, Eastern Senegal
In olden times, agriculture used to be the main economic activity in Kadiel village. Because of declining soil productivity resulting from degradation however, the agro-pastoral system is now common practice in the village; it is supplemented by gum exploitation. There are about 30 gum collectors in the village. They collect mainly from natural forests; but there are also plantations established by past tree planting projects such as PROVOBIL (*Projet de Boisement Villageois*) (Dione and Sall 1988) and private initiatives (e.g. Tijaane, a Muslim community, planted more than 2000 seedlings); some collectors have even started plantations on their own land, whereas other collectors have obtained portions of the forests by formal request from the rural community administration.

Various management systems are applied in the above properties: owners of private plots are able to exclude collectors who are not their relatives because they have the advantage of having permanent control over the use of the product and entitlement to the income realized from collection. Plot ownership is determined at household level, but it is generally granted to men because women are rarely involved in gum collection. The common forests/plantations are so large that rules of collection have to be agreed upon with six other villages that also have access to these forests/plantations.

Within the Kadiel area, there is an informal division of the forest. However, there are many cases of theft when a collector deliberately crosses the limits of his 'property' to harvest gum from another person's property. Such conflicts are generally resolved within the village. Private properties seem to produce more gum than common property. Soil degradation and bushfires are the main problems faced by the village; they lead to declines in tree density and gum arabic production. (Recorded in Kadiel, 16 April 2010)

Methodology

The above historical trend and illustrations show that a change is slowly taking place in systems of governance of gum arabic collection in Senegal. The change is not spontaneous however. Historically, it resulted from the power of the chiefs and the colonial authorities. Currently, it is part of a decision-making process by local actors that involves an optimization of utility from collection: this is the focus of the current study. Such decisions depend on the number of trees and the distance between them, competition in labour time between collection and leisure, and competition over resources. Although the study did not aim to focus on gender relation, from observations made by the first author during field work, a few elements of gender relations are analysed in the discussion section.

Empirical Strategy

We hypothesize the determinants of a village's choice to organize collection in either a private or a communal system to include the number of trees, distance between trees, off-forest sources of income, competition over resources with other collectors, environmental influences on tree productivity and the cost of regulation (e.g. monitoring cost). Furthermore, following Yang et al. (2009), we also include market characteristics. Different sources of information were used to obtain data associated with the abovementioned variables influencing the choice of collection system (Table 3.1). In addition, we include a regional dummy as a control variable; regions correspond to the gum arabic production areas in Senegal, including the villages in the Sylvo-Pastoral Zone and in Eastern Senegal.

There is concern about the endogeneity of livestock ownership and collector density to the governance system. On the one hand, the availability of resources may be constrained by livestock herding by pastoralists who lead animals into the forests and, if they leave them to overgraze, this causes deterioration of the resource. This is especially relevant because there are strong negative impacts of grazing on tree and land resources in arid/semi-arid regions. For instance, Schlesinger et al. (1990) and Milchunas and Lauenroth (1993) found that (over) grazing caused the soil to lose fertility and led to desertification of formerly productive grassland in New Mexico. Macharia and Ekaya (2005) showed that sustained overgrazing in the semi-arid areas of Kenya reduced cover, quality and productivity, changed plant composition from perennial to annual species and encouraged bush encroachment. All the same, although these livestock grazing effects are important at village level, the emphasis on livestock ownership in the current analysis relates to its income-generating capacity for the household. On the other hand, collector density is perhaps the closest representation of competition for acacia trees because, whereas the acacia area is vast in communal forests, the collector density tends to be low. Forests that are efficiently managed tend to attract many collectors such that collector den-

Table 3.1 Exogenous variables and data sources to analyse the transition in gum arabic collection systems in Senegal

Variable	Description	Data source
Number of trees		
Tree coverage	The land covered by shrub trees gives an indication of the presence of *A. senegal* trees in the domain area where the acacia species is prevalent	GLCN (2009)
Distance between trees		
Tree density	The number of trees per hectare. The density is very important in accounting for the sparseness of trees[a]	GLCN (2009)
Income source		
Livestock ownership	The average TLU per household is an indication of the village's source of livelihoods and income but also of dependence on the tree resource. TLU values are 1.4 camels, 1.0 cattle, 0.5 donkey, 0.1 sheep/goat (FAO 2004)	Survey (2009, 2010)
Competition over resource		
Village size	If at least one adult person per household is able to collect gum, the village size roughly indicates the size of prospective collectors	PEPAM (2006)
Collector density	The average number of people per square kilometre of land covered by trees; the higher this density, the higher the competition for trees	GLCN (2009)
Environmental influence		
Rainfall	The average of the cumulated rainfall during June–October in the period 1991–1998 gives an indication of climate-induced degradation. It is hypothesized that long-term low rainfall levels indicate high degradation, which leads to low tree productivity. This increases competition especially if there are market incentives	UMR HydroSciences (2005)
Monitoring cost		
Average distance to furthest property	If the tree plot is located far from the village, monitoring for protection (surveillance) will be very costly unless it can be collectively organized	Surveys (2009, 2010)
Market sources of competition		
Change in average gum sale price	This is the change in average gum price between 2008 and 2010. As an incentive to collection, an increase in price attracts collectors	Surveys (2008, 2010)
Distance to nearest market	Access to market acts as an incentive to collection	Surveys (2009, 2010)

TLU tropical livestock unit, *GLCN* global land cover network, *PEPAM* programme d'eau potable et d'assainissement du millénaire; Survey refers to primary data collection by researcher

[a]For the computation of tree density, the area of the village used for housing and other constructions was not deducted; hence, the tree density values are lower than in reality

sity remains high until some regulation can be put into operation. As no valid instruments were found to control for the possible correlation, the estimation results shall be carefully interpreted.

Primary data on resource management were collected between March and May 2010 by the first author, and secondary data were subsequently obtained as described in Table 3.1. These data relate to 53 random villages in the Sylvo-Pastoral Zone (22 villages) and Eastern Region (31 villages) in Senegal. Twenty-four (24) villages continue to organize collection in communal systems, meaning that any collector, either from the village or vicinity, possesses unrestricted rights to harvest acacia trees such that no one can be excluded; these rights are temporary but can be valid for several seasons. Two villages have demarcated plots and have adopted a purely private system where each collector has permanent ownership rights so that he can harvest trees and exclude other users. The remaining 27 villages have mixed systems where features of communal and private systems coexist: some families have obtained legal ownership and exclusion rights that may be permanent, and other collectors exploit trees in communal plots. The above classification in systems of governance is based on the proportion of collectors in the village (all men in the villages studied) who manage collection in private systems, i.e. if the village as a whole was involved in a communal system, the proportion would be 0 %, whereas, if the village as a whole was involved in a private system, the proportion would be 100 %. Proportions in between these extremes represent villages with mixed systems. A closer look at these villages shows an average proportion of 58 %.

Econometric Analysis

A probit model is used where the observed outcome is either to exploit gum in communal management systems (0) or in mixed systems (1). As only two villages had a purely private system, we were unable to have a separate category for multinomial analysis; hence, these villages were included in the mixed systems category.

Results

Table 3.2 compares the statistics of determinants of a village's choice of collection system organization by village category and overall in relation to the gum collection management system: communal (CMS) and mixed (MMS).

Shrubs and trees cover large areas in the village, about 33 square kilometres (or 3300 hectares) on average. In comparison with villages that organize gum collection communally, the villages that have adopted mixed (and purely private) collection systems have significantly lower tree density, higher livestock ownership, higher collector density and lower rainfall levels. Furthermore, these villages are larger, organize collection in forest plots located at shorter distances and are on average

Table 3.2 Characteristics of gum collection management system by village category and overall

Variable	All villages (53)	CMS villages (24)	MMS villages (29)	Equality test[a]
Tree coverage (‘000 km^2)	0.33 (0.890)	0.20 (0.232)	0.44 (1.183)	0.92
A. senegal tree density[b] (tree/ha)	34.6 (19.363)	41.7 (14.059)	28.7 (21.335)	6.51**
Livestock ownership (TLU)	17.8 (12.856)	12.3 (8.665)	22.3 (14.097)	9.11***
Village size (households)	40 (25.889)	31 (25.367)	47 (24.379)	5.53**
Collector density (person/km^2)	0.42 (0.622)	0.30 (0.379)	0.52 (0.760)	1.64[†]
Rainfall (‘000 mm)	0.54 (0.112)	0.60 (0.081)	0.48 (0.104)	22.81***
Average distance to furthest property (km)	15.8 (9.560)	18.7 (9.881)	13.6 (8.817)	3.80*
Distance to market (km)	11.5 (8.437)	14.3 (9.453)	9.2 (6.804)	5.32**
Change in average gum sale price (percentage)	34.86 (45.59)	42.23 (52.892)	28.76 (38.442)	1.15[†]

[a]ANOVA test: ***significant at 1 % level, **significant at 5 % level; *significant at 10 % level, [†]significant at 15 % level

[b]For the computation of tree density, the area of the village used for housing and other constructions was not deducted; hence, the tree density values are lower than in reality

established nearer to physical markets, but experienced a smaller increase in average gum sale prices in the period from 2008 to 2010.

Determinants of the choice of organization of gum collection systems are analysed using a probit model (Table 3.3).

Model I shows the influence of resource availability, other sources of income, competition over resources, environmental factors and monitoring costs on a village’s choice to organize collection in either a communal or a mixed system. High livestock ownership and large village size increase the likelihood of organizing collection in mixed systems, whereas long distances to the plot decrease the likelihood of organizing collection in mixed systems. Moreover, villages in Eastern Senegal are less likely to adopt mixed/private systems. Model II includes market characteristics in addition to the above influencing variables. These results are robust and, in addition, the increase in average market price positively influences the choice of transition towards private collection systems. Both models show a high percentage of correct classification of 77 % and above, good explanatory power with the R-squares of 0.47 and above, and predict a probability of adopting a mixed system of more than 0.60.

Ownership of livestock by households positively influences the tendency towards private/mixed systems: pastoralism is another source of income that would normally

Table 3.3 Probit model (0: CMS, 1: MMS) of transition in gum arabic collection systems in Senegal[a]

	Model I	Model II
Tree coverage ('000 km^2)	0.009 (0.060)	0.005 (0.059)
Tree density (tree/ha)	–0.160 (0.317)	–0.110 (0.319)
Livestock ownership (TLU)	0.522** (0.269)	0.543** (0.276)
Village size (households)	0.284† (0.243)	0.437* (0.284)
Collector density (person/km^2)	0.055 (0.129)	0.079 (0.137)
Rainfall ('000 mm)	–0.264 (1.385)	0.691 (1.641)
Average distance to furthest property (km)	–0.583** (0.313)	–0.557* (0.325)
Gum sale price change	–	0.142* (0.115)
Distance to market (km)	–	0.147 (0.248)
Zone (1: Eastern)	–0.489† (0.283)	–0.516*** (0.258)
Log (pseudo) likelihood	–19.353	–18.538
LR Chi-square	34.29***	35.93***
Correct classification (%)	77.36	81.13
Pseudo R-squared	0.470	0.492
Predicted probability (y = mixed system)	0.641	0.654

CMS communal management systems, *MMS* mixed management systems,
***Significant at 1 % level, **significant at 5 % level; *significant at 10 % level, †significant at 15 % level
[a]Marginal effects (standard errors)

indicate less dependence on the gum resource for livelihoods. Unexpectedly here, this is not the case. Possible reasons are that (1) livestock (sales of animals or animal products) do not generate an adequate income in the dry season when gum is collected, (2) households with fewer livestock have more labour migration to supplement their income through remittances and then less labour for gum collection or (3) livestock ownership as a sign of wealth at village level is linked to institutional developments and better market access.

If there are several collectors and perhaps other users who compete for the resource as expressed by large village size, the village would prefer to adopt a mixed system. The reason is that the cost of communal organization or the risk of conflict over the resource may be very high if the number of potential users is high.

If the plots/forests where gum is collected are located far away from the village, then communal systems are preferable because the monitoring cost is too high for a private owner to enforce his rights and protect the plot. Long distances to the collec-

tion plots also explain the limited interest of women in gum collection in Senegal and their preference for growing vegetables and collecting wild fruits within the vicinity of the villages. In this way, women can easily carry out their household reproductive activities while at the same time having the possibility to earn an income through these productive activities.

Market competition is straightforward in impact: higher prices make the move away from communal systems more attractive. This is because of the need to restrict occasional collectors who get involved in collection only when the price and market conditions are good. Opportunistic collectors can do so because there are no (strong) exclusive mechanisms in relation to the communally governed forests; the private system would hence enable authorized collectors to profitably exploit their trees without competing with these occasional collectors who just want to collect the maximum quantity in the optimum conditions.

Discussion and Conclusions

Theories of origin and transition in farming systems posit population pressure, environmental aspects and technological developments as the main factors influencing a shift in farming systems. Such changes are accompanied by, or associated with, changes in systems of resource governance. In the current study, we investigate the case of a non-timber forest product, gum arabic, with respect to changes in collection governance systems from communal towards private, with mixed systems in the transition. These systems are distinguishable by the mode of the acquisition, with tree marking as an effective proof of property that limits the frequency of thefts; such markings, also observed on cattle, are an indication of exclusive use rights (Wiersum 1997).

Empirical results show that the choice of mixed and private systems is associated with the number of livestock owned, whereby gum collection acts as a supplementary source of income. Note that this livestock ownership was expected to alleviate the necessity to collect gum and hence reduce the burden on the resource; however, this was not found to be the case. Perhaps a direct measure of income (which could be generated off-farm or by remittances) would have clarified the relationship between different sources of income and collection. Among the various explanations of the found effect of livestock ownership, here we focus on a plausible indication of market development. Livestock ownership is associated with the development of livestock markets that attract livestock buyers, who can also buy gum (refer to the historic case of gum collection in Lougéré Thioly, Box 3.1). These market developments will attract an increasing number of collectors depending on village size. Large numbers of collectors imply strong competition for the resource. In this case, privatization of the resource is appropriate to counteract the effects of competition. Of course, privatization may generate conflicts resulting from discontent over inequitable division of property; however, as explained by Homma (1996) and Alvard and Kuznar (2001), it is a better choice than a communal system because it generally helps to mitigate destructive action and enhance resource conservation.

Associated with market development, price incentives are the main drivers of competition. In the case of a price rise, occasional/opportunistic collectors compete with professionals in communal plots to collect gum, thereby reducing the individual quantity of gum obtained by each collector. Moreover, in order to obtain the gum in these communal plots before another collector gets it, gum may be harvested before maturity, thereby leading to inconsistent quality. Therefore, with privatization, not only would the quantity harvested by the collector not be reduced, but also the gum supplied would be of better quality than the gum harvested in communal plots (Mujawamariya et al. 2012a, b). The influence of market and related competition on systems of collection is also found in the commercialization of agricultural products (e.g. Quisumbing and Otsuka 2001) or other non-timber forest products (e.g. the *matsutake* mushrooms in Northwest Yunnan Province of China (Yang et al. 2009)). These trends are in line with Ruttan's (2002) description of change in resource governance.

Although organizing collection in a private system is preferable for the purpose of increasing productivity and quality, preventing overexploitation of the resource, and generating short- and long-term incentives for tree management, there are cases when the cost of enforcing such a system is economically and socially so prohibitive that communal systems are maintained. This cost relates for instance to monitoring: here, the monitoring cost depends on the distance to the collection area. If the area is located near the village, then each collector can privately organize surveillance. However, if the area is far away from the village, surveillance is efficiently done collectively by the villagers. As mentioned above, long distances may deter women from collection, even when women are not prevented from accessing the forest. Further attention is required on the gender implications associated with women's adoption of collection activities. Such research is needed because, if women engage in gum collection activities, this may have tremendous effects on household organization and income, and may require other changes in community resource management. The continuing tendency to organize communal systems may also be explained by another reason not directly included here, namely, the mutual insurance offered by communal forest areas. For resource users who live in drylands where income streams are uncertain, communal systems may indeed be appropriate as they allow flexible and mobile responses to uncertainty and high risk as popularized by authors like Grell and Kirk (2000). This implies that a collector will not be restricted to his own private plot, particularly in a bad year. Indeed, this insurance role of communal systems appears to be relevant and very important to changes in gum arabic collection systems. Hence, it is another avenue that merits further research.

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Part III
Collective Management of Natural Resources

> An optimist would argue that institutional pluralism enhances equity, accountability, and decision-making participation in collective forest management, whereas a pessimist would consider exactly the opposite. The question is not about a romanticised choice 'for' or 'against' certain institutions or authority; rather it is about how pluralism influences local forest governance. (Ref Bose, P. 2012. Forest rights: the micro-politics of decentralization and forest tenure reform in tribal India. PhD thesis. Wageningen University, Netherlands)

Partnerships in the drylands are one of the critical elements of managing natural resources. Nomadic pastoralists, indigenous peoples, tribal peoples, smallholders and other marginal groups play a symbiotic role directly and indirectly in the dryland collective management of drylands. Policy reforms need to recognize the identity and rights of these marginal groups in vulnerable dryland regions to ensure their meaningful participation and contribution to sustainability.

The fundamental question that runs through the analysis in the following two chapters concerns the extent to which collective action can facilitate inclusive management of natural resources in drylands. Papa Faye brings in the perspective of adding skepticism about 'environmentality' by analyzing the gender exclusion through a natural resources collectivization initiative in Senegal. While, Dheeraj et al., looks at the *Oran* dynamics and the way a community-based biodiversity management system functions in India's arid zones in Rajasthan.

Chapter 4
Oran Dynamics: A Community-Based Biodiversity Management System in India's Arid Zone

Dheeraj Singh, M.K. Choudhary, M.L. Meena, and M.M. Roy

Abstract *Oran* is a traditional biodiversity management system unique to Rajasthan, locally known as *Devbani. Orans* are common preserved sections of forest protected by villages in the name of gods or goddesses. Common pool resources such as *Orans* are usually managed under a mixture of open access (i.e. no effective owners or secured rights) and loosely defined common property regimes. The desert ecosystem, particularly in western Rajasthan, is very rich in livestock; hence, *Orans* are very important in the economy and the livelihood security of rural people and play an important role in promoting a flourishing livestock-based economy. Ancient laws utilized for the management for the *Orans* are based on a common belief in a divinity, and the entire community has an equal stake in the exploitation of the available resources. The conservation of resources and enforcement of the rules is the result of female dominance in managing *Orans*. The management committee comprises a general body that oversees the management of the forest as well as issues such as framing rules, resolving conflicts, taking action against offenders and distributing benefits. Utility maximizing behaviour, social pressure and cultural norms form a complex equation in *Oran* management. However, a comprehensive and well-tested approach to *Oran* management and conservation has not been developed or widely applied, and the rehabilitation of *Orans* needs proper planning and execution of a technically feasible package, tailored to suit their unique edaphic, climatic, vegetation, social and legal status.

Keywords *Oran* • Desert ecosystem • Rajasthan • Management • Livestock

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Introduction

Rajasthan is the largest state in India, constituting 10 % of the country's area (GoI 2008). Although 9 % of the state is classified as forestland, actual forest cover is just 5 % (FSI 2003). The region of Marwar, in the westernmost portion of Rajasthan, falls on the edge of the Thar or Indian Desert (Lodrick 1994). The Thar, like many deserts located in the subtropical zone, is marked by the scarcity and spatiotemporal variability of rainfall. Unlike many other subtropical high-pressure deserts, the region falls within the summer low-pressure zone that drives unpredictable yearly monsoons. These monsoons cross India to reach Rajasthan between July and September, the growing season in the region. Although sometimes romantically characterized as 'Marusthali,' or 'the region of death,' the area is rich in productive flora, and the sandy soils, although low in organic carbon and highly alkaline, are productive under good rainfall (Bhalla 1992). Most of the region (61 %) is either desert or semi-desert (GoR 2007), and as much as 30 % of the state is classified as wasteland (MoRD and NRSA 2005). The economy of the hot arid region of Rajasthan is largely livestock based, animal husbandry being one of the major occupations of the people. Apart from compensating farmers for poor soil fertility and hence low agricultural productivity, animal husbandry acts as an effective system to produce food under drought conditions by way of providing additional income and other essential requirements like milk, meat, fibre and manure.

In semi-arid India, common pool resources (CPRs) are often significant for poor people's livelihoods as they provide sustenance and income for household survival, and opportunities for risk sharing and coping with seasonal crises. State lands classified as revenue wastelands are included in the wasteland total and are treated as common lands by villagers but are often de facto open access, causing further degradation. They are particularly important to poorer people, who typically lack the minimum threshold requirement for survival, and influence the management of private resources and other livelihood options. From time immemorial, in almost every village of western Rajasthan, a substantial portion of land has been kept aside specifically as grazing ground in order to support animal husbandry on a sustained basis. With the breakdown of traditional management systems and exacerbated by privatization and encroachment, most CPRs in semi-arid India have become severely degraded.

Oran is a traditional biodiversity management system of Rajasthan, also known as *Devbani* and as sacred groves in other states, which are common preserved sections of forest protected by villages in the name of gods or goddesses. CPRs such as *Orans* are usually managed under a mixture of open access (i.e. no effective owners or secured rights) and loosely defined common property regimes in which various pastoral communities lay different claims to diverse resources (e.g. grazing, non-timber forest products, timber) and vie for access, control and use. Villagers still associate the trees and vegetation in the *Oran* with some religious significance which is supposed to protect the villagers and their animals. The word *Oran* is believed to derive from the Sanskrit word *Aranya*, which means forest or wilderness

(Chaudhry et al. 2011). Another opinion is that the word is derived from *Aan*, which means pledged. This chapter explores the evolution and dynamics of the management of *Orans*, with a case study from Pali district in Rajasthan, and discusses the roles of local communities in enhancing sustainable forest management and livelihood benefits.

Research Area

Pali is an important district in Rajasthan with an area of 12,387 km^2 located between 24.45° and 26.75° North Latitude and 72.48° and 74.20° East Longitude. The climatic conditions of Pali district are somewhat different than in western Rajasthan. Although basically during the summer season the temperature may rise up to 46–47 °C at the peak time of May–June, a large variation in temperature is found due to adjoining green and hilly areas. Winters are moderately cool during December–January, with the mercury occasionally falling to 4–5 °C. Average rainfall in the district during the months of July–October is 300 mm. Pali district is divided into nine geographical divisions (*tehsils)*. Table 4.1 gives an overview of the surface area of the different types of land in the CPR domain, of which 86,536 ha are covered by forest.

Although *Orans* are not part of an officially recognized category of common land, they are the most important common property resource in the rural areas of western Rajasthan as they account for 8–9 % of Rajasthan's arid region (Mitra and Pal 1994). The *Oran* acts as a strong, shared and naturalized icon in village life and works more as a culturally bound institution than a rationally formed one. It is esti-

Table 4.1 Areas of *Gochar*, forest and wasteland in Pali district

S. no.	Tehsil	Total geographical area (ha)	*Gochar* (grazing land) (ha)	Forest (ha)	Hillside (ha)	Wasteland (ha)
1.	Pali	173,174	12,670	3369	2697	8787
2.	Rohat	135,622	9676	198	386	7414
3.	Bali	143,980	11,976	31,018	19,475	6061
4.	Sumerpur	95,973	5969	556	4894	5528
5.	Desuri	130,426	10,118	18,919	5216	6973
6.	Sojat	167,755	11,770	5920	8122	8080
7.	Marwar Junction	140,307	11,039	14,281	1269	7460
8.	Jaitaran	137,620	10,751	2282	9397	5327
9.	Raipur	108,222	6763	9993	27,286	4998
	Total	1,233,079	90,732	86,536	78,742	60,628

Note: *Gochar* refers to common grazing land often under government control, forest refers to official forestland under government management and wasteland refers to fallows land not in use by village communities, which is mostly too degraded to be used for agriculture

mated that about 25,000 sacred groves and other sanctified ecosystems, varying in size between 0.1 and 500 ha, are in existence in Rajasthan, for example, the Bhadriya *Oran* in Jaisalmer district is about 15,000 ha, Baankal Devi ka *Oran* is spread over 4600 ha and Kundla's *Oran* in Barmer district covers about 7500 ha (Gokhale et al. 1998; Singh and Bahl 2006). Caste elites, pastoralists and marginal producers, whether men or women, all rely on the village *Oran*, and household economies depend on the resources available in the *Oran*.

This community organization of forest management has been successful despite the reluctance of policymakers and forest managers to share authority with villagers, their refusal to assign good forestland for this purpose and the lack of cohesion in many village communities. A common idea underlying various forms of participatory approaches is the hope that it will benefit the livelihoods of marginalized forest-dependent rural poor, and promote sustainable forest governance and the political agenda of reducing the cost of forest management by the state (Agrawal et al. 2008). As a result of this reluctance on the part of forest managers however, there are only a limited number of formal village forest committees. The legal recognition accorded to them has triggered the establishment of thousands of informal such committees, entirely managing their own affairs without any involvement by the forest authorities, because the latter do not have the capacity to oversee so many local initiatives.

The boundaries of communities do not need to coincide with their official geographical boundaries or the boundaries accorded to forest in the scientific world of forest management (Khare et al. 2000). This has a significant impact on people's participation. The village community elects its leaders from within the community, selects guards to enforce rules, fines rule breakers, manages finances and often deploys earnings for the benefit of the community.

As Table 4.2 denotes, there are a number of *Gochars* and *Orans* in Pali *tehsil*, and some *Orans* have even larger areas than *Gochars*. The case study included in the chapter discusses the *Sonai Manjhi Oran*, an area of 159 ha which is fully conserved and protected. The *Oran* is managed by a village committee whose notable features are its flexible regulations implemented in an adaptive fashion.

