

Thomas Faist
Jeanette Schade *Editors*

Disentangling Migration and Climate Change

Methodologies, Political Discourses and
Human Rights

 Springer

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ISBN 978-94-007-6207-7 ISBN 978-94-007-6208-4 (eBook)
DOI 10.1007/978-94-007-6208-4
Springer Dordrecht Heidelberg New York London

Library of Congress Control Number: 2013935483

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Preface

The specter of mass migration as a consequence of climate change has been haunting public and academic debates for several years now. Yet the debates are still lacking solid conceptual foundations which would help frame the relevant issues. This book aims to deliver two key elements, a grounding of the debate in migration theories and concepts of development. The former focuses on migration as a process of cumulative causation and thus connects environmental migration to other forms of geographic mobility. The latter moves from a lop-sided emphasis on vulnerability to development as capabilities.

Toward this end this book presents selected results from the conference ‘Environmental Change and Migration: From Vulnerabilities to Capabilities’ held in December 2010 in Bad Salzflun in Germany. It was the first of a new conference series on ‘Environmental Degradation, Conflict and Forced Migration’, jointly sponsored by the European Science Foundation, Bielefeld University and its Center for Interdisciplinary Research. An interdisciplinary publication arising out of a conference always risks ending up as a compilation of only loosely connected studies. Therefore, we engaged in a continuous process of revising the framework and the contributions. We thank the authors for their continuous engagement in this process.

Apart from the authors and editors, several organisations and persons have contributed to the publication. We thank the European Science Foundation, Bielefeld University, and the Center for Interdisciplinary Research who are the institutional and financial partners of this series of research conferences. Edith Klein carefully edited the manuscript for book publication. Special thanks go to the Collaborative Research Center ‘From Heterogeneities to Inequalities’ at Bielefeld University for making this publication possible through its financial support.

Thomas Faist
Jeanette Schade

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Abbreviations

ABG	Autonomous Bougainville Government
AHDR	Arctic Human Development Report
ARB	Autonomous Region of Bougainville
ASEAN	Association of South East Asian Nations
AWG-LCA	Ad Hoc Working Group on Long-term Cooperative Action Under the Convention
CARE	Cooperative for Assistance and Relief Everywhere
CCEMA	Climate Change, Environment and Migration Alliance
CESCR	Committee on Economic, Social and Cultural Rights
CIESIN	Center for International Earth Science Information Network
CIRP	Carteret’s Integrated Relocation Programme
COP	Conference of Parties
CP-rights	Civil and Political Rights
DIFD	Department for International Development
EACH-FOR	Environmental Change and Forced Migration Scenarios
ECHR	European Court of Human Rights
ECOWAS	Economic Community of West African States
EM-DAT	Emergency Events Database
ESC-rights	Economic, Social and Cultural Human Rights
EWE	Extreme Weather Events
FAO	Food and Agriculture Organisation
FGD	Focus Group Discussion
FMRSP	Food Management and Research Support Project
FPIC	Free, Prior and Informed Consent
GC	General Comments
GCC	Global Climate Change
GCM	General Circulation Model
GHG	Greenhouse Gas
GPID	Guiding Principles on Internal Displacement
HRC	Human Rights Council
IASC	Inter-Agency Standing Committee
ICCPR	International Covenant on Civil and Political Rights