Some Facts About *Orans* *Orans* are related to religious practices followed since time immemorial and serve to conserve natural resources. People do not harm sacred groves mainly because of socio-religious traditions and fear of the unknown, believing that anyone who cuts or uses an axe in a sacred grove may be harmed by the presiding deity. According to legend, in Ekpaniya Bavsi sacred grove in Madar village in Udaipur, about 100 years ago somebody wanted to cut a Haldu (*Haldina cordifolia*) tree from the *Oran*. From the first cut, milk flowed out, and water from the second cut. The third cut yielded blood, and the axe-man lost his sight. This man could only regain his sight when he promised to construct a new temple for Ekpaniya Bavsi and not to damage any tree in future. This kind of belief may have contributed strongly to the conservation of sacred groves. Continuous community protection of these groves has resulted in the conservation and the establishment of a variety of herbs, shrubs, grasses and trees. In sacred groves, different idols like *Majisa,*

Table 4.2 *Gochar* and *Oran* areas in different communities in Pali *tehsil*

S. no.	Village	*Gochar* (ha)	*Oran* (ha)
1	Bhagesar	339.20	28.97
2	Hathlai	31.14	20.30
3	Sapupni	100.66	65.24
4	Sonai Manjhi	92.62	158.81
5	Guda Narkhan	53.35	136.92
6	Nadana Bhatan	85.84	27.34
7	Mandal	229.87	30.29
8	Kirwa	162.88	30.18
9	Digai	21.60	34.22
10	Padasala Kalan	59.62	131.57
11	Dayalpura	208.24	26.72
12	Gadri	291.32	112.75
13	Giradra Khalsa	27.45	30.59
14	Gulabpura	2.65	35.79
15	Manihari	0.00	71.06
17	Patharla	46.43	78.52

Jamboji, Jog Maya, Bhomiaji, Pabuji, Harbuji, Ramdeoji, Mamaji (religious statues) are positioned in the shade of green trees, and nobody is allowed to cut trees, twigs, leaves or anything, for fear of the god/goddess. These practices ensure that the ecosystem is maintained and retard the desertification process.

The rural attitude of non-violence is manifested and incorporated in the very fabric of religions, which also prohibit the killing of wild animals and hunting. The inhabitants of Bishnoi, a farming community in western Rajasthan, do not cut green trees or kill animals because of their religious beliefs. Trees have been planted around temples, religious places, farms, wells and community places since ancient times to meet the need for fuel and fodder, thus also checking the spread of the desert into villages.

Vegetation in *Orans*

A major portion of each *Oran* is occupied either by dry open grassland or by grassland interspersed with trees and thorny bushes. In *Oran* management, ecologically valuable species perform key functions in the ecosystem, thereby contributing to the support and enhancement of biodiversity. Most of the grasses are of the *Dichanthium-Lasiurus-Cenchrus* type. The perennial vegetation consists of stunted, thorny or prickly shrubs and perennial drought-resistant herbs. *Orans* differ from enclosure regimes in terms of their species composition. The trees most commonly found in Forest Department plantations include exogenous plantation species like *angrezi babul* (*Prosopis juliflora*) and *Acacia tortilis*, whereas *Orans* do not have exogenous

species and are dominated by Bordi (*Ziziphus nummularia*) and Jal (*Salvadora spp*.) species. Species are found in *Orans* that are often entirely absent from other village landscapes. *Jhil* shrubs (*Indigofera oblongifolia*), with a number of household uses, *Jal* trees (*Salvadora oleoides* and *S. persica*), with valuable fruits, and *bhangri* herbs (*Blepharis sindica*), with important medicinal properties, are among several species found exclusively in *Orans.* Grasslands occur in small clumps scattered in more or less open spaces. The density and size of patches of grazing increase from west to east, following the rainfall pattern. *Orans* provide vital grazing land for livestock, water, minor forest produce, medicinal plants and green cover in villages. The natural vegetation of tree, shrub and herb species distributed in *Orans* is listed in Annex 1, together with their uses.

Orans as Natural Pastures

The desert ecosystem, particularly in western Rajasthan, is very rich in livestock; hence, the *Orans*, which are more protected than *Gochars*, are very important in the economy as well as in the livelihood security of rural people, and play an important role in promoting a flourishing livestock-based economy and in the growth of livestock-rearing communities. *Orans* are utilized for grazing and browsing of small animals. The closure of fields during the rainy season and subsequent cutting and grazing during the winter results in good pasturage, since this timing of extraction matches the growth pattern of most wild perennial grasses. The rainy season is a period of above-surface growth protected from grazing. Cutting, grazing, browsing and natural fertilizer deposition in winter provide a natural counterpart to the mowing, thatch removal and soil turning of 'modern' and 'scientific' pasture management (Kanodia and Patil 1983; Savory 1988). During this dry-season period, rhizomes and root stocks of perennial grasses remain protected beneath the surface and, as a result, these areas form vast stands of cultivated grassland. *Orans* maintain a high quantity of ground cover covered by natural grasses like *Dactyloctenium scindicum, D. agyptium, Desmostachya bipinnata, Cenchrus biflorus, Cenchrus ciliaris, Cenchrus setigerus, Cynodon dactylon, Cyperus arenarius, Desmostachya bipinnata, Dichanthium annulatum, Eleurops lagopoides, Erogrostis spp, Panicum antidotale, Saccharum spontaneum, Sporobolus marginatus, Typha* species. Although it is unclear what quantity of biomass is made available by this arrangement, *Orans* make an important contribution to browsing resources for nearly all village households (Robbins 1998). Therefore, managing the *Oran* is crucial for their own sustainable development. According to a study, 41 % livestock is dependent on *Orans* in Barmer district in Rajasthan (Singh and Sisodia 2003). Indigenous nomadic pastoralists, particularly Rebaris and Gujjars, have developed a variety of livestock breeds based on traditional knowledge and have customarily grazed camels, sheep, goats and cattle on *Orans*. In general, perennial species make up more than 35 % of *Oran* ground cover, and this is crucial for livestock production during

the dry season. Thus, livelihoods and the survival of indigenous breeds are based on access to *Orans*. In turn, the animals help conserve the biodiversity of the local ecosystems in which they graze by spreading seeds and provide assistance to the area's local communities by breaking dormancy and providing ideal conditions for seed germination. Hence, indigenous pastoralists both use and benefit from the *Orans* as a routine feature of community forest management. The management of *Orans* therefore also acts as a social mechanism to protect the livelihoods of the economically vulnerable sections of pastoralists, i.e. livestock-dependent rural communities, by recognizing and securing their right to natural resources for subsistence and livelihood purposes. Community-managed *Orans* found all across India emerged in ancient times as an explicit acknowledgement of the vulnerability of certain groups in a stratified society, who required some mechanisms that guaranteed their basic needs.

Ethno-medicinal and Ethno-veterinary Shrubs

Orans preserve endemic, endangered or threatened species, and wild varieties of cultivars. The protected species found in *Orans* are known to be of considerable value. Many of the plants found there have medicinal purposes, which the villagers use to their full benefit. For example, medicinal plants like Adusa/Bansa and vajradanti are best for cough syrup, and food species such as ber and wild grains are valuable for home consumption and trade. In addition, the *Orans* aid scientific research by yielding useful derivatives for use in the pharmaceutical, chemical and food processing industries.

Orans are often the only surviving areas of mature woodland in otherwise denuded surroundings and provide a refuge for wildlife from the encroaching development of housing, roads, modern agriculture practices and factories. To keep *Orans* in place as an age-old traditional grassland and gene pool conservation system, community participation has to be ensured. Thus, small is not only beautiful, but also provides more local variety of habitats and involves the local communities directly in caring for their own environmental flora, fauna and gene pools.

Of the around 80 species of arid shrubs in *Orans*, one third have been found to have medicinal value. A perusal of their medicinal uses indicates that the leaf is the most used plant part, followed by roots, stem, latex, bark, seed, whole plant and gynostegium, flower, fruit and inflorescence, and even plants' resin, rind and galls have one or two medicinal uses. Shrubs provide medicine not only for humans but also for their livestock. Many shrubs of ethno-veterinary importance have been identified naturally growing in *Orans*. Of these, *Calotropis procera*, *Capparis decidua, Calligonum polygonoides Leptadenia pyrotechnica, Ziziphus nummularia, Tephrosia purpurea, Lycium barbarum* and *Riointis communis* are the common species used for treating ill animals.

Water Reservoirs

As a result of pressure from cultivation, irrigation, industrialization, urbanization, mining and over-utilization, many natural water bodies are dwindling in extent and number. Natural catchment areas and water courses are also vanishing. *Orans*, which cover vast areas without such interference, are the only areas for rainwater harvesting where natural water can be collected and stored for future use. Therefore, in addition to their contribution to human and animal health, *Orans* benefit the villages through their water bodies. In Rajasthan, *Orans* are the main source of water for traditional irrigation systems. In the Aravalli mountain range, e.g. Bakhtpura village, the main watering source for the 1356 livestock population is a *Johad* (rainwater catchment and storage tank) located in an *Oran*. Several *Orans* have perennial water springs that are important in terms of providing water for irrigation and drinking purposes (Singh and Sisodia 2003).

Miscellaneous Uses

Many of the plant species found within the *Orans* are used by traditional societies for a variety of livelihood needs: traditional non-timber forest products and subsistence goods for people; nesting, roosting and foraging sites for the pest-controlling cavity nesting birds and other wild animals; sites for beehives to enhance the availability of honey; seedling orchards and seed production areas for ethno-silvicultural species to sustain essential ecological processes and life support systems. Resources traditionally obtained from *Orans* are used to make furniture, cart wheels, tools, stilts, windows, doors, toys, stencils, fencing, thatching, ropes, brooms, matchsticks, musical implements, incense, deodorant and tooth brushes; to dye leather; and in worshipping and other religious ceremonies.

In most agro-pastoral societies, women use community resources as the producers and processors of much of the collected biomass material. They are the primary collectors and processors of fallen timber for fuel and other minor forest products (especially fruits and medicinal barks and herbs). Although most of these resources are distributed and used within the household, many (especially medicinal herbs and various fruits) are important market products. Some of them are used to make ropes (*L. pyrotechnica*, *C. burbia* and so on), thatch the huts (*C. procera*, *L. pyrotechnica*, *C. phlomides* and so on), for medicinal purposes (*C. mukul*, *B. aegyptica* and so on) and food/fodder (*Z. nummularia*, *C. myxa* and so on). See Table 4.3.

Policy, Legal and Research Issues

The average size of landholdings in Rajasthan was 17.8 ha per household in 1957; this has decreased to 6 ha and is likely to further decrease to 4 ha by 2020. Because of the decreasing landholding size, the traditional farming practices are

Table 4.3 *Oran* products with environmental, social and economic benefits

Category	Example products
Community products	Timber, fruits, nuts, fodder, traditional medicines
Women's products	Medicinal plants, fruits, vegetables, colour yielding dyes, gums, essential oils, resins, berries, roots and herbs
Indigenous/traditional products	Medicinal plants, seeds, resins

disappearing at an alarming rate, with an increasing rate of conversion of marginal land into cultivated land. The proportion of the area under wastelands/pasture lands in western Rajasthan is expected to decrease from 26.4 % in 1900 to 19.7 % in 2020, whereas net sown area will increase from 39.4 % to 54.8 %, indicating the bad state of affairs of pasture lands/fallow lands (Chaudhry et al. 2011). Despite the fact that under these conditions *Orans* are the last areas where resource conservation is practiced, traditional biodiversity conservation methods have not appealed much to scientists, foresters, academicians and policymakers; therefore, there is an urgent need to systematically survey, demarcate and conduct research on the tenure rights and management of existing *Orans* in Rajasthan (Singh and Bahl 2006).

Communal tenure includes collective rights that apply to the community as a whole, such as access to forests, water sources, sacred places and pasture. Where resource users have similar stakes in the conservation of a resource, the implementation of rules for common use is easier. Even so, users in different socioeconomic positions often have different responses to enforcement authorities (Gupta 1986). The rules for access and harvesting are distributed exclusively among group members, who are easily recognized by their sense of belonging, through mechanisms based on collective responsibility and participation. For example, to have rights to obtain forest products, individuals must have contributed to the tasks and duties of their community. These individual rights to communal lands are assigned and recognized according to local norms. Community forestry tenure involves everyday practices of community forest user groups that legitimize and enforce claims over community forest resources (Vandergeest 1997). A tenure arrangement in community forestry is generally shaped by community members' social relations, including gender, class, kinship, political, economic and legal relations. It is complex, ambiguous and constantly renegotiated temporally and spatially as communities' and individuals' interests and aspirations change. It needs to be determined with the consensus of all community members and stakeholders concerned and properly communicated to all of them in a convincing way so that they accept, remember and help legitimately enforce rights and duties (Luintel and Chhetri 2008). Strong regulations against tree cutting are a characteristic feature of *Orans*. Grasses are allowed to be exploited only for grazing, not for cutting. Browsing animals are allowed to eat from lower branches, and lopping tree leaves for fodder is prohibited. It is, therefore, the act of cutting and removing by humans that is restricted rather than the use of any particular resource. Enforcement of, and compliance with, rules in an *Oran* is a complex matter. Many accounts emphasize the threat of divine retribution, and cautionary tales of divine punishment by blinding and paralysis are common (Gold and Gujar 1989; Gadgil and Vartak 1975, 1994). Land usually also falls under the secular authority of traditional village councils, elders and the community itself.

Secular and violent warnings against cutting rival those related to divine retribution, and traditional punishments for infraction are known by all inhabitants. Mutually reinforcing divine and secular authority keeps trees standing in *Orans* (Robbins 1998).

In the Philippines, community forest management is a successful example of social justice and equity. With their new forest rights, the Banila community crafted new policies to reduce existing inequities by developing special provisions for the poor and disadvantaged members in the community; in Barobbob and Kalahan, the community forest committee established norms to ensure the equal participation of women and men, rich and poor. In general, equity was perceived to have improved across all these dimensions as a result of tenure reforms. A study of three villages managed by tree growers' cooperative societies (TGCS) in India between 1991 and 1992 (Saigal et al. 2008) showed better management of leased lands by giving local people a stake in managing resources, whereas outside the leased concessions there was widespread encroachment on common lands. Land and forest policies in many countries are formalizing recognition of local people's rights, especially to provide them with opportunities that improve their livelihoods. However, as observed by Cousins (2007: 291), 'these policies must take cognizance of the complexities and realities of current regimes of claims, rights and their governance, i.e. how "actually existing" tenure systems operate in practice.' Customary tenure systems have evolved over long periods of time in response to location-specific conditions (World Bank 2003). The bundle of rights for alienation of lands and forests has been constructed where customary mechanisms are still in force for the exercise of tenure rights at local level, whereby communities organize individually and collectively, as well as distribute harvest quotas and responsibilities among their members.

In many cases, tenure reform has opened up new sources of goods for subsistence or income and new forms of access. For example, in the Petén region of Guatemala and in Cameroon, communities had no legal rights to timber or logging income prior to the creation of the community concessions or community forests (Mbile et al. 2009). In some areas of India, local communities are granted wasteland areas to grow trees for fuel and fodder. In Ghana, the Modified Taungya System for tree planting allows farmers a share of the income from the trees they plant (Thomas et al. 2012).

Orans are not classified and defined properly in the revenue records of the State Government in Rajasthan. They represent the final form of institutional control of village lands in the region, although only a fraction of their actual total area is recognized in official records, and they simply fall under the 'Cultivable Wasteland' category. Consequently, the State Government distributed *Oran* lands to industry and landless people in some places without the consent of the local community. The forced conversion of such areas into 'revenue' allotment and the encroachment on revenue land have been regularized without following the provisions of the Forest (Conservation) Act, 1980. According to this act, the permission of the Central Government is required for the diversion of all types of forestland for non-forestry purposes.

Although some parts of *Orans* appear to be forests, they are not covered by the provisions of the forest act as their legal status is not recorded as forestland in most revenue records. The communities feel a deep sense of being robbed of a traditional entitlement when *Orans* are diverted for other purposes. Faced with severely depleted grazing lands and water sources, people have now taken to plundering the sacred groves in many places in the state. For example, Karoli Kund *Oran* in Alwar district (Singh and Bahl 2006) and those near Jodhpur city are threatened by mining and stone quarrying. Therefore, there is need to declare these lands as forestlands and give legal protection from any kind of diversion for non-forestry purposes. Paradoxically, this robs the local population of their authority as they have officially no say in the management of forestland.

Equally, the traditional enforcement authority cuts across caste lines, since women from both marginal and more powerful caste communities respond similarly to *Oran* restrictions in their area (Robbins 1998). By undertaking suitably planned, technically feasible, fodder-oriented silvo-pastoral rehabilitation measures with a proper combination of high fodder yielding perennials, *Orans* and *Gochars* in western Rajasthan can act as sustainable sources of livestock fodder. In drought years, a major portion of drought relief resources available at the disposal of the State and Central Government are utilized to supply fodder to the starving livestock population. During these years, millions of rupees are spent on the purchase and transport of dry fodder from neighbouring states. Drought relief expenditure has increased more than 12 times in the state during the last 20 years. Even after spending millions of rupees, it is not possible to save the entire livestock population from starvation. Cases of legal as well as illegal diversion of *Orans* for non-grazing purpose are fast increasing in many parts of the region. As mentioned above, with these areas not declared as forest in revenue records, such diversions do not attract the provisions of the Forest (Conservation) Act, 1980. This act has prevented blatant misuse of forestland for non-forestry purposes in India since its enactment in 1980. Had these CPRs been given forest status, such misuse could have been stopped to some extent.

Encroachment on *Orans* by influential local residents is also common in many parts of the region. The absence of physical boundary demarcation helps easy encroachment in these areas. Jodha (1986) has very rightly advocated a strict ban on further curtailment of these common property resources through privatization, their regulated use through some kind of fee and designation of these resources as a source of revenue for the Panchayats (village level administration).

The Management of *Orans*

Orans and *Gochars* were the backbone of livestock-based farming in the past because they provided fodder, but now the productivity of these areas has decreased due to uncontrolled farming and grazing practices. About 80 % of the land in these community forests in arid and semi-arid tracts of Rajasthan is in very poor condition due to excessive grazing, wind erosion and land degradation (Singh and Singh

2010). The livestock population in Rajasthan in terms of adult cattle units (ACU) increased from 9.6 million in 1983 to 11.3 million in 2001. It has almost doubled during the last 50 years. Consequently, the fodder deficit increased from 14.9 million tons in 1983 to 28.2 million tons in 2000 (Gupta 2003). Thus *Orans* – traditionally an extensive system of sacred forests and pasture lands – have problems meeting the needs of increased human and livestock pressure, despite their protected nature.

This has been exacerbated by the fact that all community-based forest resource management institutions that existed in India prior to British rule were dismantled when the British colonial state took over the forestlands. More productive forestlands were designated as reserve forests, dedicated to the production of commercial timber. Less productive lands were designated as revenue forests to meet local biomass needs. Because communities had no control over these revenue forests, they were treated as open access resources. More recently, in the 1990s, the system of joint forest management was introduced by the Indian government. Local communities were given some authority to protect patches of forests and assigned a share of the timber as a reward (Gadgil and Guha 1995). However, villagers are still not able to adapt their management to their own objectives because they do not have the final three rights (management, exclusion and alienation). These are considered collective-choice rights or decision-making rights, since they allow the rights holder to define rules and standards for exercising other rights, such as who has access to the resource or how the harvest of a resource takes place (Schlager and Ostrom 1992). Because they allow the rights holder to establish new rules or adjust existing rules, these rights are crucial for allowing resource users to adapt to changing conditions affecting resources or livelihoods.

Conservation of biodiversity in India's arid zone is quite a difficult task because of inadequate data on flora and fauna and the lack of adequate demarcation of areas (Krishnankutty and Chandrasekaran 2007). Because their capacity to provide economic benefits in the form of fodder, fuel wood and small timber has been eroded, *Orans*, which were once the mainstay of the pastoral-based rural economy, have lost their relevance in the lives of the rural population to a great extent in many places. Continued over-grazing of naturally growing palatable grasses, legumes and shrubs like *Dhaman (Cenchrus ciliaris), Bhurat (Cenchrus biflorus), Anjan (Cenchrus setigerus), Kanti (Tribulus terrestris)* and *Bordi (Ziziphus nummularia)*, especially during the pre-seeding period, has adversely affected their seed production and regeneration. Poor regeneration of palatable species has resulted in their gradual replacement by non-palatable grasses and shrubs like *Tephrosia purpurea, Aristida adscensionis, Eragrostis ciliaris, Aerva pseudotomentosa, Leptodenia pyrotechnica* and *Calotropis procera*. Grazing-induced desertification in degraded rangelands is a stepwise process (Milton et al. 1994). In the initial stages, it is possible to prevent the degradation process through management practices by altering the stocking density and animal type (Westoby et al. 1989). However, in the later stages, more costly and unpleasant steps become imperative, especially in a populous country like India, i.e. removal of livestock from affected areas and soil/vegetation manipulation. Major parts of *Orans* have become totally devoid of palatable grasses and

shrubs, resulting in reduced capacity to support the livestock population on a sustained basis (Chaudhry et al. 2011).

With regard to tenure rights, the central issue of concern is the extent to which reforms increase or reinforce rural people's rights to land and forest resources. On the one hand however, recognizing customary rights sometimes involves reinforcing the power of customary authorities, who may fail to act for the benefit of communities; on the other hand, granting greater power and oversight to elected local governments may undermine customary rights and practices through greater state interference. This is supported by a case study of the Bhil, a predominantly forest-dependent scheduled tribe in the semi-arid region of south-eastern Rajasthan (Bose et al. 2012). Forest tenure reform usually involves granting rights to people already living in or near forests and using forest resources. Tenure rights should be conceived of as a bundle of rights (Schlager and Ostrom 1992) consisting of access, withdrawal, management, exclusion and alienation rights. These rights grant powers of choice and action to the rights holder. The transfer of management rights under forest tenure reform usually produces community forestry models involving co-management arrangements. The widely used concept of co-management is generally agreed to be the sharing of power and responsibility between the government and local resource users (Berkes et al. 1991, cited in Carlsson and Berkes 2005; Fischer 1995). Rather than being a static state, co-management should be understood 'as a process in which the parties and their relative influence, positions and activities are continuously re-adjusted' (Carlsson and Berkes 2005: 67).

In some cases, finding the right balance between rights and responsibilities can be a struggle. As a process, co-management consists of negotiation, bargaining or mediation and provides a venue for problem solving and learning. Ideally, it combines the strengths and mitigates the weaknesses of each of the partners involved (Singleton 1998). However, co-management can also generate unintended outcomes for communities. For example, onerous restrictions on resource use can discourage participation in the system, stifle innovation or even exclude some stakeholders. Also, because the state is not a single entity, attempts at collaboration can be undermined when different government branches or agencies have contradictory policies. The centrality of natural resources to village life and to management politics has resulted in joint management and authority systems to govern *Orans*. Each successive legal system imposed over the years has resulted in a mixing of institutional forms, creating the conditions of legal pluralism under which these lands are governed today (Robbins 1998).

Despite this legal pluralism, Robbins (1998), in his analysis of different management regimes and forms of authority over pasture (fallows and *Gochars*), found differences in management outcomes in terms of response behaviour and landscape. As opposed to fallow and *Gochar* (grazing) land, where management is based on 'mutual coercion' and political control, respectively, he found that what he calls the 'shared cultural form' in *Oran* management leads to a higher incidence of perennial plants and indigenous species than other management regimes including forest enclosures, and results in a combination of tree protection and grazing (Robbins 1998: 430).

Oran Management in Sonai Majhi

The *Oran* selected for the present case study is managed by a committee jointly elected by the villagers. In the selected village, Sonai Manjhi, the population consists of different groups, *Sirvi* (130 families), *Hirager* (30 families), *Devasi* (60 families), *Meghwal* (65 families), *Rajput* (68 families), *Mali* (25 families), *Barber* (12 families) and other castes (35 families). Care was taken to include a committee member from each caste so as to represent the interests of every section on the *Oran* management committee in rule framing and decisions relating to expenditure of revenue and to the management of the *Oran*. Here, as in other parts of India, people do not harm the *Oran* mainly because of socio-religious traditions and fear of the unknown, believing that those who cut vegetation or use an axe there may incur the wrath of the presiding deity.

The management committee is composed of a general body that oversees the management of the forest as well as issues such as framing rules, resolving conflicts, taking action against offenders and distributing benefits. The general body has a regular monthly meeting. In the event of an emergency such as a forest offense or amendment of existing rules, a meeting of the general body can be called at any time. Over the years, the committee has changed its rules in response to changing conditions. In the first year of operation, for instance, no people or cattle were permitted to enter the forest or utilize any of its resources. From the second year onwards, the area was opened for grazing after the rainy season from October to June. At the same time, people were permitted to enter the forest to collect dry and fallen wood and leaf litter between September and February. Most operations are suspended from July to September as these are the rainy months, and the vegetation is not disturbed; also, the fallen leaves and litter are allowed to decompose to add to the fertility of the soil.

Sonai Manjhi has a large sheep population mainly owned by the *Devasi* tribe for which the *Oran* serves as grazing grounds. The animals have contributed to the ecology of the region to such an extent that they cannot be separated from the natural state of the *Oran*. As the animals graze, they provide manure to otherwise infertile ground. At the same time, the seeds in the manure have a higher chance of germination, are provided with ideal gestation conditions and increase the natural propagation of local trees. Because the animals consume the foliage on the ground, it helps to keep termite numbers low. This feeding on ground fall and tall grass has also lowered the incidence of forest fires.

The villagers also selected a specific area for total protection, where no collection activity is allowed for 5 years so that it can develop into a dense forest and can act as a forest nursery where new plants are raised and used for planting in the *Oran*. Generally, the indigenous and local species are selected and valued by the local communities for cultural or religious reasons.

During the control period, a number of new species are planted. These enclosures are guarded against cutting and grazing, and the rules are enforced by fencing and patrolling by guards. However, poor members of the community are permitted

to extract a limited quantity of fallen and dried fuel wood. Restoration of the vegetation also leads to the return of wildlife to the selected area (Singh and Gupta 2010).

Strategies for *Oran* Conservation and Management

There is a very strong need to study, survey and demarcate areas designated as *Orans* in the region and to formulate laws and regulations to check encroachment and keep away the owners of the adjoining agricultural fields. There is a need to systematically collect disaggregated land- and economic data, to document the participation and benefits for specific groups by participatory assessment and participatory evaluation. From this, it would be possible to develop locally accountable systems of land use management (community approach) that encourage diverse and locally adapted approaches to the management of degraded natural resources (*Orans*, *Gochars*, wastelands) as a legitimate conservation and restoration tool.

Rangelands in the Thar Desert show tremendous capacity for regeneration when protected by fences and enclosures for a certain period of time. Studies have also indicated that, with adequate protection and grazing on a carrying capacity basis, aiming at a 70 % forage utilization level, forage yield increased by 148 %, 92 % and 116 % in poor, fair and good condition grasslands, respectively, after 2 years (Ahuja 1977). Protection of rangelands by means of enclosures in the sand dunes in Sikar, Bikaner and Jodhpur districts increased the forage yield to the range of 200–250 kg per hectare (Shankarnarayanan 1988). These measures have to be applied more rigorously for *Oran* management and improvement in arid Rajasthan.

Conservation should take livelihoods and poverty aspects into account. In the arid and semi-arid areas of India, there is an urgent need to facilitate the economic XE "Conservationempowerment of the rural masses by increasing possibilities for income generation by ensuring the sustainability of the livestock-based rural economy of the area. This involves increasing fodder production from *Orans* and other land destined for grazing by encouraging natural regeneration of palatable grasses, shrubs and tree species. There is a need to undertake technically feasible, fodder-oriented silvo-pastoral measures, comprising a suitable combination of high fodder-yielding perennials and annuals. Consideration should also be given to practices like rotational grazing, deferred grazing, stall feeding and the establishment of fodder banks.

Conservation management should also focus on developing the capacity of the local rural population to withstand frequently occurring drought with minimum hardship. For this, research must focus on the selection and management of drought and salt-tolerant trees, shrubs, pastures and other means of minimizing rangeland degradation. Research should also identify production systems that are efficient, ecologically sustainable and financially viable. This involves the development of planning tools such as decision support systems that assist producers to adapt management to climate variability and other ecological hazards (Tewari and Arya 2005).

In the case of *Orans*, the conservation of resources and the enforcement of the rules is the result of female dominance in managing the *Orans*. Women from all caste groups are generally responsible for the collection of *Oran* resources for food, fuel and other uses, and the coppicing of trees for goat and sheep fodder. Women's day-to-day decisions in the field with respect to cutting trees and the utilization of natural resources are crucial in determining the preservation level of vegetation stocks in *Orans*. Because women are key players in the maintenance and preservation of traditional resource institutions, there exists a positive relationship between the involvement of women in management and resource conservation. Women maintain and protect many of the traditional rules for resource preservation at their personal expense. Hence, gender dimensions are very important in enforcing any policy, regulations, and conservation and management strategy for *Orans*. Therefore, they should be given an equal role in decision making and resources sharing if these natural resources are to be conserved and maintained.

Although a comprehensive and well-tested approach to the management and conservation of *Orans* has not been developed or widely applied, there is considerable need for a deepened understanding of institutional change, landscape management and the sociology of development to suggest ways to move forward. This research should also focus on the poor, as poverty manifests itself in different people's lives in different ways, and we need to determine poor people's use of biological diversity as a local livelihood resource for sustainable development. The specific characteristic of poverty needs to be understood in its context, causes and interconnections through progressive XE "Conservationcontextualization. On the basis of this knowledge, policies can be developed to make decentralization work for biodiversity conservation, such as appropriate financial incentives, participatory planning, and monitoring and evaluation of performance.

Local community members are often widely divided by caste, class and gender over the pros and cons of rules and traditions contributing to good pasture and forest and reclamation of degraded landscapes, and over whether this should be done through bureaucratic control and central state authorities or local communities with their own rules of access (Bahunga et al. 1994; Andersen 1995). We know that local community leadership plays a vital role in the success of the conservation of local natural resources and that this requires a long-term commitment to the community and the relevant initiative. Study of community initiatives reveals that leaders who are competent innovators, communicators, learners, bridge builders and systems thinkers are most successful (Timmer 2004). With time and commitment, even non-native community members and outsiders can assume important leadership roles. Successful leaders evolve for a variety of reasons, but they all share the respect of the communities with whom they work. All the cases evaluated by Timmer (2004) possess an element of community participation, and the level of community participation reflects the degree to which community members engage in a project and the democracy of the decision-making processes.

In *Orans*, community members own the resources, and consequently all members have equal rights, share equally and are bound by the same rules. Community ownership ensures that the community remains engaged and committed to the objectives of the enterprise to achieve conservation and financial sustainability. Networks of communities – defined as the diverse forms of secondary-level organizations of forest-dependent communities, such as federations, alliances and associations that defend and promote community interests (Ostrom 1990, 1999; Agarwal 2001; Bromley 2004) engaged in community-level collective action – may promote the success of their actions and their scope at regional, national and international level by knowledge exchange and by building a social and political basis for resource conservation. Networks often become part of forest tenure reform processes that emerge from XE "Conservationmajor reforms, and later they may become promoters of similar developments in other places.

The Road Ahead: Linking Conservation with Poverty Reduction

Even though sources of livelihoods are changing throughout developing countries, forests will nevertheless remain important for livelihoods and income. Hence, there is need to determine the actual and potential benefits for the rural poor in and around proposed protected areas before they are gazetted, and to ascertain the extent to which protected area restrictions will impose costs on the rural poor. In some cases, tenure reforms have made new forest resources available to communities; in other cases however, communities may have had access that was informal or even illegal. In most cases, new rights have been incorporated. With new responsibilities, the reforms have placed new limits on access. Although the world's low-income nations possess a rich heritage of biodiversity, poverty reduction and biodiversity conservation are often in conflict, and the pressing challenge is to resolve that conflict. As far as a comprehensive approach to linking poverty reduction and conservation is concerned, nobody knows exactly 'how to' based on a wide range of successful experiences. Conservation of forest resources can make only a partial contribution to poverty reduction. However, it is important to recognize the value of restoring natural resources. Different things can be done at site and institutional level. Local empowerment and enabling conditions are key factors that provide the foundation necessary for community-based organizations to thrive. These conditions influence the capacity of a community to mobilize the skills and political will necessary to succeed. Thus, internal enabling dimensions of motivated leadership, community participation, gender empowerment, transparency and accountability are critical if *Orans* are to be conserved.

Annex 1

Nature of species	Name	Used as
Tree	*Acacia leucophloea*	Most of the trees are used for collection of leaves, fruits, flowers, fuel wood and fallen timber
	Albizia lebbeck	
	Anogeissus pendula	
	Acacia tortilis	
	A. nilotica	
	A. senegal	
	Azadirachta indica	
	Mimusops hexandra	
	Prosopis cineraria	
	P. juliflora	
	Salvadora oleoides	
	Salvadora persica	
	Tamarix aphylla	
	Tecomella undulata	
Small trees and shrubs	*Calligonum polygonoides*	Many of the shrubs are used for fuel wood and fodder
	Capparis deciduas	
	Acacia jacquemontii	
	Balanites roxburghii	
	Ziziphus nummularia	
	Calotropis procera	
	Crotolaria burhia	
	Aerva tomentosa	
	Clerodendrum phlomidis	
	Leptadenia pyrotechnica	
	Lycium barbarum	
	Grewia populifolia	
	Commiphora mukul	
	Euphorbia nerifolia	
	Cordia rothii	

(continued)

Nature of species	Name	Used as
Herbs and grasses	*Ephedra foliata*	Most of them are used as fodder for animals. However, some have miscellaneous uses for medicine, thatching material, extraction of perfume, as vegetables, and for extraction of gums and resins
	Asparagus racemosus	
	Corchorus spp.	
	Arnibia spp.	
	Euphorbia hirta	
	Sida cordifolia	
	Sueda fruticosa	
	Heliotropium spp.	
	Eleusine compressa	
	Dactyloctenium scindicum	
	Cenchrus biflorus	
	Cenchrus ciliaris	
	Cenchrus setigerus	
	Cynodon dactylon	
	Desmostachya bipinnata	
	Dichanthium annulatum	
	Lasiurus hirsutus	
	Panicum antidotale	
	Panicum turgidum	
	Phragmites species	
	P. turgidum	
	P. antidotale	

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Chapter 5
Adding Scepticism About 'Environmentality': Gender Exclusion Through a Natural Resources Collectivization Initiative in Dionewar, Senegal

Papa Faye

Abstract Research on the commons has demonstrated the capacity of local people to define efficient common resource management institutions and organizations that enforce them. However, little is still known about the motivations of the actors that craft bottom-up institutions. Environmentality proponents tie such motivations to the environmental awareness coming from local participation in previous governmental interventions in natural resource governance. This chapter is a critique of the environmentality concept. Therefore, it argues that the ability and knowledge to develop environmental institutions comes mostly from the capacity to tap into environmental discursive strategies and to articulate them with other dominative discourses rather than from participation in previous project interventions. Those dominant actors craft new rules to suit their own interests rather than developing envionmental sensitivities. Drawing from ethnographic research in Senegal's Saloum Islands, the chapter demonstrates that young men, despite the fact that they have never been involved in development interventions, by idealizing collective interest have formulated very sophisticated ideologies to manipulate women who participated in any projects in the area. The reputation of women in Dionewar is both a social construct and a result of a changing (environmental) context. The collective-interest-idealized initiative (collectivization) created gender exclusion, increased gender-based conflicts about access to a wild fruit called *to'oy* and fostered privatization.

Keywords Collectivization • Environmentality • Privatization of natural resources • Gender exclusion • Conflicts • Project interventions

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Introduction

Drawing from empirical cases in very diverse contexts and types of natural resources all over the world, proponents of commons theories have demonstrated the capabilities of local people to develop strong institutions for sustainable natural resource management (McCabe 1989; Ostrom 1990; Becker and Ostrom 1995; Berkes 2009; Haller 2010).

In practice, local institutional arrangements, when registered, are called Local Conventions (Dicko 2002; Djiré 2003, 2004) in Senegal. Development interventions think of Local Conventions as being regulations that are inscribed and formalized on paper, and when they are signed by local administrative authorities. Where they are initiated by environmental projects or NGOs, the implementation of Local Conventions usually collides with local resistance or sabotage because of the gap between formal rules and local people's prevailing informal norms (Faye et al. 2012).

Local Conventions have proved socially integrative, politically correct and ecologically effective for development interventions because of the participation spaces that they open up. However, in most cases, such conventions have not brought the reduced levels of conflict promised by their advocates because they have failed to guarantee equity and social inclusion in natural resource management (Ribot 1999; Agrawal and Ribot 1999; Agrawal and Ostrom 2001).

Development organizations are still supporting the creation of formal Local Conventions and the formation of organizations (committees) throughout the countryside, despite their weaknesses. However, once they leave, the game re-opens. Post-project interventions benefit those actors that can build a convincing discursive strategy to subtly craft environment-sensitive new rules that enable them to control the access to valuable natural resources.

Environmentality proponents link the power to establish local environmental institutions with actors' experience of participating in previous project interventions. Agrawal calls environmentality 'the knowledge, politics, institutions and subjectivities that come to be linked together with the emergence of the environment as a domain that requires regulation and protection' (2005a: 226). *Environmental subjectivities* come into existence when local people 'come to care for, act and think of their actions in relation to something they define as the environment' (2005a: 164).

Such environmental subjectivities can be considered as community-based natural resource projects' 'lasting effects' on governance (Robinson 2011: 5). Local residents in Kumaon in India, because they were involved in regulatory practices instead of being subject to colonial imposition – which they resisted – behaved afterwards as *environmental subjects*. From being former resisters, local residents even requested more regulations than the state forest service could provide or implement (Agrawal 2005b: 171). Birkenholtz (2009) demonstrated that resistance to, and support of, state groundwater conservation by local residents differed according to the various subjectivities (caste, class and ecological conditions) of farmers involved in the processes. From his perspective, the making of environmental subjects draws both from governmentality and hegemony (social power and subjectivity).

Fisher and Chhatre (2013), in the same line, demonstrate the way in which political action against restrictive conservation has altered local agency towards a collective decision to protect and manage forest resources in the case of the Dhauladhar Wildlife Sanctuary (DWLS) in Himachal Pradesh, India. The exposure of local residents to resource management initiatives and their attendant environmental messages produced lasting effects despite the failure of projects. The Joint Forest Management project promoted activities to both disseminate environmental messages within communities and conceive new local management initiatives (Fisher and Chhatre 2013).

Robinson also found similar lasting effects after an environmental project intervention supported by the German government in Kaolack in central Senegal. From previously engaging in collective sabotage of regulations set by the Forest Department before the 1990s, certain local residents collaborated with local government officials and the Forest Department to enforce new forest use restrictions in the 2000s (Robinson 2011).

However, a growing literature questions the concept of environmentality. A number of scholars are increasingly sceptical about the argument that the existence of participation spaces engenders the crafting of new institutions that are 'socially empowering, developmentally progressive, and ecologically stabilizing' (Mawdsley 2009: 249). Cepek (2011) argues that, although the Field Museum's community conservation projects constitute a regulatory rationale and technique, they do not transform Amazonian Ecuador Cofan people's subjectivity according to plan.

Bose et al. (2012) showed how scheduled tribes like the Bhil, although they have attempted to claim their rights to forestland and resources, were increasingly incorporated into the government administration, but ended up being disempowered and politically fragmented.

Actors' participation in projects does not necessarily increase local awareness and environmental shifts. Instead, targeted actors may use co-management as an opportunity to actively transform habitual power asymmetries, as Caruso (2011) showed in relation to the Ashaninka Communal Reserve in Peru. 'The local partner may be neither evidently empowered nor disempowered…but rather be exploring unexpected strategies for creating political space and re-casting relationships with the dominant partners' (2011: 624).

This chapter contributes to the counter-environmentality literature and demonstrates that the power of a particular actor or group of actors to build strong institutions and control natural resource management depends on their ability to tap into environmental discourses and make them coherent with other supportive ideologies. This knowledge and power to craft environmental institutions do not necessarily depend on experience in participating in previous project interventions or on the mobilizing of environmental subjectivities.

The collectivization initiative in Dionewar Island shows how women were excluded and resources (and related financial returns) privatized, drawing from the collective interests discourse. Collectivization entails shifting from a situation where multiple actors can access resources openly or with minimal regulations to another form of access where a management body strictly regulates access for the

benefit of a specific user group, operating on behalf of an imaginary public community. Collectivization enables the implementation of a new system with 'self-profitable' rules and norms. Thus, it provides a case against the theory of environmentality and shows how environmental subjectivities can be strategically and selectively used for exclusion rather than for environmental sensitivity. By gender exclusion, we refer to the restriction of women's access to forestry resources following the collectivization project initiated by young men with the support of elder male leaders and some high officials from the elected rural jurisdiction.

Following this introduction, the chapter is composed of six sections. The next section presents the methodology and the research setting. The second describes the background of natural resource management in Dionewar in the era of women's control. The third section analyses changes in gender relations around natural resource management after the greater commoditization of forestry resources and the introduction of processing opportunities. The fourth demonstrates how the collectivization initiative has resulted in gender exclusion and exacerbation of gender-based conflicts. The fifth section discusses the way project development interventions serve as opportunities for some groups to capture resources and exclude others. The conclusion sums up the results and draws several development and governance implications, and pro-equity recommendations.

Methodology and Research Setting

The data presented here were collected from 2010 to 2011 in a 4-year research programme (2009–2012) funded by the European Union and the French Environmental Global Fund (FFEM). The author was working in this programme as Researcher, coordinating fieldworks and scientific writing, in the think-tank responsible for research tasks, known as *Initiative Prospective Agricole et Rurale* (IPAR), in Dakar, Senegal.

The methods were essentially qualitative, with interviews, focus groups and participant observation. An assistant conducted in-depth ethnographic surveys in each site. The author personally coordinated the research and conducted temporary missions, representing a total of 3 months, and participated in an event during the action phase conducted by ENDA-Graf Sahel (*Environment et development en Afrique Sahelienne-Groupe de recherche et d'action formation*), the NGO responsible for the programme's development initiatives. More intensive 2-year fieldwork was conducted by three research assistants on each of the three sites in Senegal jointly chosen by the research team and the development team. This chapter draws on data collected in one of these sites, the Saloum Delta.

The programme was an action-research initiative with 2 years of ethnographic fieldwork and 2 years of observed intervention (researchers documented the intervention action of the development partner to signal on-going changes provoked by the intervention and to suggest patterns of adaptation of the approach). The programme was implemented regionally in Senegal, Mali and Burkina Faso, with two

institutions in each country sharing responsibility for research and actions. The general coordination was in the hands of a French NGO known as *Groupe de Recherche et d'Echange Technologique* (GRET) and a research institute based in Ouagadougou called *Laboratoires Citoyennetés*.

This paper focuses on Senegal's Saloum Islands, consisting of 19 islands spread across the Saloum River. Dionewar is one of them. Dionewar refers both to the name of a small island or village among the 19 located throughout the Saloum River – Fleuve Saloum and to a rural jurisdiction – Rural Community.[1] The Dionewar Rural Community is composed of three island-villages: Dionewar, Falia and Niodior.

It is located in south-western Senegal in the Fatick Administrative Region, the department of the same name and the Arrondissement of Niodior.[2] It stands at the delta of the Saloum River and the periphery of the Saloum Delta National Biosphere Reserve known by its French name, *Réserve Nationale de Biosphere du Delta du Saloum* (RNBDS). It covers an area of 316 km^2 and is delimited to the west by the Atlantic Ocean, to the east by Djirnda and Bassoul Rural Communities, to the north by Fimela Rural Community, and to the south by Toubacounda Rural Community (Faye et al. 2011). See Fig. 5.1.

The 1998 agricultural census estimated the population of Dionewar Rural Community at 11,274 inhabitants, with a population density of 35.68 inhabitants per km^2 (PLD 2003). Data from PEPAM[3] indicated 12,864 inhabitants with, respectively, 5057 on Dionewar Island, 7058 on Niodior Island and 749 on Falia Island. The population is more than 99 % composed of Serer Niominka and less than 1 % of migrant Fulbe who work mainly for autochthons as seasonal herders, especially in Falia village.

Background to Natural Resource Management: Did Women Control Resources in Dionewar?

During pre-colonial times, in African societies, natural resources on non-agricultural lands were generally subject to open access conditions, without any form of family or individual ownership. Because of their abundance, these resources belonged to those who needed and used them (Bromley 1991; Idelman 2008). Open access or

[1] The term Rural Community is used to refer to the most local and rural decentralization entity, not to a community living in a rural area.

[2] In Senegal, the administrative and territorial architecture is as follows: 14 regions composed of several departments and each department composed of several *arrondissements*. The jurisdictional architecture is composed of the 14 regions, each composed of both Communes (urban jurisdictions) and Rural Communities (rural jurisdictions). Both comprise regions, but there are two different authorities: the administrative and territorial authority is nominated by the President of Senegal and the political authority is chosen through local elections on a party-political basis.

[3] http://www.pepam.gouv.sn/acces.php?idloc=09222001, February 2010.

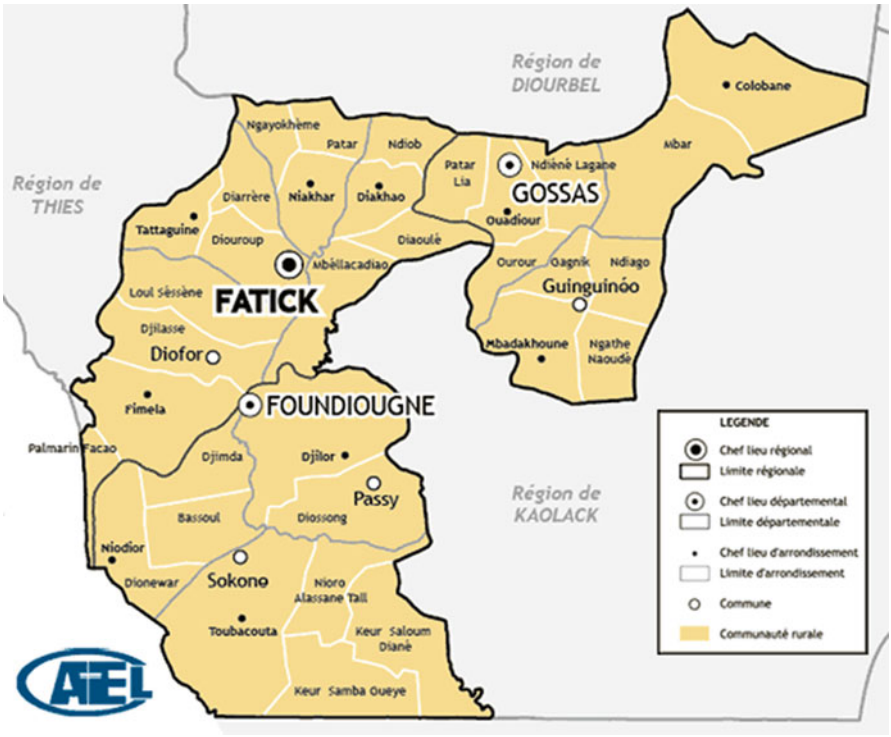

Fig. 5.1 Map of Fatick administrative region (Source: http://www.au-senegal.com/carte-administrative-de-la-region-de-fatick,033.html)

very limited regulation often resulted in resource degradation or scarcity. The 'rule of the game' (North 1990) that used to guide natural resources governance were, according to Guèye and Tall (2003): 'first come, first served'.

During the colonial period, the argument about the scarcity of resources resulting from degradation and droughts became more compelling, leading to greater control over resources and restriction of access rights. Some cases of individual or collective ownership appeared and replaced open access (Bromley 1991).

In Senegal, valuable resources like forests with high commercial wood and domestic energy potentials were under the control of the state (Ribot 1995, 1999, 2001). Local people were stigmatized as 'degraders' and strict control was exerted by the forestry service to limit their access to valuable resources surrounding their villages (Ribot 1995, 1999, 2001). The same logic was reproduced during the post-colonial period in the 1960s.

In the 1970s and the early 1980s, all over the world, local resistance and the inefficiency of colonial and early post-colonial authoritarian policies discredited the strict control of local people's access to natural resources. In the 1990s and 2000s, the trend towards Local Conventions accelerated following the passage of national decentralization laws in 1996 and decentralized forestry policies in 1998.

Development projects and NGOs played a dominant role in promoting and implementing Local Conventions throughout Senegal.

Supported by legal experts, development project proponents argued that the Decentralization Code of 1996 called for the establishment of tools to enable local people to participate in natural resource management, with support from locally elected authorities. The term 'modern and legal tools' used in the Decentralization Code has been interpreted as a call for Local Conventions to be elaborated (Sow 2005; Granier 2007).

In response to Local Conventions not being named as legal tools in the decentralization laws, and the contradictions signalled in the law itself, the Forestry Code of 1998 has been under revision since 2009. Almost all parties have recommended formal and legal recognition of Local Conventions in the upcoming law. Because of state resistance, especially by the National Forest Service and the arrival of a new political party after the 2012 presidential elections, the process has been suspended.

In Dionewar Rural Community, the *Detarium senegalensis* is a wild tree known as *ndo'oy* (in Seereer).[4] It had been managed as a common resource; the only restrictions on the use of the *to'oy* (the fruit of the *ndo'oy* in Seereer) were applied at the start and end of the harvest period. Since 2010, however, the management of *to'oy* has been collectivized, supposedly in the interest of the whole community, for better equality.

In Dionewar, women and children used to be the only commercial users of the *to'oy*, selling hard fruits to middlemen from urban centres and earning a significant income. Women benefited most from the commercial exploitation as children took part just to get cash for their school requisites. Intervening agents (state-based and civil-society-led), empowered women with organizational assistance, training in processing, and rotating micro-credit funding and practices. Thus, women gained knowledge and adopted strategies to maximize their revenues from these interventions.

However, since 2010, men have opposed women's control over *to'oy* exploitation. Interviews reveal that the reason differed from a group to another. Women argued that men showed an interest in *to'oy* only when the fruit became more valuable because of the processing facilities that they had obtained from development interventions. Young men thought that women could not guarantee the sustainability of the *to'oy* trees, which are depleting because of age and lack of protection against outsiders. In any case, men managed to reverse decades of history in which women had been the primary beneficiaries of natural resource management interventions. Although accused of being the only group to profit from natural resources and the benefits thereof, women used to invest some of their earnings in public or collective interest infrastructures and needs (mosque, school requisites and social grants to students in national universities). What is clear is that natural resources in the area attracted a lot of interest from the state and development interventions; therefore,

[4] The social group living in the Saloum Island belongs to the Seereer ethnic group; they are called Seereer Niominka.

the control of natural resources implied automatic partnership with those interventions and a right to the related material flows.