ICESCR	International Covenant on Economic, Social and Cultural Rights
ICIMOD	International Centre for Integrated Mountain Development
IDMC	Internal Displacement Monitoring Centre
IDP	Internally Displaced Person
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
IGO	International Governmental Organisation
INGC	Instituto Nacional de Gestão de Calamidades (National Institute for Disaster Management)
IOM	International Organisation for Migration
IPCC	Intergovernmental Panel on Climate Change
IWTC	International Workshop on Tropical Cyclones
LDC	Least Developed Country
LiSER	Living Space for Environmental Refugees
MICOA	Ministry for the Coordination of Environmental Affairs
MONRE	Ministry of Natural Resources and Environment
NAPA	National Adaptation Programmes of Action
NATO	North Atlantic Treaty Organization
NELM	New Economics of Labour Migration
NGO	Nongovernmental Organisation
OAU	Organisation for African Unity
OCHA	Office for the Coordination of Humanitarian Affairs
ODI	Overseas Development Institute
OECD	Organisation for Economic Cooperation and Development
OHCHR	Office of the High Commissioner for Human Rights
OLS	Ordinary Least Squares
P&E	Population and Environment Studies
PIC	Pacific Island Countries
PNG	Papua New Guinea
R2P	Responsibility to Protect
RMMRU	Refugee and Migratory Movements Research Unit
RSG	Representative of the UN Secretary-General
SLA	Sustainable Livelihood Approach
SLR	Simple Linear Regression
SRES	Series of Specific Emission Scenarios
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environmental Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNGA	United Nations General Assembly
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations International Children's Emergency Fund
UNSC	United Nations Security Council

UNU-EHS	United Nations University Institute for Environment and Human Security
WBGU	Wissenschaftlicher Beirat der Bundesregierung Globale Umweltveraenderungen (German Advisory Council on Global Change)
WEDO	Women's Environment and Development Organisation

Contributors

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Part I
Introduction

Chapter 1

The Climate–Migration Nexus: A Reorientation

Thomas Faist and Jeanette Schade

Abstract The introduction discusses the current ‘climate migrant’ debate. It further elaborates on the topic of ‘climate migration’ from a sociological view point and introduces the chapters of the book.

Keywords Climate migrant debate • Migration theory • Numbers • Sociology • Uncertainty

1.1 Introduction

In February 2012 the Intergovernmental Panel on Climate Change (IPCC) published its comprehensive report on climate extremes based on the most recent scientific knowledge regarding the impacts of global warming (IPCC 2012). While there is no absolute certainty about these changes due to insufficient data for some regions, the report confirms a high degree of likelihood for many phenomena. There is an overall decrease in the number of cold days and nights accompanied by an overall increase in warm days and nights. This can be confirmed particularly for North America, Europe and Australia as well as for much of Asia. More droughts have been experienced in southern Europe and West Africa. There is also a statistically significant trend that heavy precipitation events are increasing in some regions, but decreasing in others, and that tropical storms seem to be shifting poleward in the Northern as well as in the Southern Hemispheres. With respect to

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future developments the report regards it very likely that warm spells over most land areas will increase. This will perpetuate the erosion of mountain areas that are now still at permafrost latitudes. The expected increase in heavy precipitation for some regions is likely to lead to more floods in catchment areas. Such observations and projections raise the question of how people living in the affected areas are going to deal with the climatic repercussions of global warming. That global warming could cause major migratory and refugee movements has therefore been at the forefront of concern since the establishment of the IPCC. Scientific focus has thus been put on the 'climate push' and vulnerability to climatic conditions.

Current research on the subject of environmentally and climate induced migration is still frequently narrowed down to climate change vulnerability and the environmental push factor, and therefore misses some of the complex interlinkages between societal and environmental vulnerability, migration and capability. The social construction of human–environment relationships, the social inequalities backing the unsustainable exploitation of natural and human resources, the efforts of persons affected to overcome such inequalities by geographical mobility, and the role of institutions in sometimes overcoming but often reproducing existing vulnerability and resource poverty have to be seen in conjunction. The need now is to transcend predominantly policy-oriented approaches which are limited by estimating numbers and identifying high risk zones. Such unreflexive approaches that barely consider the social contexts and conditions of migration are still dominant in the debate. The contributions to this volume fill this gap and shed light on the complexity of the nexus between environmental change, vulnerability and migration—and take the discussion to a new realm in capabilities for facing climate change.