It is common knowledge in Senegal that the Niominka ethnic group persons are hardworking – women often more so than men (Pélissier 1966; Dimé and Fall 2009). In this chapter, rather than stating that women work harder than men, we attempt to explain women's reputation as being both a social construct and an effect of a changing context.

The social divisions of labour within the Niominka group prescribe that men undertake fishing and cereal cultivation, and women collect shellfish and forest fruits like *to'oy*, baobab and oil palm fruits. Recent environmental changes have undermined men's livelihood activities, as fish have become scarcer and salinization has reduced crop yields. These changes have reduced returns on men's labour, exacerbating the rural exodus towards national urban centres and emigration to Western Europe (Fall 1992), often illegally, via artisanal boats. The Saloum islands have been a point of departure for illegal emigration, very long before the now well-mediatized tragedies.

In contrast to men however, women have continued to engage in agriculture. The crops women used to grow, which formerly held little commercial value, have recently become more valuable because of new processing and marketing facilities in urban areas (Faye et al. 2011). Further, it has become easier for women to access land as men have abandoned agriculture for other economic activities or more leisure time (Faye et al. 2011).

In the early 1980s, with support from the National Department of Fishing, women formed strong economic interest groups (known by their French acronym, GIE: *Groupement d'Intérêt Economique*). The creation of GIEs in the fishing sector corresponds with a global trend of peasant organizations, producer groups and multiple other forms of grassroots organizations (Gellar 1997; Dimé and Fall 2009) in the rural area as new forms of organizations capable of receiving development aid in a context of structural adjustments or the denying of the 'providence state' (World Bank 1989; Faye 2006; Totté et al. 2003). However, men were not members of the GIEs as the work undertaken by those GIEs (the collection and processing of shellfish and wild fruits) was labelled as women's work. It was more a social division of labour than disinterest or inactivity, as young men were engaged in fishing.

On the island of Dionewar alone, in 1994, more than 20 GIEs with over 300 women members came together to form a Local Federation of GIEs, known by the French name *Fédération locale des GIE* (FELOGIE). The formation of a network of GIE federations was a national initiative of the Fishing Department, especially in the artisanal fishing sector.

Therefore, all GIEs within a local jurisdiction formed a FELOGIE, all local federations of GIEs throughout an administrative region were organized into a Regional Federation of GIEs and the latter formed the National Federation of GIEs known by the French name *Fédération Nationale des GIE de Pêche* (FENAGIE-Pêche).

Consequently, any form of state-based intervention in the fishing sector has to pass through these organizations. Non-state – civil society-based – interventions

also choose to work with them as they are quite well organized and have a lot of experience and interests in natural resource management or conservation.

One of the main partners of the Dionewar FELOGIE was the World Environment Fund (WEF) that funded the installation of processing technologies and started training women in the processing of both forest and aquatic products at the end of the 1990s. Since then, the FELOGIE has partnered with all development interventions in the village because of its members' dynamism and organizational expertise.

Federation leaders have constructed strong networks through knowledge exchange visits sponsored by WEF, International Union for Conservation of Nature (IUCN) and other external intervention agencies. The federation has achieved national renown, twice winning the national award for women entrepreneurship, under the Socialist Party government in the 1990s and the Liberal Party government in the 2000s.

With more than 300 members, the FELOGIE was attractive to any ruling party, and these sought to ally with it through the Ministry of Family and Women's Entrepreneurship. The FELOGIE gained in political mobilization capacity and visibility. These prizes added to the federation's credibility with respect to politics and the development sector.

At the same time, women become very conscious of development interventions and the advantages to be gained from the classification of the Saloum National Park as a UNESCO World Heritage Site in the 1970s. They used their GIEs and their federation to partner with external intervening agencies.

With IUCN, they created a Beach Village Committee in 2004 because this agency was interested in protecting mangroves and cleaning beaches. They extended its intervention to fit the need of the national programme, Women and Shellfish, run by the NGO Environment and Development in Africa (ENDA). They used management committees to connect with development interventions and capture the resultant benefits such as rotating credits, investment opportunities, visibility and the reinforcement of their control on natural resources.

They adapted management committees to suit the needs of the incoming agents, changing the name of the committees but leaving the same people in charge. Throughout, village women dominated important positions on the various committees. In this way, women were able to make use of external interventions to serve their needs, successfully reversing the trend in development for rural people to be manipulated by external projects.

Power relations within the community were changing in response to shifts in changing economic opportunities. At local level, men began complaining that projects favoured women, accusing external agents of causing a disruption of local social structures by empowering only women and never men.

Observation and interviews showed that women were very advanced compared to men in terms of organization and collective action skills in Dionewar village. In the neighbouring villages, Rural Communities Niodior and Falia, similar developments took place. Men felt marginalized and discriminated against both in the field

of development and in the crafting of the local institutions about natural resource management, especially aquatic and forestry resources.

Young men used their dynamism in cultural and sports associations to gain power in the political area. They allied with young women who could not access positions of leadership in the local federation. Together, young men and young women persuaded the leader of the cultural and sports association to stand as a candidate for the local elections, which they succeeded in winning democratically with support from their colleagues on the other two islands. Following the election, the situation began to change; young men, working with the new president of the Rural Council, began to pursue a hidden agenda against women.

Projects and Processing Facilities: Advantages and Side Effects on Women

This section demonstrates that, when the economic and political stakes around the management and uses of natural resources become valuable, men's interest is aroused and women are exposed to exclusion, no matter how long they have been in the sector.

Although there are no legal constraints on women accessing natural resources in Senegal, women still play a secondary role in their management and control (Bandiaky 2011). The (economic) value of natural resources often rises with development interventions following the imposition of local exploitation taxes and benefit-sharing schemes for partnering actors.

When the value of natural resources increases, competition over their control also increases, and the likelihood of women's access decreases. As Monimart (1989) and GESTE (2010) observed about land access in Mali and Senegal, respectively, women get access only to non-valuable resources or resources that are not needed by men.

In Dionewar village, the introduction of processing technologies opened up new market opportunities for women, which in turn changed men's and women's stakes in natural resource management. Resources that had been under women's control when used only for subsistence became objects of competition between women and men once they took on a commercial value. In Dionewar, control of *to'oy* fruit became contested after development interventions funded equipment, materials and training for fruit processing.

Across West Africa, governments and development actors are seeking to create conditions favouring the processing of natural resources at regional, national and local level, on the premise that marketing processed goods will necessarily capture more value added than marketing raw materials. The *to'oy* case represents an example of this trend.

The provision of processing equipment and training by development interventions in the Saloum Delta, and in Dionewar particularly, raised the economic value

of forest fruits, especially *to'oy*. Whereas net revenue for unprocessed *to'oy* is about 6 USD per bucket-load, juice fetches around 12 USD for the same unit. Juice is marketed in urban areas, where businesswomen have begun to offer good prices. Hence, local women have gained greater awareness about these commercial opportunities. As a result, local women have been able to exercise a greater degree of power in the market for *to'oy*. From being simple harvesters, they have become processers and traders in urban markets. Occupying these different roles has provided them with more negotiation power on sale prices as compared to trading with merchants coming to the village to act as middlemen in supplying urban centres with *to'oy*.

With these expanded opportunities, almost all Dionewar residents became aware of the benefits of fruit processing. The FELOGIE, which managed the processing facility, began renting materials to processors regardless of whether or not they were members of the organization. Table 5.1 shows the fees charged for some services.

The FELOGIE also defined new regulations governing labour and benefit sharing between individual GIEs and the federation. GIEs are required to provide several days of labour for the federation before they work for their GIEs or for themselves. This rule is a condition for access to the processing unit. The revenues collected during such collective work are dedicated to the maintenance of the processing units and the purchase of new materials, and also support the credit fund during non-exploitation periods.

Subsequent to the processing and market opportunities, there was a rush on harvesting *to'oy* in the village. Thus, the resource became subjected to competition between individual women, GIEs and new-coming males, looking to maximize their margin in a context of rising relative prices. Although the federation tried to regulate the competition by rotating producers' rental of processing technologies, prices rose in both local and urban markets for processed and non-processed *to'oy*. Hence, the rotating rental no longer regulated the exploitation pressure efficiently, and the fruits were harvested before they became ripe.

The Village Beach Committee extended its domain of intervention with the support of IUCN in the early 2000s and, later on, of ENDA ONG from 2006 to 2008. This was a first attempt to institutionalize the regulation of competition for resources. In this Village Beach Committee, a sub-committee composed exclusively of women

Table 5.1 Prices for processing various forest products

Services	Tariffs (USD)	Observations
Rent of heating materials	0.25	Fixed price
Rent for shell transformation	0.05	Calculated on the duration of the process
Rent for cymbium transformation	0.2	Calculated on the duration of the process
Rent of live vest	0.1	Daily based
Rent of juice-making materials	0.2	Per litre

Source: Faye et al. 2011: 50

was specially commissioned to guard all natural resources: aquatic and forestry, including *to'oy*.

As men began to be interested in harvesting and processing *to'oy*, they refused to obey the Village Beach Committee and the subsequent surveillance sub-committee. Women cited some cases of physical abuse of women in charge of surveillance by men involved in harvesting, especially when they tried to enforce the regulations about access. Therefore, women felt powerless to control men's activities. As the committee president stated, '*What can a woman do to compel a man when he resists*?'[5]

Although processing opportunities promoted by development interventions increased women's powers and income, they also aroused men' interest and justified their initiative to control resources and related financial benefits. The next section describes the discursive strategies deployed to legitimate the collectivization initiative and the resulting conflicts that stemmed from it later, after elder women realized the real motivation behind the new management committee.

Collectivization: Legitimating Discursive Strategies and the Emergence of Gender Exclusion in Dionewar

This section deals with the way the collectivization – management for all the islanders – initiative in Dionewar drew on different discourses (relating to religion, conservation and humanism) to convince local people, and elder women in particular, to accept the prevailing monopoly over forestry resources, especially *to'oy*. It also shows the effects of the implementation of the collectivization initiative on gender relations around natural resources – conflicts among groups on Dionewar village-island.

Since 2009, a group of young people has been collectivizing the management and exploitation of *to'oy*. The group is entirely composed of young men and young women formerly involved in the culture and sports movement, and who supported the former president of this movement in his campaign to be elected president of the Rural Council, as already mentioned.

After winning the election, the new president pushed young people to take the lead in natural resource management. It should be recalled that the new president of the Rural Council had been member of the Rural Council and had headed up the Rural Council's environmental and NRM technical committee. However, the president said he did not want to appear as a youth supporter because of his previous long-time opposition to the FELOGIE women in relation to natural resources and project intervention issues. He thought that revealing his true position would lead women to accuse him of taking his revenge on them. However, the conflict between the local president and the federation president had been obvious to us (the research-

[5] Interview with the president of the surveillance commission of the former Beach Committee in 2010 by the author and his research assistant in Dionewar.

ers) since the contact meeting with the Dionewar village people in July 2009. Vigorously reacting to long speeches by her husband (who was village chief) and the local president, the federation president complained that men accused them of monopolizing natural management-related interventions and the benefits thereof, but that, when they invite men to a meeting with partners, the men try to prevent them expressing their opinions and wants.

Indeed, during the elections, the federation had supported the then opposing candidate to the current president of the local government. The current president never unfolded his thoughts about natural resource management, on the pretext of not wanting to be accused of attempting to out-compete the senior women who had been exerting a monopoly on the control of natural resources with the support of development interventions ever since the 1970s. '*Although the management of forest resources is transferred to the rural jurisdiction, I don't want to behave as a partial president*'.[6] He added that these women were like his own mother as most of them were the same age as his.

During a general assembly after the Muslim Friday Prayers at the mosque, a group of young people, led by a graduate recently returned from studying Islamic Studies in Egypt, announced their intention to collectivize the management of forest resources, and *to'oy* in particular. The group offered to volunteer to monitor forest sites, limit access and regulate harvesting operations. They mobilized several discourses to convince other residents to accept collectivization. They aimed especially to convince senior women in the federation, who had exercised long-standing control over natural resource management. Analysing the youth group's arguments, we identified three discourses to which they appealed: those based on religion, conservation and humanism.

The religious discourse focused on the need to enlarge and renovate the mosque, a socially desirable outcome in a village where all residents are Muslim. The young people argued that Dionewar needed to renovate the mosque in order to assert its position vis-à-vis surrounding islands, such as Niodior and Falia, which had larger and more elaborate mosques. There had long been profound rivalries between these three villages, including competition over mosques. As a result of this appeal, the Notables' Committee (senior men) and the Mosque Committee supported the initiative for collectivization and thanked the young people for agreeing to volunteer in the interest of the village and the 'Will of Allah.' The senior men welcomed and blessed the collectivization initiative, which was presented to them as a mechanism to fund the renovation of the mosque and to bring it up to the same standard as that in neighbouring villages such Niodior. However, as already discussed, elder women used to contribute to the renovation of the mosque and reinvested in social issues such as buying school requisites and providing subsidies to students attending universities in urban areas. Senior women had also contributed to the renovation of the mosque from their income from shell-fishing activities, not only from *to'oy* returns.

[6] Interview with a Rural Council's high official in 2010 by the author and his research assistant in Dionewar.

Therefore, the argument about imposing collectivization to fund the renovation of the mosque was not strong, if it was the real single reason.

The conservation discourse to which the young people appealed was more elaborated. The lack of surveillance due to women's inability to enforce regulations on access to *to'oy* was a strong argument. It was said that, because of weak surveillance, people competed over the resource and harvested all the fruits before they were ripe. The notables supported the young people's contention that early fruit harvesting threatened the natural regeneration of the resource. They both argued that, when no fruit was left to decompose on the ground, there could be no new process of germination during the rainy season. The depletion of the population of *to'oy* trees and the absence of young trees were proof that the resource was being depleted, according to collectivization proponents.

The humanistic discourse appealed to the notion that collective interests or the ideal of common-good resources should be prioritized over the interests of individuals or particular groups. This discourse was an implicit critique of the GIEs, although they were not as individualistic as the men claimed: they reinvested some of their earning in public issues like the mosque, education, rotating credit among women and household expenses. The young people argued that the community contained many people who wanted to work but who could not because of their physical condition (e.g., children, old men, people with disabilities). Hence, the aim of collectivization was to enable these groups to benefit from management on the basis of collective interest. As a result, a Forestry Resource Management Committee (FRMC) was proposed to favour equity through the enforcement of new rules and regulations about surveillance, access and redistribution of profits. It was a bottom-up initiative without project support.

The FRMC's crafting of new rules and regulations was a way for the young people supported by notables to institutionalize their discourses. Hence, the FRMC proposed rules for the surveillance and control of forest resources. The rules over harvesting *to'oy* included a restriction that only FRMC members could harvest fruits in forests. Anyone breaking this rule would be fined 1 USD per fruit collected. There were also distributive rules: the FRMC was only to collect and sell *to'oy* to women named on a list established each week. *To'oy* was to be sold to local women at a fixed price of 6 USD, whereas it was to be sold to outsiders for 10 USD. This price differential allowed women to earn a small profit by reselling fruits. The money collected from the sale was to fund the enlargement and renovation of the mosque during the first year. Afterwards, these revenues were to be used for social investments that would benefit everyone, including people with disabilities, children, and old men and women.

During the first year, senior women applauded the initiative. The president of the federation said that women were receiving greater benefits than they had before. Women thought this was a consequence of the collectivization system. However, conditions during the first year were somewhat unique, due to a bumper crop of fruit. This meant that, without the involvement of young men, women would not have been able to harvest and processes all the fruits available. Because of the shortage of labour for processing, the federation president convinced senior women

members of the local federation to offer free training on processing to young women. Women did not wonder whether the conditions of abundant fruit would continue in the coming years.

The senior women's agreement to support collectivization was based on several rationales, according to older women interviewed. The first reason was the abundance of *to'oy* in 2009 during the period of the FRMC's establishment. Women argued that *to'oy* fruits were so abundant in the forest that, without the intervention of young men, they would have rotted. The second reason was the idea of equity, also humanistic, subsequent to the creation of the FRMC both in the generation of 'public money' (for the whole village) and in the reinvestment in the mosque. Although more than 4500 USD were collected for the mosque renovation, the FRMC president was accused of committing fraud because of the lack of receipts from sales. Senior women in particular thought that the large amount of sales should have produced more money than was accounted for, and they called for the dismissal of the FRMC president. The third argument put forward was that the collectivization was also supposed to produce efficient ways to accumulate 'private money' for the FELOGIE from the rental of processing equipment to those newly involved in processing.

In 2010, the second year of collectivization, the situation changed. *To'oy* fruit was not as abundant as the previous year, young women had gained experience in processing and the FRMC was aware of the greater revenues available through the sale of fruit processed into juice.

The FRMC members decided to harvest the fruits, bring them to the village and sell them to those registered on the processors' list established by the collectivization committee prior to any harvesting operation. Senior women complained, accusing the committee of preferentially selecting young women on the list. Young women, in turn, affiliated their GIE with the federation, which had been formerly monopolized by elders. This meant that senior women could not refuse young women access to processing technologies so long as they agreed to pay the rental fees, even if the latter did not have access to leading positions.

Conflicts spawned a blame game between actors. Elder women accused young men of using young women to take revenge for elders' past control over natural resources, and of confiscating the resources that constituted their power. For their part, the FRMC accused senior women of aiming to monopolize the management of *to'oy*. As the FRMC president put it, '*We have left them with shellfish resources; they have to leave forest resources to us*'.[7] The president of the Rural Council supported the FRMC, arguing that '*management power over forests within a rural jurisdiction has been transferred by the state to the Rural Council [local government], and that of aquatic resources not. That's why I said yes to this initiative on forestry resources*'.[8]

[7] Interview with a Rural Council's high official in 2010 by the author and his research assistant in Dionewar.

[8] Interview with a Rural Council's high official in 2010 by the author and his research assistant in Dionewar.

In 2011, an action research programme was initiated in Dionewar, with intervention activities conducted by EVE (*Eau-Vie-Environnement*, a national NGO which is a sub-entity of ENDA-Graf) and the research tasks conducted by IPAR. The programme targeted the three villages within the Rural Community: Dionewar, Niodior and Falia. Following research results, EVE proposed to establish a Local Convention on natural resource management in each village, with an inter-village Local Convention to be established later to connect the three village-islands.

To enforce the Local Convention, ENDA decided to reinforce local organizations already dedicated to natural resource management. The programme had co-funding from the French Global Environment Fund (FGEF), which financed the establishment of a fund called Inciting Fund, aimed at supporting pertinent projects to be devised by local organizations working on natural resource management.

During the negotiations about the Inciting Fund, formal organizations were targeted as interlocutors and potential beneficiaries. Therefore, in January 2012, the president of the rural jurisdiction and the FRMC leaders understood this choice as a call to convert their initiative into an official organization. However, given that all development projects that intervened in the village partnered only with GIEs and the FELOGIE, they converted the FRMC into a GIE without informing any of the senior women or the project promoters. The problem, however, was that a GIE is in essence a private organization; it cannot be presented as an inclusive forum as originally envisaged by the FRMC. Therefore, the young men began positioning the FRMC young men's GIE as a formalized and legitimate interlocutor in the project. Worse, they determined a set of economic activities in which to invest their share of the financial returns from the Local Convention that the project aimed to set up.

Young FRMC men began discriminating against senior women in favour of young women with whom they allied in relation to the distribution of the fruits they harvested for sale and processing. Senior women discovered all that was being done by young men and young women to exclude them from both access to *to'oy* and the processing thereof. They ended up revealing this publicly and intensifying their resistance to the circumvention of the FRMC's initial aim. Thus, the project initiative of supporting the elaboration of a Local Convention for equity about access and benefits could no longer occur in the timeline of the project itself as the management of natural resources became more than ever complex. Consequently, the project decided to work with the two other villages where the dynamics were less complex. The next section discusses the results and draws implications for the environmentality concept and development interventions. It ends with several recommendations.

Conclusion and Discussions

The case studied in this chapter has shown that young men, despite the fact that they have never been involved in development interventions, formulated very sophisticated ideologies to craft new rules about access to natural resources to manipulate

women who participated in any projects in the area and instrumentalized the project. The ecological, humanistic and the religious discourses, as well as the idealization of collective interest, were instruments fabricated to legitimate the re-making of environmental rules and organizations to control access to resources and projects intervening in the sector. The collectivization initiative ended up by creating gender exclusion. It increased gender-based conflicts about access and processing of *detarium senegalensis*, but also privatization. The reputation of women in Dionewar as hard workers shifted from being a social construct to becoming the result of a changing (environmental) context offering new benefit flows.

In rural areas, development projects create new institutions or make institutional choices based on logics of local participation in their initiatives. However, these ways of operating distribute or redistribute important resources and affect the positions of actors and groups in socio-political and economical structures. The creation or empowerment of an organization provides power and privileges to its members. Such power and privileges contribute to the making of authorities in a social setting (Ribot 2007a, b; Ribot et al. 2008).

So, participation does not necessarily produce positive and progressive outcomes in the areas of interventions of projects – be they governmental or civil-society based. Caruso (2011) showed how co-management was used by some powerful actors to reshape power relations and to find spaces for domination. Mawdsley (2009) found similar negative results about Delhi's Bhagidari scheme in India, where the emerging environmental concerns amongst the middle classes were not necessarily ecologically effective or socially progressive. Further, Mawdsley (2009: 249) said:

> Even in Kumaon, participatory governance (and here specifically in terms of resource management) has not always been environmentally effective or socially just, never mind other parts of India more driven by caste, class, religious and gender divides. In urban India, class may increasingly be fracturing society not just along economic and cultural lines, but also in terms of representation and voice within the changing paradigms of governance. Long-standing inequalities are being amplified and re-articulated by the new dispensation associated with the participatory governance paradigm.

The material foundations of project interventions influence the distribution of the stakes about resource management and the re-positioning of groups of actors in time and space. The reasons and the way the FRMC was converted into a private organization, although aimed originally at collective interest, is proof of that. To understand the complexities of the actors' actions and stakes in relation to natural resource management, especially in the presence of projects, action-research programmes could draw valuable benefits from constant mutual exchanges of ideas and practices all the way along the intervention. Action research cannot operate well if restricted in the form of one institution or team dedicated to research and another creating development strategies and running them on the ground. The conducting of ground activities during the development stage produces more insightful information that needs to be taken into account in the on-going approach and to be reflected in new intervention strategies. Therefore, longer interventions that articulate actions and research are required to make equity happen in local natural resource governance.

Short-line interventions usually draw on rapid rural appraisals that cannot grasp the complex continuous dynamics of rural areas, especially in material-based projects.

In dryland regions, because of the scarcity of resources, the rare existing wetland forests, (like islands in the case studied here) are very attractive for development or environmental projects. Such project interventions bring with them new opportunities through economic valuation of resources but also arguments that existing actors can use to promote their own interests, excluding vulnerable social categories, like senior women in this case. Equity is the most important achievement that an intervention can have in the area of natural resource management or conservation. However, it is procedural; it takes time and resources, and requires back and forward movements between research and development activities, provided that the project's timeline allows for this. If the goal of projects is to achieve justice and well-being for local people, especially in rural areas, then expending resources and time in procedural issues would be more valuable than achieving concrete outcomes that could profit some powerful actors while reversing previous social relations, particularly gender relations.

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Part IV
Resilience and Reducing Vulnerability

> Many dryland inhabitants are migrating to urban and wetter rural areas but they are primarily motivated by economic objectives and risk mitigation as a result of rainfall variability (Ref Van Dijk, H., Bose, P., Krokenburg, A. and Dietz, T. 2014. Drylands dialogue report. The African Studies Centre, Leiden.)

There is a need to highlight the connections between global changes (economic and climatological changes) and the diversity of local practices to deal with these consequences. The connections between different scales from local to global level increase in number and in complexity by the emergence of markets and international nature conservation policies and convention. A better strategy is required to foster continuous and constructive dialogue between practitioners, policy makers, private partners and donors to convince them to develop more productive land-use systems characterized by social inclusion and the sustainable delivery of economic and ecological services.

The final two chapters of this book provide empirical evidence of the current scenarios and risks associated with the drylands in Africa. The case study of Savannah forest beekeepers in Cameroon by Verina helps to provide examples of actions to reduce vulnerability. Peris et al., in their chapter takes Loita forest as a case study to show linkages between (inter)national forest governance, livelihoods and resilience.

Chapter 6
Forest Governance, Livelihoods and Resilience: The Case of Loita Forest (*Entime e Naimina enkiyio*), Narok County, Kenya

Peris M. Kariuki, J.T. Njoka, C.L. Saitabau, and H.S. Saitabau

Abstract Loita forest (*Entim e Naimina enkiyio*) is an indigenous upland dry forest of approximately 330 km^2 located in Narok County, southern Kenya. It is rich in biodiversity, is of religious and cultural significance to the Loita Maasai, is an important habitat for wildlife, and is a source of water, dry season grazing and timber and non-timber forest products. Before and since Kenya's independence in 1963, this forest has been owned and managed by the Loita sub-tribe of the Maasai, with the adjoining lands in the division. However, in the early 1990s, it would have been converted into a nature reserve by Narok County Council had the Loita community not resisted through a court case. Over the last 25 years, the increased settlement and logging in the forest have become a threat to biodiversity conservation and may in future negatively affect the community's livelihoods. The Loita Maasai are, however, careful to deter outsiders from invading their forest, while tolerating settlement in the forest by their own community members. Changing lifestyles, livelihoods and attitudes towards, and use of, this forest by community members undermine the roles of existing traditional institutions such as the council of elders and the Oloiboni who have traditionally managed this forest. The decline in the

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authority of traditional institutions and the lack of strong modern institutions to support them leaves gaps in the continued sustainable management of this important indigenous forest.

Keywords Loita • Indigenous communities • Dry lands • Institutions • Conflicts • Livelihoods

Introduction

Livelihoods in the drylands of sub-Saharan Africa were historically based on nomadic pastoralism as the main economic base. In Kenya, these livelihoods were altered during the late nineteenth century by formalization of rights to land and associated resources during the colonial (1890–1963) and post-colonial (1963 to date) eras. Whereas sedentary communities adjusted to the changes, pastoral communities were slow to do so; thus, they were marginalized on the basis of their economic, social-cultural lifestyles and inability to fit into Western development pathways advocated by the colonial government through sedentarization and destocking (Blewett 1995). In the process, these communities were disenfranchised of their lands and lacked opportunities in formal education, and their areas remained underdeveloped in terms of infrastructure and social amenities while government attention shifted to high potential areas.

This chapter focuses on a communally owned indigenous forest, Loita forest (*Entim e Naimina enkiyio*: The Forest of the Lost Child) in Narok South District, herein referred to as Loita forest, located in Narok County, Kenya. The overall objective of this chapter is to investigate how forest tenure and governance has affected the use and management of Loita forest and to attempt to answer the questions: (i) how have forest tenure policies impacted on the resilience of livelihoods of the Loita Maasai community and (ii) what are the competing interests, resultant conflicts and their impact on the conservation of Loita forest? These issues are addressed by describing prevailing government policies affecting forests and other natural resources nationally and by investigating the use of Loita forest by the local community, the institutions involved in its management and challenges experienced over the last century. The chapter is based on a review of published and grey literature and supplemented with primary data collected through focus group discussions, key informant interviews and field observation between November 2011 and March 2013.

In the next section, we discuss the Maasai and land management in Kenya from colonial to post-colonial times, followed by background information on Loita Division. The fourth section discusses the current use and management of Loita forest, and the fifth section describes internal and external conflicts relating to access, tenure and management of the forest and its resources. In the final section, a discussion on key issues arising is presented, and in conclusion we argue that, despite the challenges facing traditional management systems, they are the ones best suited to the continued conservation of Loita forest. They could, however, be strengthened through recognition and support by national and county government policies

because an integrated management system is required to address current challenges, while encompassing a wider scope of stakeholders and new forest uses not previously envisaged under traditional communal ownership and management.

The Maasai and Land Management in Kenya

The Maasai and Their Loss of Autonomy

During the pre-colonial period in Kenya, land was owned communally, and ethnic groups moved or changed boundaries after internal and external wars. Between 1895 and 1963, the Crown Land Ordinance put all land under colonial government and created the Southern Maasai Reserve (3600 km^2) comprising then Kajiado and Narok Districts; Loita Division is within Narok County (see Fig. 6.1). The Maasai lost the Northern Reserve (Laikipia County) to white settlers and parts of their dry season grazing area near Nairobi (KLC 1932; Rutten 2008). Formalization of land rights in Kenya to Maasai land entailed a shift from initial communal to crown land, then to native reserves and subsequently to group or individual ranches in the 1970s, and finally the breakup of group ranches into private ownership over the last four

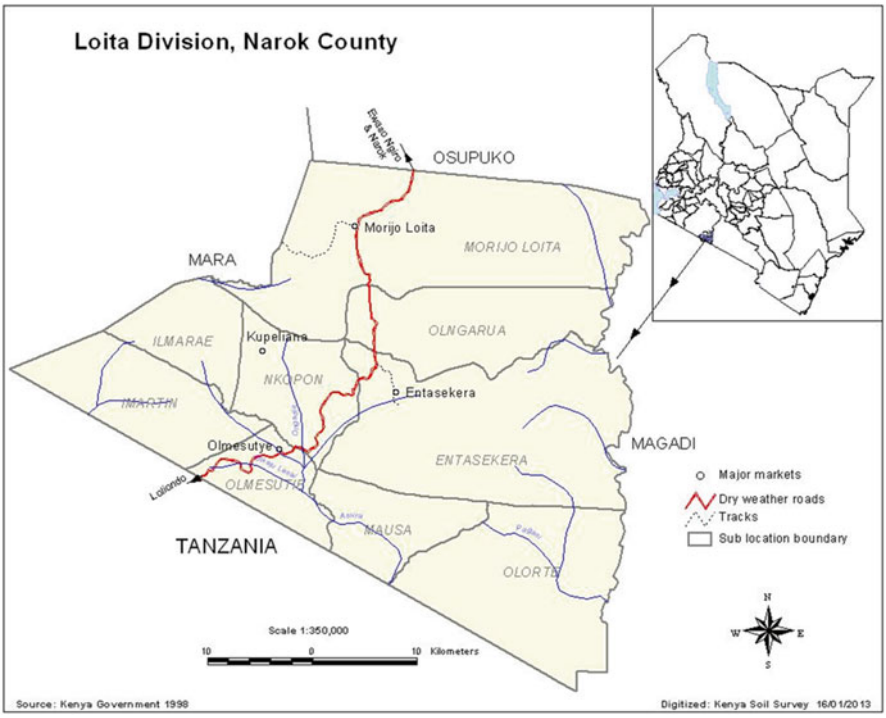

Fig. 6.1 Map of Kenya showing location and administrative boundaries of Loita Division

decades (Rutten 2008). The ranching concept was adopted faster in Kajiado District than in Narok District, thus allowing the Loita Maasai to continue exercising their customary land rights.

From the colonial period, government development policies in Kenya favoured agricultural cropping over pastoral production systems (Voshaar 1998). This focus is clearly demonstrated by the development of irrigation schemes whereby in the 1970s major irrigation projects were initiated and established. However, most were unsuccessful or collapsed due to mismanagement, for example, Bura and Hola irrigation schemes (RoK 2007a). Over the past four decades, pastoral communities have adjusted their livelihood strategies in an attempt to cope with frequent droughts and limited grazing areas, influenced by their interaction with farming communities. This transitioning from a purely pastoral economy to one based on mixed livestock and cropping has been promoted by development agencies, non-governmental organizations (NGOs) and government (Blewett 1995; Wangui 2008) as a copping strategy in response to the weather variability in dryland areas. Kenya's population has risen from 8.9 million in 1963 to over 41 million in 2012; this rapid population growth has increased the demand for arable land. This increased demand exerts pressure in some areas which is diffused by government re-locating people from areas of high concentration (high potential areas which cover less than 20 % of the total land area) to low concentration areas mostly in drylands (covering over 80 %).

The Maasai also lost some of their territories through the establishment of wildlife conservation areas known as reserves: Nairobi National Park (117 km^2: 1946), Amboseli Game Reserve (115,100 km^2: 1948) and Maasai Mara Game Reserve (392 km^2: 1948). The colonial and post-colonial governments sought to appropriate wildlife as an economic resource, centralizing wildlife management through legislation (Kabiri 2010). Game parks and reserves mostly occupied strategic grazing lands reserved by nomadic pastoral communities for use during the dry season. Once demarcated, these areas are no longer accessible to livestock; however, Maasai pastoralists have to contend with wildlife outside the protected areas. The Maasai culture of non-consumption of game meat positively supports wildlife conservation, leading to harmonious co-existence. However, this interaction of livestock and wildlife exposes livestock to wildlife diseases, predation and forage competition (Grootenhuis 2000). Communities adjacent to wildlife conservation areas have to contend with these challenges as wildlife is vital to the tourism sector. In Kenya, the tourism sector accounts for 10 % of GDP and over 9 % of formal employment, whereas agriculture accounts for 24 % of GDP (of which livestock comprises only 14 % of total agricultural GDP) and 18 % of formal employment (RoK 2007a).

Government Policies Affecting Forest Tenure and Management

Before the introduction of central government and national legislative frameworks on biodiversity conservation, indigenous communities such as the Maasai had defined a wide range of rules, regulations and procedures for access, utilization and control of natural resources, including biodiversity (Awimbo et al. 2004). These

were disrupted by colonial and post-colonial governments that undermined traditional resource management institutions. After independence, the national government developed strategies to address development needs in policy documents such as development plans, sessional papers and, more recently, a long-term strategy document Vision 2030 (RoK 2007a). Besides broad policies, the government has developed specific policies addressing resources and objectives for which they will be managed (RoK 2007a). This section discusses past and current legislative frameworks affecting forest tenure and management in Kenya, namely, Vision 2030, forest, wildlife, water and land policies. Vision 2030 is Kenya's development roadmap, implemented through 5-year medium-term plans. It aims to 'create a globally competitive and prosperous country with high quality of life by the year 2030' (RoK 2007a: vii). In its goals and objectives, Vision 2030 seeks to identify and implement flagship projects that will trigger development in the economic, political and social sectors. Environment issues fall under the social pillar, whereby in relation to conservation 'the country will intensify conservation of strategic resources (forest, water towers, wildlife sanctuaries and marine ecosystems) in a sustainable manner without compromising economic growth; Kenya intends to attain a 10 % forest cover by year 2030' (RoK 2007a: 106–107).

The forest policy (RoK 2007b) implemented through the Forest Act 2005, unlike the previous Forest Act Chapter 385 which was restricted to managing government forests only, has a wider mandate including management of forest reserves, private forests and community forests (RoK 1982, 2005). It allows for increased involvement of forest-adjacent communities and other stakeholders in forest management and conservation, and stipulates that forest management planning should now be based on an ecosystem approach (RoK 2005). The Kenya Wildlife Service (KWS) policy advocates restrictive non-consumptive utilization of wildlife, especially after the hunting ban vide legal notice no. 120 of 1977, and the revised Wildlife Management and Conservation Act 2013 (RoK 2013) is geared towards the conservation and management of wildlife in Kenya, with stiffer penalties for poaching and options for compensation in the event of damage and destruction by wildlife. Loita forest forms a migratory habitat for wildlife between Maasai Mara and Ngongoro Conservation Area in Tanzania, but the Loita community does not qualify to benefit from wildlife revenues from tourism as there is no wildlife park or reserve within the division (RoK 2013). The Maasai community has previously lived harmoniously with wildlife, but cases of poaching and human–wildlife conflicts have increased. Loita forest is an important water catchment; rivers emanating from the forest supply water within and outside Loita Division. The Water Act 2002 lays out mechanisms for the development of a natural resource management plan for the protection, use, development, conservation and control of water resources. This act promotes participatory water management efforts, particularly those that focus on protection of water catchments through water resource users' associations (WRUAs) (RoK 2002).

The Crown Land Ordinance (1902) and the Maasai Land Treaties (1902, 1911) affected the Maasai community and their land (KLC 1932). The colonial government laid the foundation on which successive post-colonial governments in Kenya continued to misappropriate community land. The Lawrence Commission encouraged the establishment of group ranches in drylands to increase livestock production. Group

ranches were supported by the Maasai community as they helped them safeguard the land and prevent intrusion of non-Maasai neighbours into their territories and land uses such as cultivation agriculture that are incompatible with pastoralism (Rutten 2008). In the 1970s, group ranches began to disintegrate because of poor management and the desire to have individual land titles to act as collateral; this latter led to subdivision and the issuing of individual freehold titles (RoK 2001; Rutten 2008). In addition, land pressures became more acute in the southern rangelands because of proximity to Nairobi, the impact of enclosures and subdivision, such that between 1960 and 1990 more than 70 % of group ranches were subdivided (RoK 2001).

Under the old Kenya constitution, land in Loita was held in trust by Narok County Council under article 62(2). However, Loita forest could be an exception as community land (under article 63 (1) (d) (I)) is land 'that is lawfully held, managed or used by specific communities as community forests grazing areas or shrines' according to the New Constitution of Kenya 2010. In 2009, the government of Kenya adopted a new land policy which changed 'trust land' into 'community land' (RoK 2009a). Under this policy, community land once demarcated can be registered under the community name, thus reducing the likelihood of misappropriation by the trustee county government. It also recognizes rights of communities to access resources upon which they depend, including providing for secondary access to land (RoK 2009a). Government policies in Kenya are being revised and reviewed to align them to Vision 2030 (RoK 2007a) and the New Kenya Constitution 2010.

Background to Loita Division

Geographical Location

Loita Division is located at an elevation of between 2000 and 2600 m above sea level, 320 km south of Nairobi towards the Kenya–Tanzania border (see Fig. 6.1). The division covers an area of approximately 1718 km^2 in the Great Rift Valley; Loita forest is approximately 330 km^2. In the 1970s, land in Narok was subdivided into group ranches, but the Loita Maasai resisted land demarcation and opted to have all land remain under communal ownership (Pimbert 2001, cited in Ongugo et al. 2011). According to a senior chief, the Loitans opposed demarcation because their low population (6356 people with a density of five persons per square kilometre in 1969) would have resulted in loss of their ancestral land (RoK 2011). Besides, their livelihood (semi-nomadic pastoralism) was supported by communal ownership which allowed access to communal resources in the different habitats and seasons (Loomali Ole Koiye, July 2012, personal communication). However, gradually privatization has been taking place with land allocated and fenced for projects that serve the public good, such as Ilkerin Loita Integrated Development Project (ILIDP), health centres and schools. Narok County Council has also subdivided plots in all market centres allocated for development by individual Loitans. In addition,

Kamorora Group Ranch (69,999 ha), situated at the edge of the forest bordering Nguruman escarpment and Kajiado County, is registered with a title deed. This group ranch was demarcated and belongs to some 14 families who leased it to a private developer in the 1970s. According to key informants, this was allowed in order to block intrusion into Loita territory by the neighbouring Loodo Kilani Maasai sub-tribe living in Kajiado. There is no marked boundary for Loita forest; it is part of a landscape highland forest (*Osupuko entim*) emanating from the northern boundary with Narosura Division and continuing in a series of multiple hills to the southwest, in the direction of Olorte.

Loita Division can be subdivided into three main ecological zones: the upland dry forest with glades and wetlands, an ever-green bush land and extensive savannah grasslands (Fig. 6.2). The forest zone lies on the north-eastern to south-eastern direction of the division. The bush land ecological zone lies in the central part of the division, running from the northern direction downwards to the Kenya–Tanzania border. The grassland area is on the western direction of the division, extending from Nkopon through Ilkerin hills towards Maasai Mara and the Kenya–Tanzania border; open grasslands consist mainly of grasses *Themenda triandra* as the main undergrowth with annual and perennial short species, with *Acacia derpanolobium* as the dominant species (Maundu et al. 2001).

The Maasai Political System

The Maasai are a Nilo-hematic people divided into social territorial sections known as *Olosho*. Each *Olosho* is occupied by a Maasai sub-tribe; they straddle Kenya and Tanzania with at least 20 sub-tribes. The Loita Maasai sub-tribe occupies the southern parts of Narok County in Kenya and northern regions of Ngorongoro District in Tanzania, traversing the international boundary. Although they have different nationalities, Loitans who straddle the Kenya–Tanzania international boundary interact freely in trade and cultural ceremonies, and share cross-border family relations. They have a remarkable process of power distribution across the whole society based on sections/villages *(Imurwa*) and clans (*Olgilala*) which cut across the territorial sections. The Loita Maasai sub-tribe has five clans *Ilukumai, Ilaiser, Ilmolelian, Iltaarosero* and *Ilmokesen*. Each clan belongs to either the black (*Orokkiteng)* or the red (*Odomongi)* moiety, and each clan has its own leaders (Zaal and Morgan 2006). The political system and authority traditionally lies with the council of elders and age-group spokesmen, and the spiritual leader (*Oloiboni*) has authority over the sub-tribe's cultural and religious matters. Age-group leaders are selected at boyhood and hold this position permanently; by virtue of their positions, they are caretakers of the forest and perform cultural ceremonies (Maundu et al. 2001; Zaal and Morgan 2006). Women and girls pass through rites of passage parallel to those of boys as they graduate from childhood to adulthood during initiation; however, women do not have age-groups and join their husband's age-group once married.

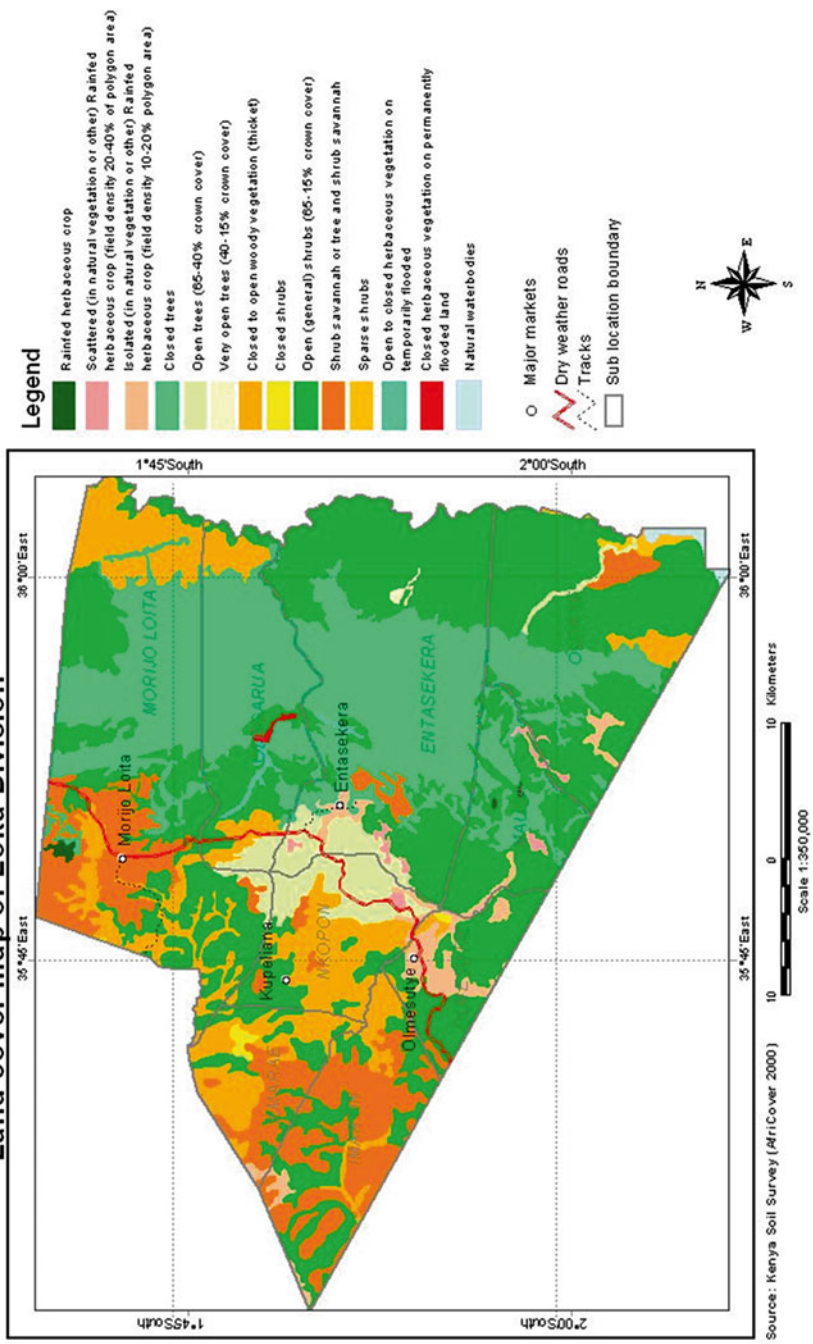

Fig. 6.2 Map showing vegetation types in Loita Division

Current Use and Management of Loita Forest

The Loita Forest (Entim naimina e nkiyio) Biodiversity

A Loita Maasai legend has it that a girl child (Entito) was herding her father's calves and took them to the forest edge. While herding, she went into the forest and got lost; the calves returned alone in the evening. Maasai warriors (*Morans*) were sent to look for the girl; they searched the forest calling her name with no success (LNECT 1994). Loita forest is an upland indigenous dry forest in which three broad categories of plant communities can be identified: Afromontane dry conifer forest dominated by *Juniperus procera;* mid-upland semi-deciduous forest; and mixed species low upland forest dominated by *Podocarpus latifolias, Olea capensis, J. procera, Zanthoxylum usambarense, Diospyros abyssinica*, *Teclea nobilis* and *Warburgia ugandensis* (Legilisho-Kiyiapi 1999). The forest hosts threatened plants species *Prunus africana*, listed in CITES Appendix II since 16 February 1995, and also *Osyris lanceolata*, a species banned from harvesting in Kenya because of threats posed by international trade (RoK 2007c) and listed in CITES Appendix II in March 2013 (CoP 16: Prop 69, 2013).

Loita forest (see Fig. 6.3) supports large mammals such as African elephants and Cape buffalos. It is rich in primates including baboons, Vervet monkeys, Colobus monkeys and Sykes (Legilisho-Kiyiapi 1999). It is also rich in bird life. It is an important site for conservation of species such as grey-headed shrikes and Hunter's

Fig. 6.3 Photograph: Section of Loita forest (Photo credit: P. Kariuki)

cisticolas and is home to threatened species such as the lesser kestrel, white-headed vulture and crowned eagle, and to endanger species such as the martial eagle and the lammergeier (Legilisho-Kiyiapi 1999). The grasslands are home to ungulates like wildebeest, impalas and gazelles. It is a critical refuge area for wildlife from Maasai Mara Game Reserve and Ngorongoro Conservation Area. This forest is a main water catchment for the region; permanent rivers originating from the forest include Kanunka River draining towards Ewaso Nyiro, and Olkejo Arus, Olpusare and Enkare Nanyoike streams flow southwards towards Lake Natron. Despite its biodiversity and ecological importance, Loita forest is experiencing pressure from timber logging and human settlements within the forest: a situation attributed to changing lifestyles and development resulting in changing forest structure and species composition (Karanja et al. 2002; Ongugo et al. 2011).

Use and Management of Loita Forest

To examine the importance of the different habitats (forest, grassland and bush land habitats) to the local community, focus group discussions were conducted to identify and list the 10 most important uses of these habitats by Loitans and then rank the importance of each habitat for the 10 listed uses. The ranking was done using the proportional piling method during a workshop at Entasekera in February 2013. The ranking exercise was carried out by men and women separately. The results are briefly presented and discussed in this section (Table 6.1). For the Loita Maasai, this forest is a cultural and ceremonial site, a grazing area, and a source of water and of timber and non-timber forest products.

Women ranked source of water, dry season grazing and source of medicine as the three most important uses, whereas men ranked source of water, construction mate-

Table 6.1 Community ranking of the importance of the forest habitat for various uses in Loita Division

Forest use	Ranking by men	Ranking by women	Combined rank
Water (rainfall and rivers)	1	1	1
Construction wood	2	4	2
Dry season grazing	4	2	3
Medicinal plants	5	3	4
Food	3	6	5
Wood fuel	8	5	6
Wildlife habitat/tourism	5	8	7
Normal grazing	10	6	8
Cultural/religious activities	8	9	9
Aesthetic/environment	7	10	10

Note: Rank 1 equals most important and 10 least important
Source: Fieldwork 2013

rial and food as their first three priority uses. This discrepancy can be explained by the fact that, whereas men can graze livestock inside the forest throughout the year, women – because of distance from their homesteads, their other domestic chores and fear of wild animals – rarely graze livestock there except during the dry seasons, when they have no option but to do so. Men's ranking of construction wood as the second most important function indicates the importance they attach to the forest as a source of timber and building poles, as they are involved in logging activities and building cattle enclosures and modern semi-permanent and permanent houses. They spend more time in the forest and harvest wild food fruits and honey during warriorhood, meat camps and while grazing livestock; hence, they ranked the forest habitat as a source of food as number three. Women are in charge of primary healthcare and value the forest as a source of medicinal plants in third position, whereas men ranked this as number five. In the combined ranking for men and women, water, construction material and dry season grazing were the first three most important uses of the forest habitat for the Loita community.

Pastoralism is the main livelihood base for all households, and grazing during the dry season is the major use of Loita forest for over 75 % of the community livestock. It explains why the community fights any attempts to demarcate a forest boundary, convert it to a nature reserve or privatize any section, as such action would hinder or limit access to their treasured grazing areas (Obare 2003). Use of traditional medicine is popular among Loitans for preventative and curative purposes as the preferred form of healthcare. Herbal medicine is the local people's first option before visiting a health centre. Medicinal plants such as *Todallia asiatica*, *Warburgia ugandensis* and *Z. usambarense* – commonly used by the community and now scarce in bush lands – are mainly obtained from the forest.

Over 99 % of households in Loita Division use wood fuel energy (charcoal and firewood) for cooking: firewood collection is a responsibility of women and girls. *Olea europaea* ssp *africana* is the most preferred species for firewood because it is multipurpose, i.e. it does not produce smoke even when wet, has a good aroma to obscure foul smells from the calf pen (inside the traditional hut) and is important as a source of light in a Maasai hut at night, besides its main use as firewood. Due to high demand, *O. europaea* spp *africana* is now scarce. It is destructively harvested to the extent that stumps are uprooted or split, especially around homesteads in areas in Ilkerin and Olmesutie (Maundu et al. 2001), located about 15–20 km from Entasekera shopping centre situated at the proposed forest edge. In Loita, charcoal production is mainly a by-product of land clearing for cultivation. Charcoal making is undertaken mainly by migrant workers – employed as farm labourers – to supplement their income as they open up bush lands and forested areas for cultivation. Charcoal is sold in market centres within Loita as export of charcoal from the division is prohibited and monitored through environmental committees. Charcoal making is more prevalent on the northern side of Loita because of easier and faster access to Narosura market and Narok town, a major market and transit point for most charcoal produced in Narok. Charcoal making and sale has been reported in other divisions in Narok as a by-product of bush clearing for cultivation and as an adaptation to climate change to which people resort in times of drought and famine (Ballis 2005).