This book casts serious doubt on whether existing terms such as 'environmental migrant' and a focus on projecting concomitant migration flows are appropriate tools to capture underlying processes of mobility and social change. Even more fundamentally, we criticize the theoretical and conceptual framework which seems to undergird the inflationary use of terms and numbers. Instead, we argue for a re-orientation of research on migration in the context of climate change and environmental degradation which is cognizant of the rich theorizing on human migration. This orientation implicates a move away from a concern with the invention of ever new terms to describe the phenomena and an abandonment of a futile search for the ultimate causes of migration brought about by climate change. We deem it important to re-orient this mushrooming field of research to consider the strengths of accumulated knowledge in the field of migration and bring it to bear on the complex relationship between anthropogenic climate change and migration. It is fruitful to think of climate change and migration as a two-way relationship, a nexus. In particular, this means a focus on the social frameworks, the processes and consequences of migration in the context of climate change. It is necessary to place migration in the fold of manifold structural social inequalities in and between national states. As to agents, it is necessary to go beyond the notion of vulnerability because it often hides the very active role human beings play in interacting with their 'environment'. Agency needs to be brought in, which means recognizing that migration is most often a proactive and not simply a reactive choice.

In a nutshell, we thus move from considering vulnerabilities to include capabilities. Seen in this way, migration in the frame of climate change is a case of spatial and social mobility, a strategy of persons and groups to deal with a grossly unequal distribution of life chances across the world.

Toward this end, we proceed to disentangle the confusion with the usage of terms and give an overview of the main strands of the ‘climate migrant’ debate, which exposes the bias of the debate on ‘push’-thinking and the problem of the natural resource base. We will then reflect on vulnerability to climate change and environmental migration from sociological viewpoints before we introduce in depth the main insights from migration studies that could and should inform research on environmentally induced migration. With the complexity of migration decisions and processes in mind we discuss the challenge of double uncertainty inherent in investigations into climate-related migration, which explains the controversial nature of the estimations and projections of ‘climate migrants’. Finally, we give an overview of the chapters and their specific contribution in illuminating the debate on environmental migration.

1.2 The Hassle with Terms: What We are Talking About?

There is a proliferation of terms related to the ‘climate migrant’ debate. One of the most frequently referred to in the debate is El-Hinnawi’s definition of ‘environmental refugees’ used in the mid-1980s for the homonymous United Nations Environment Programme (UNEP) report, which included all ‘those people who have been forced to leave their traditional habitat, temporarily or permanently, because of a marked environmental disruption (natural and/or triggered by people) that jeopardised their existence and/or seriously affected the quality of their life’ (El-Hinnawi 1985, p. 4). This UNEP report was, however, not yet related to climate change, but to the environment–population–development nexus, and was then used to point to the problem of the breakdown of life support systems due to overexploitation of carrying capacities, for example, for livestock keeping (Kliot 2004, p. 72). The term was then extended to explicitly include people displaced by development projects or who have to flee industrial accidents (Jacobson 1988) and to comprise people fleeing environmental degradation as a cause or consequence of violent conflicts (Loneran 1995).

The first report of the Intergovernmental Panel on Climate Change (IPCC) also used the term ‘environmental refugee’ in quotation marks and described it as ‘people displaced by degradation of land, flooding or drought’ (IPCC 1990, pp. 5–10). The second IPCC report used the term ‘ecological refugees’ (quotation marks again in the original) to refer to those fleeing natural disasters (IPCC 1996, p. 416). This understanding resembles the one Norman Myers used for his early estimates of ‘environmental refugees’ which he regarded to be ‘people who can no longer gain secure livelihood in their erstwhile homelands because of drought, soil erosion, desertification, and other environmental problems’ from which some ‘flee’ across borders and others become ‘internally displaced’ (Myers 1993, p. 752). Biermann

and Boas tried to be more concise and used instead the term ‘climate refugee’ embracing only people who flee the direct effects of climate change (within or across borders), that is, sea-level rise, extreme weather events, droughts and water scarcity (Biermann and Boas 2007, p. 8).

The use of the term ‘refugee’ in this context became quite disputed, however, because of its legal meaning under the Geneva Refugee Convention. Indeed, the United Nations (UN) refugee organisation did reject the use of the term ‘environmental refugee’ or ‘climate refugee’ and any attempts to broaden the mandate of the Convention (Piguet 2008, p. 2). This might have been one of the reasons why the term ‘environmental migration’ and ‘climate migration’ came into use. The third IPCC report, for example, is somewhere in between. It stated that ‘migration may be the last of a complex set of coping strategies’ to ‘adapt to interannual variability of climate’. Nonetheless, the report still uses the term ‘environmental refugees’ in quotation marks (IPCC 2001, p. 397). The fourth IPCC report, finally, did not use the term ‘refugee’ at all, but only spoke of ‘environmental migration’ emphasising at the same time that ‘there is a lack of agreement on what an environmental migrant is anyway’ (IPCC 2007a, p. 365).