The forest is also an important source of wild food plants and wild honey. The fruits *Carissa spinarum, Rhus natalensis* and *Pappea capensis* are popularly consumed as wild fruits. Honey harvesters roam the forest in search of honey from wild bees. In the Maasai community, honey harvesting and trade are regarded as a culture of the *Ilarutok* of *Iltorobo* origin (Were and Olenja 1986). Honey is very important in Maasai culture for household use, administering herbs and as part of dowry negotiations. Furthermore, it is one of the essential ingredients for making the traditional brew (*enaisho*) used during ceremonies.

With modernity, the housing model is gradually changing from the Maasai traditional hut to semi-permanent/permanent houses. There is, therefore, a tendency to utilize more hardwood timber, unlike the small diameter shrubs and saplings (withies and fitos) used to construct the traditional Maasai hut; this has increased demand for timber within Loita. Timber harvested is used locally for construction of public social amenities such as schools, modern permanent houses and cattle *bomas*. Preferred species targeted for timber and fencing posts are *Juniperus procera* and *Podocarpus falcutas*, mostly harvested from Loita forest.

The Loita community relationship with the forest is based not solely on extractive use, but also on cultural and spiritual values: inside and surrounding Loita forest there many cultural and sacred sites such as *Oltukai, Oloitoktok, Oltiyani* and *Emugurr olkine.* The Loita Maasai culture is characterized by a living rich heritage demonstrated by cycles of ceremonies as one goes through various stages in life. Major cultural ceremonies include: *Olkipoket* (naming); *Enkipaata oolayiok* (formation of an age-group which happens during boyhood before circumcision); *Nkorrenkel* (a rare ceremony held twice – 1974 and 2006 – in the last 50 years, which involves preparation of a junior age-group by a senior age-group); *Emurata* (circumcision); *Eunoto* (warriors' graduation ceremony into junior elders) (see also Box 6.1); *Eokoto e kule* (warriors can eat alone)*; Enkang oo Nkiri*

Box 6.1: Cultural/Ceremonial Use of Loita Forest: The Case of the Oltukai Shrine

The Oltukai (*Phoenix reclinata*) shrine enclave, located along the river Alkeju arus in Olmesutie sub-location, is a very important site for the community, used mainly for prayers. The site is revered by the community, as it is associated with the deity (Engai). It is located in a wetland below the Olmesutie manyatta where prayers and sacrifices are offered. The site is surrounded by *P. reclinata* bushes. Burning, cutting or collecting of firewood is strictly prohibited in and around this site. If by accident this site is desecrated, or in times of severe drought or epidemics, a cleansing ceremony must be performed by chosen elders and cultural leaders led by the *Oloiboni*. The cleansing ceremony involves sacrificing a sacred sheep under a *Ficus* tree and pouring a mixture of milk, beer and blood as a libation to appease the gods and the ancestors. The site is used during community ceremonies like the warriors' graduation ceremony to become junior elders (*Eunoto)*.

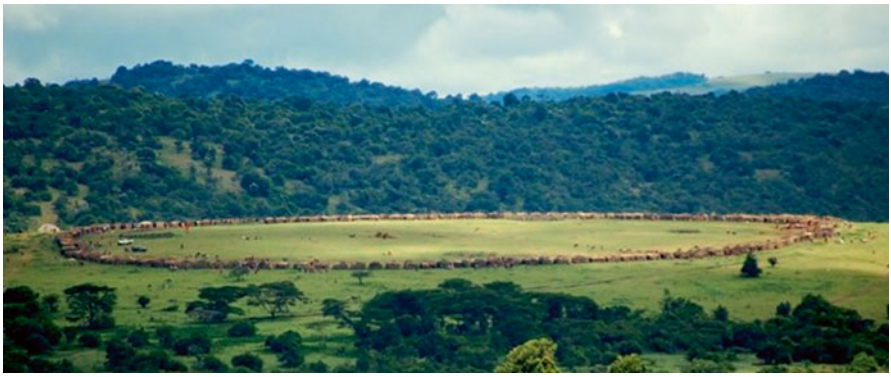

Fig. 6.4 Photograph: Emanyatta oo Lorikan (April 2010) (Photo credit: H. Saitabau)

(breaking food taboos by junior elders); and *Manyatta oolorikan* (graduating to a senior elder) See Fig. 6.4. An age-group goes through these ceremonies to create a new age-set (generation).

Women have one major cultural ceremony: *Olamal loo nkituak* (a fertility ceremony). During the ceremony, women go through an arc formed by a stem of a huge *Ficus thonningii* (*oreteti*) in the forest. Thereafter, they proceed to a selected village where two elders sprinkle on them milk and beer using leaves of *Phoenix reclinata* (*Oltukai*) (see also Box 6.1) as they enter a *boma*. The women wear *Periploca lenearifolia* (*Osinantei*) leaves on their necks as a symbol of fertility.

These ceremonies play a significant role in providing a platform for enhancing harmonious interaction of local culture and biological resources. At the same time, they represent an intergenerational transmission of indigenous knowledge. Important species such as *O. europaea* ssp *africana, Rhus natalensis, Ficus thonningii* and *Euclea divinorium* used during the ceremonies are collected from certain sites in the forest as directed by Oloiboni, necessitating its conservation. This intimate relationship between Loita Maasai culture and the environment bonds them with nature and the forest, thus ensuring preservation of their culture and conservation of biodiversity for future generations.

Loita forest acts as a water catchment, and its value as a source of water exceeds all other individual uses as perceived by the community (see Table 6.1). This underscores the Loita community's value of the forest habitat as a source of water, with rivers, streams and swamps emanating from this forest supplying water to the whole division. Loita Division is endowed with a variety of landscapes, picnic sites and wildlife ideal for tourism investment. The forest block has the highest elevation from where one can view large areas in and outside the division: a scenic view attractive for ecotourism. There is no tarmac road in the whole division; it is served by limited dry weather roads connecting Morijo, Entasekera Ilkerin, Olemesitye and Olorte market centres. Ecotourism ventures currently undertaken include camping tours, donkey riding and trekking safaris through Loita forest and Nguruman escarpment to Magadi in Kajiado.

The Loita's Struggle

State (Focusing on Legal Status)

In Loita Division, land has been under customary tenure and is designated as Trust Land under Narok County Council; this land has never been demarcated. Traditionally, Loita forest has been protected by the *Nkindongi* clan, from which the Oloibon hails (see Fig. 6.5), supported by the council of elders and warriors who patrol and guard the forest against destruction by outsiders.

Domestic use of the forest by adjacent communities, such as firewood collection, is not controlled but guided by the inherent ethic of the Loitans on conservation. In the 1990s however, environmental committees were established in six sub-centres to control illegal harvesting and to authorize extraction of products from the forest such as timber for local use in development projects within Loita, for example, the construction of schools and health centres. The traditional forest management institutions and environmental committees have not, however, been able to block competing internal and external interests and pressure, as evidenced by current permanent settlement and cultivation inside the forest, which has increased over the last 30 years, and the court case between the Loita community and Narok County Council that started in 1993.

Fig. 6.5 Photograph: The Oloibon Mokompo ole Simel (1986 to date) and his son (heir) (Photo Credit P. Kariuki)

The Case between Narok County Council and the Loita Community over Loita Forest

With formal authority derived from the Trust Land Act Cap 288 of 1962 (revised in 1970), in the early 1990s, Narok County Council (NCC) officials planned to gazette Loita forest as a nature reserve without obtaining prior informed consent from the community. This was meant to increase tourist revenues and reduce pressure, especially in Maasai Mara Game Reserve (Voshaar 1998). This, however, presented a challenge: first, because the consent of the local community in Loita was needed, and, secondly, because land in Loita Division has not been adjudicated and there was no marked forest boundary or registered title. When the Loitans learnt of the NCC's plans, they opposed the idea, and there were disagreements between the Loita Council of Elders (LCoE) and the NCC. There was also polarization within Loita between those for and against the proposal to convert Loita forest into a nature reserve. Those against the proposal included the LCoE supported by the Ilkerin Loita Integrated Development Programme (ILIDP). To strengthen their defence against the county council, they established a legal entity – the Loita Naimina Enkiyio Conservation Trust (LNECT). At the same time, another group, Loita Concerned Citizens (LCC) – a smaller grouping – supported the NCC's proposal. Hence, its stance was in opposition to the LCoE. In their opinion, the NCC would have better technical and managerial skills to manage Loita forest and to come up with equitable benefit-sharing procedures.

As the court case was going on, the ILIDP participated in forums of the conference of indigenous peoples in Vienna (1993) where they lobbied concerning rights of indigenous people to own and manage their forest resources. The national and international support that they gained as a result of the publicity during these forums and in local and international media strengthened their resolve to hold and defend Loita forest against alienation. Thereafter, the Loita Ethnobotany project was established (1995) to document traditional forest use and to legitimize participatory traditional conservation practices. At national level, just before the 1997 national elections, Loita Division – previously one ward – was subdivided into five wards, allowing adequate representation at the NCC. One of the five councillors elected from Loita Division to the NCC, who initially was against the establishment of the nature reserve, fortunately became the NCC chairman. Political changes, local opposition and international lobbying and support for the community made the case lose momentum. It was delayed and became expensive and, as a result, the local community representatives (ILIDP and the LCoE) opted to have the case settled out of court.

Internal Conflicts on Use and Management of Forest Resources

Internal conflicts in Loita relate to ownership, control and use of Loita forest, resources and the politics therein by people within Loita Division, their interests and those of their neighbours and partners, as well as the neighbouring Purko

Maasai sub-tribe. As already mentioned, Loita forest has been traditionally protected by the Nkindongi clan; as the cultural and spiritual custodians of Loita forest, they claim to protect and own this forest, even preventing settlement of non-clan members in their neighbourhood. As discussed in the section on the uses of the forest, Loita forest has many sacred and cultural sites such as *Oltiyani*, *Oloitoktok* and *Oltukai* for the various Maasai ceremonies. Hence, this claim by the Nkindongi clan is true, and they are the spiritual leaders and custodians of culture. This is supported by the fact that Loita forest has been conserved better than other Maasai forests such as Maasai Mau and Mau Narok. These forests, managed by the Forest Department (state organization), were degraded through logging and encroachment before the year 2000, when logging was banned and forest squatters were evicted. Other, coincidental happenings support their claims. For example, during the court case between the Loita community and the NCC, the Nkindongi powers (spiritual) caused confusion in the court case, making it end with no clear resolution (Saitoti Ole Melonye, July 2012, personal Communication). The Nkindongi claim to have protected the forest culturally from alienation using charms buried within the forest. This, however, contradicts the situation observed on the ground, as permanent settlements have been erected on glades inside the forest for over 25 years by members of the Loita community. These households have gradually settled inside the forest, beginning with an initial temporary cattle enclosure (*boma*) during the dry season, then a temporary homestead (*Enkang*) and then permanent residences inside the forest. To further complicate matters, social amenities such as primary schools have been established, for example Empurputia Primary School located about 8 km from an earlier proposed forest boundary at Entasekera shopping centre (Legilisho-Kiyiapi 1999).

This development indicates the Loitan community's change from a semi-nomadic to a sedentary way of life. Settlement in forest glades contradicts traditional range resource use in Loita, whereby pastures inside the forest were meant to be used only during the dry season. This permanent settlement is a likely source of conflict for the Loita community as it reduces grazing resources available during dry the season to families living in the Loita plains. It is not clear why settlement was allowed inside the forest initially. However, the period of settlement coincides with the time that the NCC initially proposed to convert the forest into a nature reserve. Hence, if the community had lost the case to the NCC, the forest boundary would have had to be moved deeper inside the forest. Thus, the settlement inside the forest appears to be a silent protest by community members to stamp ownership by occupation. Tourist campsites have been established inside the forest by non-Loita community investors in partnership with some Loita families. Ecotourism is a forest use that allows a few individuals to benefit from the commons through non-traditional uses of this forest. With a density of about 14 people per square kilometre in Loita currently (RoK 2009b), land is relatively abundant and there is no limitation on where one settles, but gradually there may be a scramble for forest as more people opt for this non-traditional use (RoK 2010).

A few members of the Purko community reside within the boundaries of Loita Division; the rest of them live on the northwest and northern boundaries of Loita

Division and forest. During the case between the Loita community and the NCC, the Purko Maasai sub-tribe, who are numerically more than the Loitans, wanted to be enjoined in the case as stakeholders because, as Loita forest neighbours, they also claimed to protect and use it. According to the Loita community, this forest belongs to them solely, but, traditionally, neighbouring Maasai sub-tribes – even from Tanzania – can on request be allowed to use the forest during extreme drought and for certain cultural and religious ceremonies. This is a possible source of conflict because, under the traditional system, good neighbourliness was encouraged, but this does not imply ownership in a statutory sense.

Discussion and Conclusions

Discussion

The Kenyan drylands' potential to support wildlife, ranching, irrigated farming and mining has since the colonial period made them a target for competition among local, national and external interests. Nationally, these areas are prioritized for the development and expansion of irrigated agriculture, wildlife conservation and tourism by the government without due consultation and consideration of local communities living in these lands. Kenya's Vision 2030, under its economic pillar, seeks to develop and grow Kenya into a middle-income country (RoK 2007a: vii). This vision is being implemented through other government policy documents such as the arid and semi-arid lands (ASAL) policy (2012) and Vision 2030 Development Strategy for Northern Kenya and other Arid Lands (RoK 2012). Communal land excisions and increasing agricultural production in drylands previously inhabited by nomadic pastoralists who are encouraged to settle result in undermining local livelihoods as well as the resilience of land under traditional resource management systems and their institutions. Sedentarization reduces pastoralists' mobility and has at times invalidated traditional conservation approaches, including conservation of community forests as dry season grazing pastures. These community forests are endowed with endemic, rare and threatened species, for example the Mijikenda community's Kaya forests along the Kenyan coast, gazetted as national monuments and recognized as world heritage sites and hot spots for biodiversity conservation (Nyamweru et al. 2008). Forest legislation has been criticized for failing to protect the country's indigenous forests or to ensure sustainable use of plants and other resources of the forests and woodlands, whereas traditional management has been successful, for instance the conservation of Mijikenda Kaya and Loita forests (Nyamweru et al. 2008; Mutta et al. 2009; Ongugo et al. 2011).

Land tenure policies have shifted the control of land from the community to individuals under freehold arrangements. In the drylands, traditional institutions were able to accommodate multiple resource use by different categories of users and with different bundles of rights, such as access, occupancy and/or disposal (North 1990). There was also fluidity in rights enabling all members of the community to

access resources, especially the poor. As reported elsewhere, the disintegration of traditional management systems in pastoral areas has created a population of landless pastoralists who are vulnerable as resource users, concentrating power and wealth amongst a few, resulting in tenure insecurity and conflict over resource use (Rutten 2008). These changes in land tenure have led to the emergence of several land use systems and are a source of conflict between various users and competing interests in land and resources therein. Elsewhere where land has been privatized, in terms of gender perspectives, land privatization has increased men's control of land as the sole registered titleholders, further exacerbating the gender issue because women under communal ownership had use rights but, once land is privatized, it is wholly owned by men, and land becomes commoditized (Wangui 2008).

Loita Division is mainly inhabited by the conservative Loita Maasai sub-tribe whose bonds are enhanced by cultural activities during which community members share and transmit tacit and implicit knowledge. Traditionally, there are rules and regulations to control the use of various resources. This knowledge restrains people's behaviour: 'people obey rules and regulations not because of the sanctions involved but also because legal systems have the force of moral legitimacy and moral support of others,' according to Hodgson (2006: 5). Changing lifestyles and attitudes in Loita, such as the LCC during the Loita forest case, further undermine the authority of traditional institutions, especially amongst the elite class whose value systems may have changed or been diluted by religion and formal education. Furthermore, traditional institutions, rules and regulations are in constant transition; the Loita case demonstrates that traditional institutions are not static but evolve to reflect demands for inclusion by diverse groups. A good example is the LCoE, whose composition was changed to include government-appointed chiefs and which co-opted community members with technical skills to address modern challenges (the legal tussle between the Loita community and the NCC). There is need, however, for representation of all groups in the management of the forest. Despite the change in the LCoE's composition, it has not effectively allowed direct representation of women during council meetings. For holistic and sustainable management of land and other natural resources in the ASALs in Kenya, there must be 'respect for the authority of customary systems of natural resources management that promote sound environmental practices and enforce their decisions' (RoK 2009a, 2012: 21). Neglect of customary institutions may weaken them, and, according to Hodgson (2006: 3), the powers of these institutions may lapse and institutional dispositions may fade if they are not exercised with sufficient frequency, as institutions can only be observed through behaviour. New lifestyles and beliefs could also have changed the community's perception and interests in the forest. In the NCC case, the community was divided, with the ILDP, the LCoE and the LNECT being against the elected councillor and the LCC in support of the NCC proposal. A similar case of disagreement between community members is reported in Ngong area where a programme of land consolidation to enable division of the area into individual ranches was set up in 1961. This decision was opposed by the elders but favoured by the young educated Kaputei and backed by Kajiado County Council (Rutten 2008). The young influential politicians supported the privatization and tried to reduce the

social-economic dominance exerted by community elders (Rutten 2008). The exercise of authority by government, without due regard for existing institutions, over resources previously managed under traditional systems creates confusion. In the Loita case, this may explain the perceived ad hoc settlement and logging observed in the forest.

Dryland forests were held in trust by county councils. The New Forest Act 2005 (RoK 2005) created local authority forests under article 24(1), which provides for their sustainable management to provide goods and services and thereby support local communities' livelihoods. Under the earlier act, these forests were wholly under the county councils and Forest Department (now Kenya Forest Service) and would provide technical assistance when called upon; it is not clear how Loita forest will be affected by the new policy. Traditional forest management, where practiced, has sometimes proved to be more effective, such as in the case of Kaya forests at the coast, where, when other seemingly better conservation strategies were introduced by government, the biodiversity and size of these areas reduced as the community began to clear forests (Mutta et al. 2009).

According to the millennium ecosystems assessment (MEA 2005), people obtain benefits from ecosystems, which include provisioning, regulating, cultural and supporting services. Ecosystems services influence human wellbeing, which has multiple constituents including the basic requirements for a good life such as food, clothing, shelter, health, good social relations, security and freedom of choice (MEA 2005). According to a World Bank report (World Bank 2007), in Kenya, forests account for 1 % of the monetary economy and 13 % of the non-monetary economy; however, forests are faced with threats manifested through the increase in illegal activities such as charcoal making, logging, harvesting of non-timber forest products and excisions (Mathu 2007). Uncontrolled harvesting precipitated the 1986 presidential ban on felling indigenous tree species, preventing any form of exploitative management of indigenous trees in forest reserves. The situation continued to deteriorate, and in 1999 a ban on felling timber in all government forests including plantations was declared by the president (Mathu 2007). The exploitation of Loita forest has been relatively well controlled for traditional uses. In Loita however, the emergence of new forest uses such as tourism and commercial harvesting of timber from which individuals solely derive benefits will require new rules not envisaged in the traditional system.

The traditional use of wild plants as food and medicine at household level as well as for sale has been reported as an adaptation strategy for local communities as a stop-gap measure during famine periods or extreme drought (Siri and Katrina 2011). The practice of preventive as opposed to curative healthcare is common in East Africa (Hamilton 2004); in the Maasai community, it is common practice to routinely use certain plant species in soup for various age-groups and genders (Maundu et al. 2001); and for children, medicinal plants are used together with milk (Parker et al. 2007). Care and selective harvesting of plant parts has always been practiced; however, there is an increase in demand for plant species which are over-harvested for the market (Legilisho-Kiyiapi 1999; Musyoka 1999). During the rampant illegal harvesting and trade in *Osyris lanceolata* for export from around 2005 to 2007, it

was reported that poachers came to harvest this species in Loita. Hamilton (2004) observed that plant species with a commercial value are more likely to be depleted when sourced in the wild compared to those species that have only subsistence use. The high valuation placed on Loita forest by the community for water and dry season grazing and the court case between Loita community and the NCC reflect a protest against appropriation by the government of resources that directly affect the community's livelihood base, pastoralism. To the Maasai, water availability – not land – with sufficient supplies of pastures is the binding constraint for pastoralism; and, without dry season areas with sufficient water, other range land is essentially useless (Blewett 1995). Land is seen as an ecosystem comprising various habitats, and, traditionally, maximum use of the commons was ensured through control of dry season grazing areas. This also explains the rejection by the community of the proposal to set a forest boundary (Legilisho-Kiyiapi 1999). Drawing a forest boundary creates enclosures and a construed scarcity that would negatively affect the use of forest resources (Obare 2003).

The experience of the Loita Maasai demonstrates the vulnerability of indigenous communities to exploitation through misuse of government policy when legal ownership and management is unclear. This happens when traditional institutions involved in resource management are undermined, thereby creating uncertainty in access, exploitation and control of resources such as Loita forest (RoK 2009a). This uncertainty makes the forest prone to political misappropriation and further demonstrates that adequate political representation of indigenous communities can influence policies and decisions affecting people and their resources. Political representation, however, is not static; the five Loita wards created before 1997 were once again merged into one ward in 2012, lowering their veto power at the Narok County Assembly – hence the need to have clear policies and laws protecting resources owned by indigenous communities or in communal ownership under dynamic political regimes.

Conclusion

This chapter has described the tenure, livelihoods and challenges affecting the management of Loita forest. It has shown that traditional resource management systems have been effective in conserving this forest and meeting local community needs. This confirms that indigenous local communities have a deep understanding of the ecosystems that they inhabit and have adapted to them by having dynamic management systems, such as semi-nomadic pastoralism and a communal land tenure system, for survival. However, unclear tenure, inadequate political representation and disregard of traditional institutions are gradually weakening their effectiveness at local level, as they are not adequately supported by statutory government policy. Modern lifestyles and community members' changing value systems have further aggravated the situation, with more capitalistic tendencies supported by statutory policies continuing to affect local communities with land and forest resources under

communal ownership. Consequently, the current management systems are bound to change, albeit gradually. Loita forest is an important resource for the community and an integral part of community members' livelihood, culture and ecosystem with which they have lived for generations. Internal and external interests are challenging traditional systems of forest management, and hence there is need to strike a balance between satisfying the needs of a growing population, changing attitudes and value systems, and wise use of this forest resource for posterity.

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Chapter 7
Savannah Forest Beekeepers in Cameroon: Actions to Reduce Vulnerability

Verina Ingram

Abstract The savannah forests in Adamaoua, Cameroon, are home to traditional, forest-based beekeepers, subsistence farmers and pastoralists. This sparsely populated region is economically marginal and little developed, with lower than national average incomes. Forest apiculture is important here: honey, beeswax and propolis contribute on average to 68 % of household income and have high food, medicinal and cultural value. Bees are also critical pollinators of crops and trees. Practised by 48 % of the population in Djerem Division, apiculture is a route out of poverty only for a few larger-scale beekeepers, but provides a safety net and income diversification for the majority of the 12,000 beekeepers in the region. This savannah ecosystem has been historically subject to climatic changes. Unusual and increasing climatic variations add to human and forest vulnerability by affecting flowering seasons, pests and apiculture production. Land tenure is traditionally regulated, and the government, the formal landowner of public domain forest, is practically non-existent. Increasing apiculture product commercialization, mineral finds, dams and growing migration are transforming local perceptions of forest and land tenure and adding to already insecure livelihoods. The results of research (2004–2010) on how these beekeepers use the forest, their vulnerabilities and responses indicate that individual and group solutions are being bricolaged to secure livelihoods, adapt and mitigate changes. This includes formalization, collective action, product value-adding, tentative customary tenure changes and innovative new chain and market arrangements. Apiculture professionalization and product diversification are increasing the value of forest beekeeping and of revenues for men and women.