In addition, the terms ‘eco-migrants’, ‘ecological migration’ and terms that suggest a lesser degree of a direct causal relationship such as ‘climate-related migration’ or ‘environmentally induced migration’ have been introduced into the debate. Research entities of international organisations such as the United Nations University or the research unit of the International Organisation for Migration (IOM) indeed undertook great efforts to define and elaborate on appropriate terms (e.g. Renaud et al. 2007; Laczko and Aghazarm 2009). Nonetheless, the fact that the IPCC and many others—including some authors of this volume—have a tendency to put the terms ‘climate migration’ or ‘environmental refugee’ into quotation marks is still a strong signal that the meaning of those terms is often ambiguous and anything but crystal clear. In the end, which combination of words is chosen and why depends to a great extent on the context. The word ‘refugee’ is still often used to highlight the emergency nature of the situation of such people and the responsibility to act and help them (as Biermann and Boas did). The word ‘migrant’ is used partly to avoid the term refugee, but also because it has a broader connotation and encompasses the diverse types of environment related population movements such as circular and seasonal migration, long-term migration due to slow onset changes, or short-term displacement due to sudden events. To stress the non- or semi-voluntary character of those movements the term is often endowed with a prefix such as ‘forced’ or ‘impelled’ migration. The word ‘climate’ might be used to emphasise the interrelationship with global warming and the climate change discourse. The term ‘environmental’ might be used instead to emphasise that it is often empirically not possible to distinguish migration triggered by global warming from that triggered by other sources of natural disasters (e.g. cyclical weather anomalies) and environmental degradation (e.g. overexploitation of natural resources). Moreover, even where such differentiation is possible, as is the case with volcanic disruptions, the emergency response does not look that different from climate related disasters.

In this volume the terms ‘climate migrant/migration’—if they are used—should not be regarded as well-defined concepts, but as terms that express, first, that the current debate on environmentally induced migration is closely attached to the climate change discourse and the expected increases in weather anomalies. Second, the term encompasses environmentally induced migration beyond displacement and flight. Nevertheless, such terms still support the main proposition of the debate which is that of the ‘environmental push’. The most frequently used terms in the volume are, however, ‘environmental migrant/migration’ which is meant to stress the complex relationship between climate and environmental change. The use of the latter terms in this book is usually not meant to embrace people who have been uprooted due to development investments and thus departs from the meaning that Jacobson and Lonergan coined.

1.3 Strands of the ‘Climate Migrant’ Debate

The climate change and climate migrant debate is generally deeply entrenched into the environment and population discourse. This discourse is firmly rooted in neo-Malthusian thinking, which emphasises the mismatch between humankind and its resource base (Saunders 2000). The field of population and environment studies (P&E) is a crucial case in point and tends to reproduce mainly three narratives of the environment-migration nexus (Hartmann 2010): first, the poor and landless in particular migrate to forest frontiers to access new land which leads to deforestation and further degradation (e.g. Geist and Lambdin 2001); second, environmental degradation and population pressure impels migration and produces environmental refugees (e.g. El-Hinnawi 1985); and third, migration leads to (ethnic) conflicts over scarce renewable resources and urban unrest in destination areas (e.g. Homer-Dixon 1999).

The ‘climate migrant’ debate has its origins in the latter two of the P&E narratives of migration and currently consists of five dominant strands. The five threads might be called the ‘ecosystem strand’, the ‘conflict strand’, the ‘refugee strand’, the ‘adaptation strand’ and the ‘relocation strand’. All of them assume a (more or less) direct link between climate change and migration, and share the hypothesis that the crucial nexus is a ‘push’ to move caused by the depletion of natural resources and capricious weather conditions (Schade 2012). According to this view land loss due to sea level rise, desertification and land slides, or water stress and storm surges lead to the deprivation of crucial livelihood assets and ecosystem services, and thus forces people to leave. This may happen suddenly due to hazard events or gradually due to slow onset changes. It might also be the result of exhausted coping capacities due to an increased frequency of extreme weather events that does not allow for substantial recovery.

The ecosystem strand thereby forms the initial base wherefrom the other threads depart. In line with the second P&E migration narrative the key terms are ‘environmental push’ or ‘climate push’. They suggest that ‘climate change’ is a

major trigger for forced and impelled migration.¹ Already the first IPCC report of 1990 argued that migration and spontaneous relocation ‘may be the most threatening short-term effects of climate change on human settlement’ (IPCC 1990, p. 9), thereby emphasising that developing countries in particular would be affected. Such warnings usually go hand in hand with the identification of high risk zones and the projections of the number of displaced persons due to climate change phenomena such as sea-level rise, coastal flooding, changes in the monsoon system and increased severity and frequency of droughts. The most cited figure in this regard is that of 200 million by 2050 (Myers 1996, p. 175). The prevailing message attached to these projections on extraordinary increases in impelled migration is usually that climate change has to be stopped. Some regard this strand of the debate therefore to be a lobbying strategy of environmentalists to increase pressure on decision-makers in order to mitigate climate change (McGregor 1994, p. 127).

Based on these dire predictions and in line with the third P&E migration narrative is the conflict strand. This strand encompasses the scientific community of peace and conflict studies as well as institutions concerned with security issues, who debate the potential for conflicts arising from such climate induced mass migration. The notion that environmental migration increases proclivity for conflicts was briefly raised in the second IPCC report with reference to Homer-Dixon and Suhrke (IPCC 1996, p. 496; Homer-Dixon et al. 1993; Suhrke 1993) and thoroughly adopted by the third report (IPCC 2001, p. 397). In 2007 it was again raised by the German Advisory Council on Global Change (WBGU 2007), and finally also adopted by relevant international organisations such as the UN Security Council, the UN General Assembly and the IOM (UNSC 2007; IOM 2007; UNGA 2009a and 2009b). Migration, in this context, is treated as one of the various security threats society has to deal with in a warming world, alongside issues such as territorial disputes and intra-state as well as internal resource conflicts.

The third thread of discussion, the refugee strand, is more concerned with human security and governance issues. Actors, mainly academics and nongovernmental organisations, have raised their voices to advocate a new regime for so called ‘climate refugees’ and/or to review and adjust existing international laws (e.g. WBGU 2007, p. 129; Bauer 2010). The discussions on how to protect climate and environmental refugees are, however, very diverse, ranging from legal analysis of currently available instruments (Ammer 2009; Ammer et al. 2010; Cournil 2011; Epiney 2011), to new policy proposals (Biermann and Boas 2007; Docherty and Giannini 2009). Of particular concern are the disappearing small island states and the challenges they face regarding provisions of asylum law and other ways to protect refugees’ rights; the situation of internally displaced persons (IDPs, i.e. ‘refugees’ that do not cross borders) and involve conceptual and legal challenges (Zetter 2010); as well as the question of justice and compensation (Penz 2010), amongst others.

The fourth and fifth strands, adaptation and relocation respectively, move away from the alarmist overtones of the debate by offering solutions to the foreseen

¹ For categorisations of climate related “push factors” see inter alia Hugo 2010; Kniveton et al. 2008; Renaud et al. 2011.

disaster of imminent displacement and migration as a ‘second-order effect of unsuccessful adaptation’ (UNGA 2009b, p. 7). The fourth strand is instead concerned with the potential of migration for adaptation to climate change by generating remittances (Adger et al. 2003; Barnett and Webber 2010). This narrative was derived from the development–migration nexus debate and the work of migration research on the significance of remittances as a strategy for income diversification and coping with life risks, such as crop failures (Stark and Levhari 1982; cf. Faist 2008). Circular migration and remittances are promoted as a way forward to enhance people’s capacities for adaptation by means of accumulating skills and resources at the place of origin. The IOM, for example, advocates such circular migration schemes between developing and developed countries as a form of adaptation to environmental degradation and resource pressure (de Moor 2011). Controlled migration is thus seen as a means to avoid uncontrolled migration and flight due to adverse living conditions in a warming world. Here migration evolves into a coping strategy to handle those resource base problems.