Keywords Vulnerability • Forest-based beekeepers • Cameroon • Ethnic groups • Livelihoods

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Introduction: Forests, Climate and Beekeepers in Adamaoua

The Sudano-Zambezian savannah forests cover a broad swathe of the Congo Basin in central Africa (Fig. 7.1). These include the savannah forests of the Adamaoua region in Cameroon, which are centrally situated within this east–west phytogeographical region. This is one of the most northern African savannahs, forming a narrow transition zone and abrupt habitat discontinuity between the Congolian lowland rainforests and the Sudanian/Sahelian grasslands. The

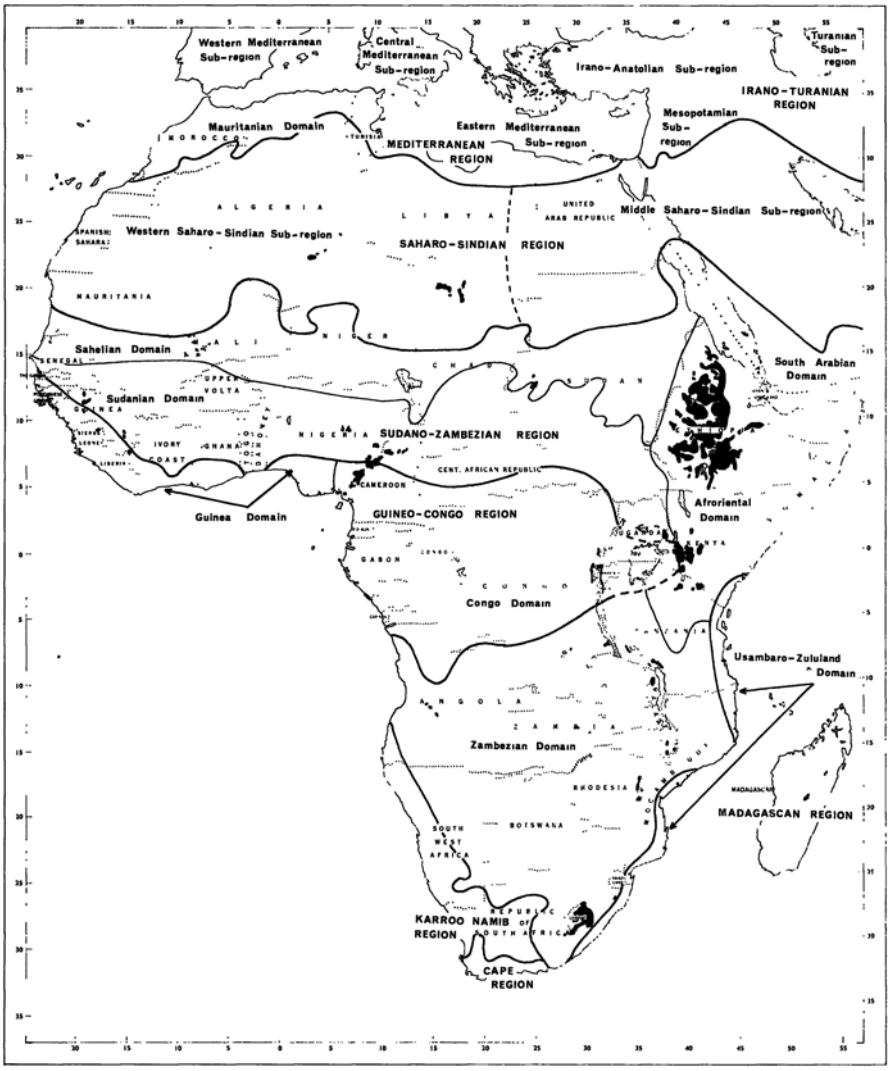

Fig. 7.1 Phytogeographical regions of Africa (Source: Brenan 1978)

forest-grassland-riverine-pasture mosaics have high species richness because of their diverse habitat complexes (World Wildlife Fund and Saundy 2008), with riverine gallery forests crossing the landscape and providing corridors for lowland species far into the northern grasslands. The savannah forest is dominated by *kea* (*Daniella oliveri*) and *kofia* (*Lophira lanceolata*) trees (Letouzey 1968), both noted melliferous species (Fohou et al. 2010). Other common plant species include *Hymenocardia acida*, *Piliostigma* spp., *Crossopteryx febrifuga, Combretum molle, Terminalia* spp. and *Trichilia emetica* (Ibrahima et al. 2007; Mitchard et al. 2009). The vegetation cover is strongly influenced by the climate. Adamaoua has a single wet season and a single dry season, with forested areas exhibiting high dry season relative humidity and mean annual precipitation of 1650 m per year (Mitchard et al. 2009). Small seasonal temperature fluctuations occur, with rainy season mean daily maximum temperatures of 31–34 °C and dry season mean daily minimum temperatures of 13–18 °C. The plethora of soil types on this undulating plateau helps explain the abrupt shift from rainforest to open grassland. The transition is enhanced by fires – which have been increasing over the last 50,000 years – and by increased human-induced land clearings over the last 3000 years. Both have reduced tree densities and created wooded grasslands (Favier et al. 2004; World Wildlife Fund and Saundy 2008). Dramatic climatic fluctuations over the last 5000 years and a drying climate over the past three decades (UNDP/ARPEN 2006; Yengoh et al. 2011) have created the current mosaic landscape of forest and grasslands. Plant–soil interactions reflect this history. Soil fertility is currently declining as a result of slash-and-burn agriculture, over-grazing by livestock, human-induced bushfires, and deforestation for fuelwood and to clear land for farming and habitation, particularly around the major population centres of Ngaoundéré, Tibati and Ngaoundal, worsening the fertility of nutrient-poor oxisols (UNDP/ARPEN 2006; Bouba et al. 2012). This type of tropical deciduous forest is one of the most optimum areas in the world for honey production (Gentry 1982). The richness of melliferous trees combined with the long dry season allows bees (*Apis mellifera adansoni*) to build up strong colonies, taking advantage of maximum nectar flows. The dry, sunny period after the rainy season enables good nectar flows and provides good foraging weather.

Within Cameroon, a lower-middle income country (UNDP 2009), Adamaoua is a predominately rural region where just under 40 % of the population live in small, urban areas. It is the second poorest region in the country, with 62 % of the rural population living in poverty in 2007 and 90 % having no formal employment (National Institute of Statistics 2010a; Republic of Cameroon 2011). The region is sparsely inhabited by mainly subsistence farmers and pastoralists. Although it still has a low population density of 13.9 per km^2, the total population has increased by 35 % since 1976 (National Institute of Statistics 2010b). Semi-extensive, small-scale agriculture is predominantly rain-fed and occurs around settlements, with nomadic cattle herding occurring extensively around and between settlements, although this has decreased significantly in the past 30 years (Boutrais 2000; Mitchard et al. 2009). The socioeconomic situation for people in the region is thus characterized by poverty, remoteness and a reliance on natural resources as the mainstay for subsistence-based livelihoods. These social and environmental factors

have led to a long tradition of traditional, forest-based beekeeping (Burnham 1975; Crane 1999). This is the principal production zone for apiculture products[1] in Cameroon, stretching from Banyo to Mieganga and up to Ngaoundéré, covering an area of around 14,000 km^2 centring on Ngaoundal in Djerem Division. Over 3.3 million litres of honey are produced annually in Adamaoua, valued at around 2 billion Central African Francs (FCFA) (Ingram and Njikeu 2011). Of the 8639 beekeepers who are members of beekeeping groups in Cameroon, 25 % are based in the region (Ingram 2009). At least another 10,176 beekeepers are active in the region, around 59 % of the total estimated number of beekeepers in Cameroon (Ingram 2014).

There is an intricate relationship between climate, environment and the livelihoods of those concerned with beekeeping. Generating apiculture products depends not only on the climate, seasonal variations and vegetation, but also on the knowledge and skills of beekeepers (Leven et al. 2005). The dependence of the local communities on the forest for subsistence, agriculture and harvesting of non-timber forest products (NTFPs), including honey, means that an understanding of these relationships and vulnerabilities is critical in developing strategies to adapt to, or mitigate, climatic change. These connections are the subject of this chapter, which looks at how beekeepers use and perceive the forest, their vulnerabilities and pressures, and the individual and collective solutions used to secure their livelihoods. With its focus on forest-based apiculture products, this study thus contributes to knowledge on the NTFP sector, one of four forest sectors which have been prioritized as vulnerable to climate change in the Congo Basin (Sonwa et al. 2011). Although the vulnerabilities and livelihood strategies of forest-dependent ethnic groups such as Bantus and Pygmies in the humid forest zone of southern Cameroon have been examined (Cummings 2004), the perspective of the Gbaya and Fulani ethnic groups, and a focus on the savannah forest ecoregion and on its vulnerability to climate change, are both under-represented in the literature to date.

Methods

Three methods of data collection and analysis were used. Primary data were collected between 2004 and 2010, using interviews conducted with 375 beekeeper families and 40 apiculture product processors and traders located in 10 villages around Ngaoundal, Adamaoua (see Fig. 7.2). The interviewees were selected randomly and on the basis of their availability and willingness to be interviewed. Guided by questionnaires, the semi-structured interviews solicited qualitative and quantitative information on respondents' characteristics, household and beekeeping activities (volumes, incomes and expenses related to apiculture product use and trade, their social and cultural uses; perceptions on climate and changes; the forest

[1] Apiculture products include hive products (honey, beeswax and propolis) and hive by-products such as wine, soaps, candles, medicines and cosmetics based on hive products.

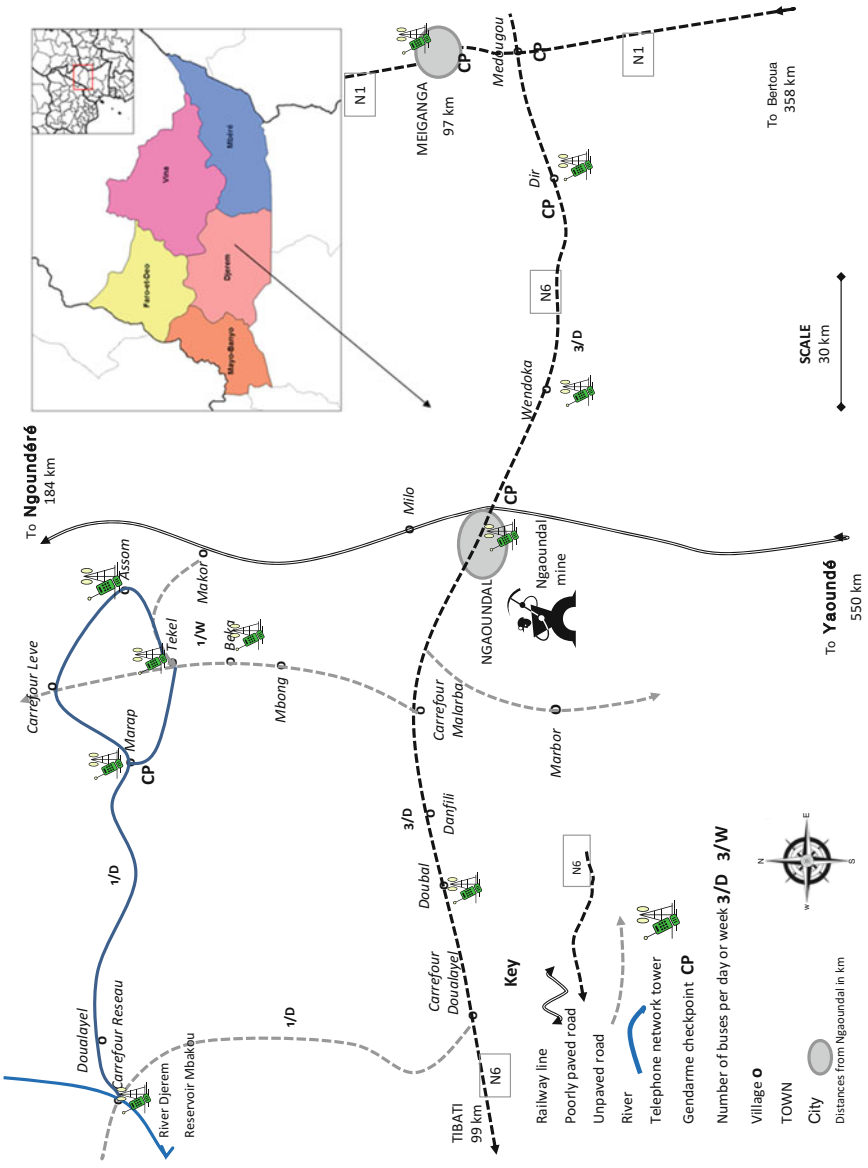

Fig. 7.2 Map of research areas, Ngaoundal, Cameroon

environment and its governance). During the same period, participatory research activities were conducted with a processing and trading company, Guiding Hope, with problem analyses and strategic development sessions conducted in 2005, 2008 and 2009. Beekeepers and companies were observed annually during harvesting, processing, plant nursery tending, tree-planting and group meetings. During the period, discussions with beekeepers, traders, companies, government and support organizations were held at workshops. Six major honey markets in Cameroon were visited (Yaoundé, Douala, Ngoundéré, Bamenda, Limbe and Bafoussam). Market prices for apiculture products were tracked annually over the study period. Climate data from the National Meteorological Service were analysed and compared to past data and predictions of climate change. Data on beekeeping-related incomes, expenses, uses and volumes were analysed, and descriptive frequencies and statistics calculated in Excel and SPSS Statistics v17. Secondary data were gathered on climate and beekeeping to verify and triangulate the primary data and enable a comparison of incomes, activities and climate vulnerabilities. Preliminary research findings (Ingram 2009; Ingram and Mala 2010) were presented to, and verified with, beekeepers, traders, support organizations and government officials in informal meetings, two workshops (FAO 2010; Guiding Hope and Paella-e Cameroon 2010) and two conferences (Ingram 2010; Ingram and Husselman 2010).

Results and Discussion

This section presents the beekeepers and their families, and discusses firstly how beekeepers use the forest for their livelihoods. Beekeepers' perceptions of their vulnerabilities, the drivers underling these and strategies currently used to mitigate these are then presented and analysed.

Beekeeping and Livelihoods

Apiculture, the science and practice of domestication and keeping of bees, is predominantly a male occupation. This is attributed to the demanding physical activity of walking on average 10 km into the forest, climbing to place hives high in trees and harvesting them, often at night. A typical beekeeper has 5 years' experience, with 58 % having up to 10 years' experience, 23 % having up to 20 years' experience, and the longest, 40 years. Averaging 43 years old (standard deviation 15), just over three-quarters of the study group had finished primary education and 16 % secondary education. Although their level of primary schooling was higher than the Cameroonian average, the proportion of beekeepers with a secondary school certificate was lower than the national average (National Institute of Statistics 2001). All were married and heads of their families of 8.25 (standard deviation 4) people, double the national average of 4 in 2007 (Republic of Cameroon 2011). The

majority (75 %) of beekeepers indicated that they were from the Gbaya ethnic group; 5 % were Bantu (Mbum) and Fulani, and 15 % were from outside the region and from other ethnic groups.

Beekeeping is the dominant source of livelihoods in the study area, with 68 % of the households in Djerem Division involved in it. On average, 48 % of the study group's annual household cash income was derived from apiculture, with 55 % indicating that it was their primary source of income. They all also practiced farming, with just over 30 % indicating that they were primarily farmers, including livestock. The majority (45 %) had at least one, and up to six, other sources of income, from carpentry and blacksmithing (12 % of beekeepers), civil service (10 %), harvesting other NTFPs including hunting (12 %), trading (12 %) and traditional medicine (1 %). Most of the honey harvest was sold; on average, 10 % was consumed by beekeepers and 4 % was given as gifts. Traditionally, other hive products such as beeswax and propolis have not been harvested: 28 % of beekeepers extracted wax, although this was reported as changing with more now processing wax, and only a small proportion (7 %) collected propolis. Processing and value adding activities were typically low. The majority (91 %) of beekeepers sold unprocessed honey and 8 % sold filtered. Average annual honey yield per hive, per year was 7–10 l. This provided a potential net income per hive, if all by-products were collected, of 19,999 FCFA (41 US$) annually.[2] The numbers of hives that each beekeeper had were thus the main variable affecting income. The traditional cylindrical hives used by 99 % of the beekeepers are usually self-made from local materials: bamboo (*Oxytenanthera abyssinica*), twine and canes from raffia (*Raphia* spp.) and rattan (*Laccosperma* spp. or *Eremospatha macrocarpa*), covered with mud and thatched with long stemmed grass and *Rubiaceae* spp. leaves. When commissioned, hives sell at around 500–1500 FCFA each (1.34–3.34 US$). Beekeepers in Adamaoua had on average 68 hives, although 5 % owned up to 400 hives. In contrast, the average for Cameroon was 11 hives per beekeeper. Average annual household income from apiculture was 281,000 FCFA (433 US$), with 87 % of households generating between 10,000 and 100,000 FCFA (111–223 US$), 11 % between 100,000 and 500,000 CFA (223–1115 US$) and 2 % up to one million CFA (2231 US$). The average household income from apiculture was almost the same as the national total household average for rural inhabitants in 2005 of 280,233 FCFA (393 US$) – half that of urban inhabitants (National Institute of Statistics 2007).

These figures show that the majority (90 %) of beekeepers are poor, with livelihoods based largely on natural capital: the forest and land used for agriculture. They share the same characteristics identified as contributing to persistent poverty in Cameroon: large household size, low education level and little access to productive assets (United Nations Population Fund 1999). Only 10 % – the larger-scale beekeepers – are able to professionalize and generate substantial, above-average incomes to lift them out of poverty. However, for the majority, apiculture provides

[2] The figure is based on average honey production of 8.3 l and average retail price of 1500 FCFA per litre to earn 18,750 FCFA; 2 kg of wax worth 5000 FCFA; and 0.5 kg of propolis worth 2500 FCFA.

an important source of cash, a safety net and diversification, complementing subsistence-based farming. It also contributes to food needs and has medicinal and cultural value, and the importance of bees as major pollinators of crops and trees is recognized.

The long historical practice of beekeeping was confirmed, with nearly half of the beekeepers knowing family traditions dating back to their grandparents, indicating that it has been practised for at least 150 years. The majority of beekeepers (61 %) have learnt beekeeping by observation and hands-on practice, passed on by family and friends. This is in contrast to other beekeeping areas in Cameroon, such as the northwest, where 97 % received training from beekeeping organizations and projects. Most beekeepers work individually, with around a quarter aided by women and 39 % by their children, helping to filter and collect hive materials. Although development projects have encouraged communal apiaries, these have not been effective, with the vast majority of beekeepers owning and managing their hives individually. One-fifth of beekeepers are members of associations or groups, which have a largely social function, and group sales are not common. The strongly individualistic culture of the Gbaya ethnic group, large distances between villages, poor infrastructure, established traders and negative experiences with NGOs forming cooperatives have combined to make collective action uncommon. However, it has been increasingly encouraged by NGOs since the mid-2000s and more recently by buyers such as Guiding Hope. By 2011, the latter was the only trading apiculture organization in Cameroon to be registered and comply with government phytosanitary and export requirements.

Governance Voids

The arrangements and institutions[3] governing how apiculture and its trade are conducted have a strong impact on livelihoods not just of beekeepers but of all those in the value chain, from the forest to consumers of apiculture products. Institutions affect how the chain operates: the activities, people, organizations and relationships involved in getting apiculture products from the hive to the consumer. This includes access to, and control of, forests and their resources, and the steps involved in accessing markets: warehousing, transport, processing, retailing and export; the value gained; and distribution of costs and benefits (Kaplinsky and Morris 2003; Ribot 2005). Governance arrangements concern access either to resources or to markets, but not the whole value chain. Although statutory systems cover both, they operate through different institutions and organizations.

Beekeepers indicated that, despite the savannah forests being state property, in practice, there was a void of formal regulations and the government was largely

[3] 'Institutions' refers to the 'rules of the game' – humanly created formal and informal mechanisms that enable and shape individual, group and social expectations, interactions and behaviour (Ostrom 1990).

absent, both physically and effectively. The 1994 Forest and Wildlife Law addresses resource rights and provides customary user rights to forest communities, permitting communities to collect 'all forest, wildlife, fisheries products freely for their personal use, except protected species.' This right can be exercised in all unprotected areas, and includes subsistence fuelwood and wood for construction needs. Free access is a usufruct right. Thus, legally, products may not be commercialized. There is no licence system for harvesting or trading apiculture products. Most forested land has belonged to the state since independence in 1961, and the vast majority of agricultural landholdings in rural areas, around 90 %, do not have a title deed (Tonye et al. 1993; Egbe 1997). This is due to the expensive and bureaucratically complex registration process, a lack of knowledge of the possibility of registration and, often, a lack of need unless customary ownership is challenged, creating a need for legal title. According to the 1994 Law, forests outside the public state land are grouped in three ownership categories: community forests, communal forests and private forest. Generally, people living in forest areas fully retain their traditional user rights in their communal areas in what is known as the *permanent forest domain*, which is land allocated solely for sustainably managed forestry or as wildlife habitats such as protected areas and council forests, and logging concessions. Customary rights are also enshrined in the non-permanent forest domain, areas not requiring long-term forest maintenance, including areas up to 2500 ha allocated for the sale of timber, private forests, communal and community forests. These latter two forms of decentralized forest management occur where management (but not ownership) is devolved to the local council and communities, respectively.

Unlike the permanent forest domain in the humid forests in the south of Cameroon – which are nearly all state-owned with mosaics of timber production concessions, protected areas for conservation and communal forests – the savannah forest in Adamaoua is all permanent forest. It is not commercially attractive for timber, and there are no timber concessions there. Just 4 % of the land is under protected area status, and there are no community or communal forests. Despite the existence of this statutory framework, most beekeepers, and indeed communities, were unaware of statutory land and forest use laws. Trees and their products on private land are owned by the landowner. However, as most land is held under customary and not statutory title, this is a grey area. In practice, state ownership of forests has rarely been contested in the region. Forest cover changes in Cameroon tend to be driven by land use changes (Robiglio et al. 2010). The conversion of forest to other uses, such as the Mbakou Reservoir for energy and to supply drinking water; the recently awarded bauxite mining concession near Ngaoundal; and increasing spread of urban areas is, in contrast, well governed by political and bureaucratic elites, entrepreneurs and civil servants. These actors have successfully maintained control of land and its uses since colonial times, often at the expense of women in the informal sector, ethnic minorities and the poor (Njoh 1998). However, there have been changes, with intensified competition between actors governing different aspects of land and natural resources, such as large-scale mining (Schure et al. 2011). Thus, although there are different categories of forest land, state forest and communal forest with different rights for user categories, there are in practice

governance voids as the government is hardly involved in the management or exploitation of these forests.

Apiculture products and markets were scarcely mentioned in forest, agricultural or livestock regulatory frameworks up to 2008, making apiculture products – honey, wax and propolis – 'invisible.' On a national level, their trade is largely indiscernible and undocumented, with statistics sparse. Until 2008, it was unclear which ministry was responsible. A reason for this lack of official recognition is that individuals and organizations in the sector – beekeepers, national traders and exporters – operate largely informally.[4] Rights to trade have developed only recently, and currently only concern the requirement for a permit to stock livestock products in collection centres and to export them. The lack of policy and legislation did not bother practice and trade, although the lack of state support for beekeeping in Adamaoua was bemoaned. This has begun to change recently, with the introduction of a 96,000 US$ government Development Support Project for the Apiculture Chain, focusing on providing training and equipment and on setting up beekeeping groups since 2009.

Instead of formal regulations, Gbaya traditional customary systems have dominated beekeepers' livelihoods and everyday practices. The study area is a melting pot of Bantu (Mbum) and Fulbe ethnic groups – traditionally pastoral and nomadic cattle-herding peoples of western Africa of Muslim faith – known in the area as Mbororo or Fulani, into which the Gbaya have migrated over centuries. The Gbaya are an acephalous, tribal, patrician-based people with dispersed communities, with contingent membership and lifestyle based on subsistence farming. Their customary land tenure practice concerns mainly semi-shifting farm land and fertile riverine gallery forests used for maize farming. These can be up to 40 km from household compounds, but are often located near villages inhabited by the farmer's relations. Rights tend to be highly individualized and not characterized by a hierarchy of estates. Land is passed on through families, with headmen and elders generally not responsible for land allocation. Individual sales of land close to towns have been occurring more frequently since the 1960s. Fulbe pastoralists living or passing through a forest may claim grazing areas, particularly with access to water. Thus, an open access, multiple use system of forested land and its resources operates, to which the Fulbe and the Gbaya have traditionally adhered. Pastoralists, hunters and grazers accommodate one another's activities, and agreements may be made with graziers to avoid disturbance to hives.

Neither beekeeping nor honey hunting requires any form of permission. Hives are placed in the open access, primary and secondary savannah forest, usually around the village. The hives are placed around 2–5 m high in trees to avoid damage by the bush fires caused by hunters and grazers, and occasionally by beekeepers themselves due to accidents with traditional grass 'smokers' whilst harvesting. Although hives are owned by the beekeeper, the trees in which they hang are not

[4] Formality implies explicit rules, procedures and norms prescribing actors' rights and obligations and enforced by a third party (i.e. statutory regulation). Informality implies socially shared, usually unwritten, flexible, dynamic rules, created and enforced among the actors involved.

owned or specifically claimed, and may change from year to year, although beekeepers tend to return to and use the same forest area because it is easier to harvest hives that are near one another. Scarcer resources used as materials in hive construction and daily life, such as rattan and bamboo, are claimed by whole villages. Access to them is free to villagers and restricted for others, but is often granted freely upon request to the chief or to any villager. Beekeeping is not an exception, as the gathering of wild fruits, yams and seeds such as *kofia*, usually women's work, are also open access. Fruit trees in the village are also usually common property, unless, rarely, if they are known to have been planted, when they may be claimed by an individual or family. Hunting, a male occupation, often in a group, occurs in gallery forests once cleared of maize, with ownership of caught animals on a first come basis, regardless of where they are caught (Burnham 1980).

Thus, customary systems in place grant overlapping rights to farmers, pastoralists and beekeepers for forests and land. There are reciprocities and systems of exchange which are important for livelihoods and for minimizing conflicts. For example, Fulbe women exchange milk for vegetables before selling the remainder. Fulani men take Gbaya livestock on transhumance treks, and Gbaya men build rainy season shelters on fallow fields for Fulbe friends. Women, as farmers, tend to suffer more from damage by livestock in areas of shifting cultivation, adding a gender dimension to ethnic and resource-based conflicts that otherwise occur between male beekeepers and herders. There are thus many vested interests in customary systems, with producers and rent-seeking actors active along the apiculture chain and few motivations or disincentives to change, except those recently introduced by Guiding Hope.