Finally, one preventive measure to avoid uncontrolled displacement, which can be labelled the fifth strand of the climate migrant debate, is that of planned relocation of vulnerable communities. Planned relocation is discussed particularly with reference to disappearing islands in the Pacific region (Boege, this volume; Campbell 2010; Ferris et al. 2011), but also with regard to dislocations related to floods (Stal 2009) and bank erosion (Dun 2009), and as a way to enable regeneration of overexploited ecosystems (Zhang 2009). Biermann and Boas (2007) even made preventive relocation the centrepiece of their proposed climate refugee regime that embraces all those prone to severe human suffering due to the direct impacts of global warming. Their solution again forms part of an answer to the resource base problem, and it seeks to solve it by resettling affected people to places with more reliable and viable conditions. Resettlement is regarded as the only possible measure to protect those who live in places where no in situ adaptation is feasible, and to avoid displacement and uncontrolled mass migration as a form of ‘maladaptation’. Ordered relocation even found its way into United Nations Framework Convention on Climate Change (UNFCCC) negotiations and outcomes of the COP-16 in Cancun in 2010 (UNFCCC 2011, para. 14[f]).

In sum, although the climate migrant debate experienced a move from alarmist negative connotations of migration to more solution oriented discussions, all its strands are still centred upon the presumption of the natural resource base problem.

1.4 Some Reflections on Migration and Vulnerability from a Sociological Perspective

The premise of the resource base problem and the environmental push unfortunately overlooks the social conditions causing the problems and the social construction of the prospects for the proposed solutions (cf. Berger and Luckmann 1966). The underlying conceptualisation of migration in the ‘climate migrant’

debate, and the terminologies and numbers it produced, have therefore been widely criticized by social scientists and migration researchers in particular (McGregor 1993; Cannon 1994; Kibreab 1994; Black 2001, Castles 2002). For an interim period this even led to a polarisation of the debate between ‘alarmists’ and the ‘sceptics’ (Gemenne 2011b, pp. 230–239). This characterisation, however, is misleading, because it suggests that ‘sceptics’ do not believe in the severity of climate change—like those who are sceptical about anthropogenic global warming—and thus would neither believe in its potential to uproot people. Instead, the so-called sceptics are concerned with the shortcomings of the existing concepts and approaches, and are reluctant to draw premature conclusions.

In particular the ‘alarmist’ strands of the climate migrant debate characterise migration solely as an expression of vulnerability and disregard the sometimes positive role of mobility in everyday life. In equal measure they disregard the multi-causality of social vulnerability to climate change, which leads us to bring in migration studies. The lopsided focus on the ‘environmental push’ as a ‘root cause’ for uprooting and displacement is partially deceptive, because social structures determine to a large extent whether an extreme weather event turns out to be a human disaster or not (Cannon 1994, p. 17f). We argue instead that the analysis of migration as well as vulnerability to environmental conditions have to be placed within the context of the structures of inequality across the globe. The degree of vulnerability or resilience and coping capacities respectively of certain segments of a population to environmental stressors depends heavily on societal structures (Bohle et al. 1994, p. 37; Adger and Kelly 1999, p. 255). These are also a manifestation of social inequality within a particular society, and must certainly be considered on the local and national levels. The political marginalisation of the indigenous people in Chiapas (Mexico), for instance, is one of the reasons for the absence of lobbies to protect the rain forest from extensive logging by large wood traders. Deforestation resulted in huge mud-slides during exceptionally heavy rains that buried small villages of exactly those indigenous people (Alscher 2008).

Also, on the global scale patterns of inequality between nations and world regions and their historically rooted hierarchies of exploitation have an impact upon climate change vulnerability. In the Mexican case, for instance, logging is perpetuated by global demand for wood. It is thus not only extreme weather events and social inequality within Mexico that make the indigenous population vulnerable, but also global markets and purchasing power which are in turn incorporated into local and national patterns of inequality. Similarly, in Bangladesh the expansion of shrimp production for the world market resulted in the destruction of large mangrove areas which had protected the coastal areas against salt water intrusion (Stern 2007, p. 433). Moreover, shrimp production is less labour intensive and agricultural labourers left jobless, which also forces them to migrate to cities in search for new income. This leads us to a more general observation: Not only does global warming hit the developing world much harder than other parts of the world because of unfavourable geographic-climatic conditions. To an even greater degree, because of their structurally disadvantaged position, developing countries are not able to adapt as well as post-industrial countries. Moreover, the difficulties in adaptation

exacerbate the difficulties developing countries face in competing in markets (cf. Wallerstein 1974), again limiting their adaptive capacities. The character of such post-colonial societies—weak civil societies, great inequalities in income, as well as restricted access to resources, law and justice—feeds into the weak adaptive capacities of their societies (Roberts and Park 2006). We thus potentially observe a ratcheting effect resulting in a downward spiral to cope with climate change.

From a migration studies perspective mobility is, moreover, not an expression primarily of vulnerability but one of human agency. Migration is often a proactive and not simply a reactive choice. In many environmentally harsh areas mobility (rather than flight) often serves as a traditional coping strategy to deal with the scarcity of natural resources. The seasonal movements of pastoralists from wet season grazing areas to dry season grazing areas are such an example. In the form of labour migration—often to urban areas—it serves to spread risks, diversify income and enhance opportunities (Stark and Levhari 1982; Stark 1991). It is a useful strategy, for example, to substitute usury credits and lack of income opportunities for remittances. Moreover, it serves to insure families against crop failure where no formal insurance system exists.

The degree of voluntariness and agency involved in migration decisions might, however, vary to a large degree. Migration decisions must be analysed in the broader context of the livelihood settings and the ways livelihoods are embedded into societal institutions. If the latter—ranging from formal administrative structures and policies to informal social networks and civil society organisations—respond or do not respond to the demands and needs of the members of a society, two reactions are possible (Hirschman 1970): exit or voice. Exit as an option implies that out-migration from nation states or smaller administrative and social units has to be analysed in relationship to the capacities of the people (or the lack thereof) to change things in situ by raising their voice and exercising political influence. Exclusive political and legislative systems, for instance, deprive vulnerable groups of their voice option and thus restrict their search for in situ solutions (Faist 2000, p. 20ff.) in the face of climate change (adaptation) as well as other burdens. In this regard, vulnerability as a result of exclusion and inequality indeed strongly relates to a proclivity to migrate and to use the exit option. Crucial for voice is loyalty to the social unit concerned, for example, a village or a national state. Loyalty plays a major role if people feel very attached to their communities, their land and their ancestors. In some instances, exit and voice may even be complementary. If exit is succeeded by a continuing concern with the region of origin, by sending remittances for example, exit may contribute to voice in that it increases the range of options allowing for in situ adaptation of those who remained. However, to stay might likewise be the result of complete immiseration and lack of necessary assets to move or to improve conditions in situ, i.e. people are deprived of their voice as well as of their exit options. In such cases it is not a decision to stay but the plight of immobility.

To capture the human agency involved in environmentally induced migration as well as its limits, we have chosen to move conceptually from vulnerabilities to capabilities. The aim was to embed environmental migration within the broader

frame of the capabilities approach which was pioneered by Amartya Sen for development studies and since then adapted to various purposes (Sen 1981, 1992, 1999). According to Sen, capabilities are not the things that people may be able to do—their ‘functioning’—but their capacity to choose and to live a life they value. Such functions include access to food or education, or mobility, and other aims which are important to her/his idea of a good life. For that, of course, they need basic resources to make decisions on the functions they want to be fulfilled. Such resources may include natural, physical, mental, cultural, social, economic, financial and political assets, and necessitate their advantageous embeddedness in societal structures and institutions. Yet Sen goes beyond an instrumental concern with resources to enable functions and brings in the intrinsic consideration that the choice of one’s way of life and functioning is fundamentally important. In general, the term capability connects to the broader issue of human development which depends axiomatically on freedom to achieve those chosen goals. Ultimately, Hirschman’s and Sen’s approaches converge in that the ability to make choices is constitutive of agency.