Drivers of Vulnerability

Beekeepers and other actors in the value chain indicated a number of sources of vulnerability concerning the forests upon which they depend. One major group of drivers is human induced. Land is being deforested and forests degraded. Apiculture and its trade are not responsible for the degradation of forest resources and, although many people see beekeepers as inherent conservators and guardians (Paterson 1989), none of the beekeepers interviewed gave themselves this role, stressing instead their knowledge of many forest products and their dependence on the forest, as well as its beauty, magic and spiritualism. Beekeepers mentioned recent developments, such as a proposed iron-ore mine on Mt Ngaoundal and the Lom Pangar dam, and expressed concern that the mine might expand and that similar dam activities in their locality might affect them. These were, however, also seen as potential sources of employment by some. Increasing population growth and migration from the dry north have increased populations in larger towns such as Ngaoundal, Tibati and Mieganga, transforming local customs of land tenure. Land sales have been increasing and forest land is being converted for housing and agriculture, mainly by migrants, often from the north. These perceptions were confirmed by population

statistics and the local council, which indicated a 261 % increase in agricultural land use between 2006 and 2009 around Ngaoundal.

Conflicts among beekeepers and with other forest users were reported as uncommon. Tenure and rights to access forests and their resources were also not reported as problematic. However, increasing changes and tensions were noted. There are competing claims for certain forest species. The kofia tree, a favoured fuelwood species for households and for larger-scale apiculture product processers, is used to process beeswax, with significant amounts needed to melt, refine and form beeswax into blocks. It is also a host tree for edible caterpillars collected by women and children, and a source of cattle forage and medicinal oil seeds collected by women, which are also used in making soap with beeswax and honey. It is also of importance for beekeepers, as the main melliferous species in the savannah forests. Bamboo is found only in certain villages, and raffia for hive construction grows mainly in gallery forests; both are also used to make household tools and materials. Their patchy distribution means that some beekeepers in areas where they are not common have made informal agreements with other beekeepers and/or their village chiefs to access these when they are located on their traditional family-farmed lands. Pastoralists deliberately burn some areas of forest to encourage grass growth for forage, unintentionally destroying hives and damaging melliferous trees, reducing soil fertility and regeneration (Tchotsoua and Gonne 2010). Householders, farmers, pastoralists and wax processors also mentioned fuelwood and potable water as resources for which there is increasing demand from urban areas, leading to slight price rises, although these resources are not scarce. This finding complements studies indicating declines in water, pasture and forest quality (Bouba et al. 2012). Such competing claims to resources highlight vulnerabilities and mirror experiences in more populated areas of Cameroon, such as the northwest region (Dafinger and Pelican 2006), and across Central and West Africa (Winter and Quan 1999; Evers et al. 2005). Tensions are most evident between male graziers and female and male farmers in Adamaoua (Harchies et al. 2007) and between male and female farmers, male graziers and male beekeepers (Enchaw 2010; Ingram 2014).

A second pressure is climate change. The two pronounced seasons and biennial flowering of many of the main forage species result in significant variations in pollen and nectar flows, with peaks every alternate year, when two harvests may be possible. Beekeepers are used to dealing with varying production, but do not like the resulting uncertainty in terms of income. Aside from the normal seasonal variations, 97 % of beekeepers indicated that they believed the local climate had changed. Such changes can impact the volume and quality of hive products by affecting nectar flow (the quantity and the quality of dissolved nectar sugars secreted by plants). Climatic changes have many and complex effects on forests. Rising atmospheric carbon dioxide concentrations, higher temperatures, changes in precipitation, flooding, drought durations and frequency all effect tree growth, with associated biotic consequences (frequency of pest and disease outbreaks) and abiotic disturbances (changes in fire occurrence and wind storm frequency and intensity) (Sonwa et al. 2012). The extent of the savannahs in the Congo Basin has historically fluctuated significantly with climatic changes (Favier et al. 2004), and the forests are predicted

to be particularly vulnerable to future climatic changes (Yengoh et al. 2011; Sonwa et al. 2012). Beekeepers' recent experiences confirm these scientific studies. Nearly half (49 %) noted unusual and increasing climatic variations in the last few years, with an increase in extreme events: strong winds and heavy rainfalls, a longer dry season and more seasonal variability. They attributed increased bush fires, changes in melliferous tree flowering seasons, new and increased levels of pests which raid and damage hives (such as extreme *baya* [African palm civet] attacks in 2009), increased hive absconding and decreased honey production to these manifestations of climate change. Nearly half of the beekeepers (47 %) felt that these changes had negatively affected honey and wax production. These climatic changes were also deemed by 41 % of beekeepers to impact agriculture and water (13 %).

A third source of vulnerability relates to the poverty of the beekeepers. Their responses were interpreted in terms of the low level and insufficiency of capitals possessed by them. The term 'capitals' is taken from the sustainable livelihoods approach, which distinguishes six types of material and intangible capitals: natural, physical, social, human, financial and political (Scoones 1998; Widner and Mundt 1998), alongside entitlements and activities, inclusion and exclusion mechanisms, which are required for an acceptable means of living. Beekeepers indicated that potential honey flows in an area at a given time are dependent upon the species present; this process is climate, altitude and soil determined. Beekeepers have little influence on nectar flows from native species, unless the flora is significantly changed, for example by deforestation or planting melliferous crop or agroforestry species. Honey flow is a function of the bee–plant relationship and how nectar is used by a bee colony. Hive management, location, the type and especially the number of hives were indicated by beekeepers as being able to affect and increase honey flows. As between 30 % and 85 % of hives are colonized, the larger the number of hives possessed in different locations, the better the chance to increase flows. The majority of beekeepers felt that their human capital (skills, knowledge and abilities relating to beekeeping) was adequate, but knowledge of markets, ways to add value to hive products and upscale production (other than investing in hives) was lacking. They also noted a lack of physical capital: the equipment, infrastructure and access to markets, and of economic capital: the financial means to increase production and add value, and most had no or limited access to credit. Beekeepers are thus dependent upon powerful bulk-buyers visiting their villages in the harvest season, with supply determining prices. Beekeepers find it difficult to combine capitals to increase their value. Poverty thus plays a key role in limiting the ability of beekeepers and in creating inherently vulnerability. Most are heavily dependent upon natural capital (the forest for apiculture, soil and water for agriculture) and are stuck in a vicious circle that is hard to break out of to more effectively combine and increase capital, without significant trade-offs of one capital for another. Poverty and the same limitations in capitals were also noted as major vulnerabilities by traders and retailers and are not limited to Adamaoua, but experienced across Cameroon (FAO 2010; Guiding Hope and Paella-e Cameroon 2010). This is combined with a difficult business environment for apiculture traders (Tchana 2010), reflecting the same difficulties inherent in the NTFP sector (Awono et al. 2010) and in doing business in Cameroon (World Bank 2009).

These perceptions of beekeepers and other actors in the apiculture value chain from Adamaoua highlight the fact that their vulnerability has multiple sources. These arise from human actions of others, climate change, restraints caused by their reliance on natural capital and their low level of access to other forms of capital. These combine to threaten forest-based apiculture – which can be seen as a forest ecosystem good. These drivers also threaten the ecosystem services sustaining apiculture and ultimately the collective wellbeing of the local population, who are heavily dependent upon it. The beekeepers' perceptions are reflected by a number of studies on forest-dependent people and communities in the Congo Basin. Dixon et al. (1996) stress the impact of climate change and human activities on forests. Alden Wily (2011) highlights the uncertain tenure arising from pluralistic statutory and customary regulations; and the limited ability of people (Sonwa et al. 2012), policies (Bele et al. 2011) and institutions (Tsai 2002) to respond to combinations of these drivers in the face of climate change has also been pointed out. The ecosystem services concept makes explicit this link between the use and maintenance of ecosystem goods and services and human wellbeing when livelihoods are heavily dependent upon such goods and services (Millennium-Ecosystem-Assessment 2005). Adapted from Dixon et al. (1996), these drivers are summarized in the first column in Table 7.1, with the potential pressures on livelihoods and ecosystems drawn from the work of Tsai (2002), Bele et al. (2011) and Sonwa et al. (2012) shown in the second column. Actual pressures as perceived by beekeepers in Adamaoua are shown in the third column.

Reducing Vulnerability: A Bricolage of Adaptive and Mitigating Actions

In response to drivers of vulnerability, the beekeepers and organizations active in the value chain can be seen as bricoleurs. A *bricoleur* is French for a handyman or a do-it-your-selfer that resourcefully makes creative use of whatever materials are available to complete a task, regardless of their original purpose. The term has been used to describe how people draw on existing mechanisms (social, cultural, symbolic resources and relationships) to form new institutions. These may be formed under conditions of stress, combining existing institutional and organizational activities and interactions in novel ways, or created, sometimes from nothing, using physical, social and/or institutional capitals in alternative configurations. Such bricolaged institutions may be shaped by history, borrow from different cultures, incorporate rules and meanings from one area of life to another and draw on local forms of decision making (Wollenberg et al. 2001; Cleaver 2002). Beekeepers, particularly in collaboration with organizations in the apiculture value chain, have created and are developing a number of responses that enable them to adapt to or mitigate their vulnerability in the face of multiple pressures. Table 7.2 provides an overview of beekeepers and their organization's responses to actual vulnerabilities, after which a number of these are presented and discussed.

Table 7.1 Overview of vulnerabilities and potential and actual pressures on Adamaoua beekeepers

Component	Potential pressure	Actual pressures on beekeepers
Forest plant community and biodiversity	Climate changes resulting in forest composition, productivity and reproduction changes, changes in species, pest and pathogen shifts	Decreased forage production and availability of hive materials, decreasing soil fertility
Forest animal community and biodiversity	Climate change resulting in shifts in composition of communities, and/or loss of existing ecosystems, faunal migrations, invasion and pest problems	Increasing pressure of pests, decreasing forage and apiculture production, decreased availability of fauna for hunting, increasing hive absconding
Forest ecosystem services	Climate change and human activities resulting in changes in water quantity and quality, increase in extreme events, disrupting ecosystem services, loss of specific habitats and services, increased water/wind erosion, decreased vegetation productivity	Decreased apiculture production due to extreme climatic events and pests
Human wellbeing	Climatic change leading to reduced income, negative impact on food production (wild and farmed), on health and on nutrition, decrease in water quality, quantity and accessibility, decreased availability of fuelwood, increased uncertainty of income due to forest and agriculture changes	Low income due to buyers' market and local competition, pressure on medicinal plants and fuelwood, gradually increasing competing and multiple claims on beekeeping resources
Institutions	Low-level institutional response to climate change and poverty, low adaptive capacity of institutions, slow implementation of new international policies on climate change and forests, few institutional links and multilevel responses across government, private sector and civil society, and few networks, no knowledge transfer and integration across such networks, changing policies affecting access to forest resources, plural and conflicting forest and land tenure systems	Invisible sector, no specific policy measures or interactions, sector claimed by multiple ministries but no actions, no trade regulations, few customary regulations governing access to resources or markets, open access forest, beekeepers and chain with little voice

Sources: Dixon et al. 1996; Tsai 2002; Bele et al. 2011; Sonwa et al. 2012

Beekeeper and farmer adjustments to the vagaries of life and their environment is nothing new (Somorin et al. 2012), but a number of noticeable changes in their livelihood strategies can be determined in response to particular challenges and vulnerabilities. One of the most striking responses has been to create new institutions that, consciously and unconsciously, increase beekeepers and enterprises' level of governance over the apiculture chain, and thus their awareness has been raised about their dependence upon access to forest resources and access to markets. One notable group-based solution is the establishment of a small, locally run, organic, ethical trade enterprise, Guiding Hope, as previously mentioned. In contrast to the

Table 7.2 Overview of adaptive and mitigating responses to vulnerabilities by Adamaoua beekeepers and apiculture value-chain actors

Component	Potential adaptive response options	Responses by beekeepers and chain actors
Forest plant community and biodiversity	Silvicultural options (regeneration, thinning, fertilization and pest management)	Regeneration, planting bamboo and raffia, planting melliferous agroforestry tree species (i.e. mango and papaya)
Forest animal community and biodiversity	Habitat or species preservation (protected areas, conservation and restoration programmes)	Adapted hive styles, hunting of pests (African palm civet)
Forest ecosystem services	Water management measures (i.e. reservoirs, flood protection, habitat protection, watershed management, soil and vegetation protection: fertilization, irrigation, sustainable farming systems, climate smart and good agricultural practice	Informal watershed and habitat protection of forest areas for beekeeping, bamboo and raffia grove protection, regulation of access to bamboo and raffia groves, tree planting, tenure claims on forest areas by beekeepers
Human wellbeing	Measures to decrease dependence on forest ecosystem goods and services or increase resilience of forest ecosystems, valuing economic importance of ecosystem goods and services and recognizing importance for food security and poverty alleviation	Professionalization of beekeeping and marketing, collective action and formalization of groups, increased number of hives, increased commodification of hive products, increased level of commercialization, adding value to hive products, increased product range commercialized, expansion of trade to new markets and consumers, selling price increases due to value adding and certification, expansion of sustainable business model across Adamaoua and to other regions in Cameroon
Institutions	Institutional responses to mitigate climate change and poverty, implementation of international policies on climate change and forests, multilevel government, private sector and civil society networks, knowledge transfer and integration across networks, revised and pro-poor forest, land tenure and trade regulations, payment schemes for ecosystem services	New chain-integrated social enterprises, voluntary UK Soil Association organic and fair trade certification and The Body-Shop community trade certification, experimentations with geographic origin certification, voluntary development of EU export rules and a government-supported honey residue monitoring scheme, new value-chain platforms and networks, new government-supported projects, introduction of standards and regulations, tenure claims on forest areas by beekeepers

many NGOs operating along the chain in the northwest of Cameroon, it expressly registered as a business taking a triple bottom line approach to promoting sustainable, fairly traded apiculture (Ingram and Njikeu 2011). Since spotting a niche in the global market demand for sustainable apiculture products in 2006, Guiding Hope together with a support organization (Paella-e) have been assisting beekeepers to establish and legalize 35 village-based groups of around 1400 people and set up over 10 collection centre warehouses operated by these groups, built and owned by the enterprise, on community allocated land. The groups now cover around 12 % of beekeepers in the region, and account for around 2 % of total estimated annual honey production in Adamaoua. They have set up traceability and control systems to track products from harvester to importers in order to be certified as organic by the UK Soil Association. They are the first registered organic and ethnic trade apiculture organization in Central Africa and registered community trade suppliers of The Body Shop, an international cosmetic company. The higher price premium enables them to pay beekeepers up to 15 % more than the market price. Training ensures the increase in volume and the quality of production. Pilot projects have been set up to produce other honey- and wax-based products such as candles and cosmetics. Wax and honey are sold on the national and export markets. Guiding Hope has vertically integrated activities in the value chain to benefit from economies of scale in processing and selling.

New methods of hive production, wax processing and honey filtering have been stimulated at enterprise and beekeeper household level to decrease environmental impacts such as water and woodfuel use – thereby decreasing vulnerability and also increasing production. For example, beekeepers were encouraged to respond creatively to problems, such as *baya* hive attacks, by experimenting with adapted hive designs and locally adapted solar wax melters to reduce woodfuel and water requirements. To export to the lucrative European market, Guiding Hope first needed to attract the attention of, and work with, the government. After Guiding Hope had presented itself and its ideas to a number of government agencies, the Ministry of Livestock, Fisheries and Industrial Animals emerged as a partner. Together, they set up a honey residue monitoring scheme as a European Union requirement to regulate the level of pesticide and chemical levels in honey imports into Europe. This scheme also acts as a market barrier, as the costs, skills and procedures to set up and pay for collecting honey samples and having these tested by a certified laboratory outside of Cameroon are significant for small enterprises. It is an additional burden as beekeepers do not use chemicals either in beekeeping or on sources of bee forage, which is from natural forests and thus naturally organic. This was a significant step given that there were no standards and regulations for the sector and no competent government authority in Cameroon. Guiding Hope realized that performance was constrained by low professional management capacity, low skills and lack of access to resources, corresponding to Bernard et al.'s (2008) findings. It sought external technical support, grants and venture capital financing, and partnership with experienced, like-minded buyers in Europe and North America. This enabled the enterprise to professionalize itself and to professionalize its associated beekeepers, and

to increase scale, profits and the prices paid to beekeepers.[5] It is now extending its operations to other divisions in Adamaoua and other regions in Cameroon, and linking with existing beekeepers' groups. This has led it to set up platforms and exchanges between the Adamaoua beekeepers and beekeepers from across Cameroon and Africa, such as the Apiculture Interprofession and Exporters Union, as lobby and action groups for the sector, and it has links with Apitrade Africa, a pan-African association promoting apiculture. By linking and controlling many of the activities in the chain, and initiating formal standards, Guiding Hope has bricolaged new governance arrangements, some of which now apply to the entire industry in Cameroon and are being keenly watched by apiculture organizations in other African countries. The use of voluntary, market-based certification standards is intended to internalize the environmental costs and benefits linked to apiculture.

Individual and collective actions have been stimulated as a consequence of Guiding Hope's activities. Because of the increasing demand for apiculture products, higher prices and the tangible benefits that large-scale beekeepers derive from their increased incomes (such as new motorbikes, children sent to school and zinc roofs), more beekeepers have been encouraged to increase production. This raised discussions within the newly formed beekeeping groups and in the communities about how to overcome problems such as the availability of hive materials, pests and the expansion of hives. Villages have responded with different approaches. Six have initiated community nurseries where raffia and bamboo are propagated and then planted on common land, making agreements with graziers to avoid disturbance. Others have preferred to plant melliferous fruit trees in the village and keep hives closer to the village, enabling women to participate and ownership to be clearly demarcated. The setting up of community forests[6] was discussed, although this was felt to be too costly, difficult and not needed in the absence of a direct threat to customary ownership of land and forest. Further agreements on tenure and access have not been felt necessary. Thus, tentative changes to customary tenure can be seen to be occurring, and hybrid, formal forms of tenure are being considered in order to protect and regulate access to key resources. Women who have been trained in soap making have started their own micro-business activities, incorporating and adapting traditional knowledge of medicinal herbs and plants to create new recipes for soaps with cleansing and medicinal properties. This adds value and creates new products and markets, with soaps being used domestically but also sold locally, nationally and internationally. Although significant changes in women's livelihoods have yet to be seen, this is a first step towards empowerment. Likewise, women are encouraged to become beekeepers, for example, through demonstrations and exchanges with beekeepers in the northwest region, showing how hives can be more 'women

[5] These initiatives led to Guiding Hope winning the SEED Initiative 'Supporting Entrepreneurs in Sustainable Development' in 2008 and the 'Best New Small, Medium and Micro Enterprise in Africa' Award in 2011.

[6] Under the 1994 forest law communities adjacent to forests may initiate a process whereby they can manage and exploit, but not own, forests for a period of up to 25 years based on a management plan agreed with the government.

friendly' by being kept close to home and on stilts to avoid women having to climb trees. Women, supported by role models, have also been encouraged to take responsibilities in the village groups for tasks such as quality control and record keeping. Propolis is now collected, being per kilo one of the most valuable hive products. A good number of beekeepers now either produce their own wax or sell comb (honey and wax together), rather than just honey. This has created valuable new markets and products, and thus opportunities for beekeepers. For traders, the wax market is far more lucrative than the honey market, and wax is easier to export than honey. Others have started processes to designate communal 'bee-forests,' designating areas of forest located close to villages solely for beekeeping. Others have become certified traders, collecting honey and wax from individual beekeepers and selling on to Guiding Hope.

However, the apiculture groups' power to counter wider-scale deforestation and degradation in the public domain forests has not yet been demonstrated. They have not taken steps to claim council or community forests, seeing this as bureaucratic, time consuming, costly and inappropriate – as a process focusing on giving rights to extract timber. They also do not have sufficient economic or social power, or tenure rights, to maintain large areas of forest cover. No other actors in the chain, such as the 12 or so other major buyers, are promoting any such initiatives, but instead rely on price as the main incentive to trade. The government's new project and one local support NGO active in the area do not stress issues of sustainability either, but focus on production. The changes are still too new and it has only recently been realized that long-term resource management is important to maintain and increase current levels of production and quality. Beekeepers also indicate that new enterprises and institutions – such as the new rules introduced by Guiding Hope – need to be sufficiently embedded and the benefits proved before more beekeepers will be willing to take the risk of professionalizing and upscaling. Professionalizing means putting 'all your eggs in one basket' and forsaking subsistence farming and other potential income-generating methods. This runs counter to the diversification strategies deployed by most households to mitigate and spread risks. Equally, the efficacy and outcomes of collective action over a longer time scale need to be evident for beekeepers and others in the chain to professionalize. Another barrier to this is that, despite the presence of associations and enterprises, 50 % of beekeepers continue to mention problems of a lack of coordination and collaboration. This may be driven by the individualistic Gbaya and Fulani cultures, negative experiences with associations in the past that lead to a lack of trust. Many also indicate a lack of markets: local market saturation has led to low local selling prices and a buyers' market, and problems about paying cash immediately upon delivery. These problems have been reiterated at chain forums and networking events (WHINCONET 2006; Guiding Hope and Paella-e Cameroon 2010).

These bricolaged responses are summarized in Table 7.3, showing the different rights and responsibilities embodied in the different types of governance arrangements.

Table 7.3 Governance systems rights and responsibilities for beekeeper households

Governance system	Access to resources	Access to markets
Customary	Open access to forests, rights of access shared with other users (farmers, pastoralists, hunters)	Not applicable
Regulatory	Enshrines customary harvest of non-timber forest products for subsistence use State de-facto ownership of forested lands – possibilities for decentralization of rights to exploit as council and community forests and concessions	Responsibilities to adhere to new honey residue monitoring system for exports to the EU Responsibilities to register collection centres with the ministry
Collective	Voluntary village-based set up and maintenance of apiforests and nurseries New village-based apiculture groups with collection and quality control centres	Possibilities for government and donor support for production and processing if registered as a beekeeping group
Market-led	New responsibility to conduct organic beekeeping to obtain organic or community trade certification	Right to access certified organic and community trade markets New rights to export formally if a registered beekeeping group

Conclusion

The savannah forests in Adamaoua, Cameroon, are home to traditional, forest-based beekeepers, the majority of whom are also subsistence farmers who share access to, and use of, the forest with pastoralists. This sparsely populated region is economically marginal and little developed, with lower than national average incomes and characterized by chronic poverty. The majority of inhabitants are reliant upon natural resources for their livelihoods, generally diversifying to minimize their vulnerabilities due to the seasonal variations in climate. Forest apiculture is important here: honey, beeswax and propolis contribute on average to 68 % of household income and have additional food, medicinal and cultural value. Bees are also critical pollinators of crops and trees. Although nearly half of the population in Djerem Division – the centre of apiculture production in Cameroon – are involved in apiculture, it is a route out of poverty only for around 10 % of the beekeeping population, the larger-scale beekeepers. It does, however, provide a safety net and income diversification for the majority of the 12,000 beekeepers in the region.

This savannah ecosystem has been historically subject to climate change. Beekeepers indicate that increasing and unusual climate fluctuations add to their existing vulnerabilities by affecting flowering seasons, pests and apiculture production. In this remote area, tenure is traditionally regulated and the presence of the government, the formal landowner of public domain forest, is practically non-existent. Increasing pressure on land and forests due to population increase and migration, increasing apiculture product commercialization, changes in land use

because of mineral finds and dams, and growing conversion of forest to pasture and fields are transforming local perceptions of forest and land tenure. At the same time, the livelihood opportunities based on apiculture are becoming more lucrative.

Beekeepers are aware of their vulnerabilities and have responded with individual and group solutions, bricolaging new institutions and governance arrangements in an effort to secure their livelihoods, and to adapt to and mitigate changes. These include formalization and collective action in groups, product value adding and innovative new chain and market arrangements. Tentative customary tenure changes have been made to protect and regulate access to key resources. Secure tenure and regulation of access and control have been shown to be important for sustainable forest exploitation (Barry and Meinzen-Dick 2008). However, conflicts with formal tenure arrangements, if enforced, are likely to undermine and negate customary regulations. Despite the recent developments in regulatory mechanisms, the apiculture trade remains characterized by a lack of formal governance and a predominance of informal rules and market-led arrangements. Coherence between policies and regulation on forests, livestock, agriculture and climate change has been largely lacking. As a result, there exists little coordination between sectors and few formal incentives to actors in the chain to operate sustainably, but instead to maximize incomes. There are many vested interests in the informal systems with producers and rent-seeking actors along the chain and few motivations or disincentives to change, except those recently introduced by Guiding Hope. Formalization, counter to local customs, has only occurred because of the opportunity to raise and diversify incomes and because of increased awareness. The nature of the business operating environment is an important part of the context. The participative, hands-on, supporting approach of Guiding Hope and Paella-e, building upon enabling formalization practices, appears to help improve outcomes for both livelihoods and the resource base, creating a pathway towards decreased vulnerability.

These initiatives and changes in arrangements are still recent. Thus, their sufficiency and effectiveness in maintaining production and trade – given the continued expected increases in scale – have yet to be seen. Other concerns include the ability of these new governance arrangements to be inclusive of all in these rural, male-dominated communities. The sustainability of increased production, particularly given competing claims for natural resources important in apiculture, also remains to be seen, especially as there is growing evidence of threats to forest forage. Although the resource is still substantial and population density in the forest is low, the lack of comprehensive, strong governance arrangements represents a potential risk of increasing vulnerability.

These experiences suggest that a combination of the functioning customary systems and market-led schemes can work to create more sustainable value chains. These enable investment in social and environmental outcomes, diversifying and increasing incomes and reaching more beneficiaries though a combination of increased products, added-value production and increased production. This has provided incentives for sustainably produced apiculture products that provide positive livelihood benefits to thousands of people in the chains and desirable products for thousands of consumers in Cameroon and abroad.

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