Greater capabilities may be equated with lesser vulnerability, which is certainly true for impoverished and marginalized populations. If assets can be multiplied, livelihoods are more sustainable, and the eventual loss of one asset can be compensated for by the use of others. Accordingly, we understand vulnerability as lacking or being deprived of essential assets necessary to realize functions crucial to coping with environmental change. The specific role of migration has thus to be contextualized with regard to the other assets available to a person or household, including its political assets, its voice. And voice implies capabilities. Migration is thus shaped by the same assets available for in situ alternatives, their ‘double uses’, and the overall combination of tangible and nontangible resources available to an individual or a household. Whether migration is an expression of vulnerability or capability depends to a large extent on the degree of freedom or choice for exit or voice or a combination of the two. That migration can be chosen at all is a manifestation of capability, if the case of immiseration is avoided.

1.5 The Potential Contribution of Migration Studies to Research on Environmental Migration

Difficulties in conceptualizing and researching environmentally induced migration meaningfully arise from the complexity of migration processes. These are in most cases multi-causal and no single ‘driver’ such as environmental degradation can normally be isolated from other drivers, which may or may not be related to the environment. Failing or exploitative credit and labour markets, for example, are acknowledged incentives for migration decisions too (Massey et al. 1993, p. 436ff) and these might go hand in hand with environmental degradation. Migration processes are self-perpetuating and become partly independent of their original drivers, which is called ‘cumulative causation’. They are path-dependent,

which means that migration follows the paths of previous migratory flows, irrespective of legal classifications and raised hindrances. Thus trying empirically to distinguish clearly climate driven migration from other types of migration such as environmentally, economically or even culturally driven processes would be close to impossible. To add a further difficulty, migration away from environmentally unsafe locations does not mean that the places of destination are better protected from environmental hazards. Hugo, for instance, observed that people move from the eroding and storm prone coasts of Asia to its coastal mega-cities, which are equally threatened by the increase in extreme weather events (Hugo 2010). If search for environmentally safer locations is the main reason for moving in this case, that would make no sense, but path dependency and cumulative causation can explain this at first sight counterintuitive mobility pattern. Finally, migration is non-linear, i.e. circumstances that might trigger migration in one case do not necessarily trigger migration in a case with comparable external conditions. A study of two Mexican villages with comparable environmental pressure showed that only in one of the villages did a considerable number of people choose to migrate. The inhabitants of the other village remained in their community, mainly because they had no migration history or tradition (Schmidt-Verkerk 2009). This is so because in addition to the proximate causes of migration an infrastructure for movement itself—for example, migrant networks and/or financial means—needs to be in place to lower the transaction and transfer costs involved (Faist 2000, pp. 96–123).

To account for migration in the context of climate change, as indeed all other migration situations, the conditions at the place of origin and the destination, as well as intervening factors along the migration route have to be taken into consideration. Most studies on environmental migration mentioned thus far focus solely on the place of origin and thereby often face problems linking existing migration unequivocally to environmental changes. Other obvious triggers for migration, such as economic, educational, political and cultural reasons and discriminative practices, are neglected, as are the dynamics of migration processes once they have unfolded. The role of intermediary factors and transnational ties such as social and informational networks, established migration roots, professionalized agents, costs of transport, and so on, are often not considered—even less so the possible impact of climate and environmental change on such factors and social spaces (Schade and Faist 2010, p. 9). Also, very few case studies reverse the optic and ask how environmental change at destinations might impact upon migration. Dry spells in the United States, for example, may slow down migration from Mexico, as demand for seasonal harvest workers decreases (Kniveton et al. 2008).

Fundamentally, migration often relies on supportive social networks and intermediary institutions that perhaps not everyone has access to. A person may lack the ‘right’ ethnic or religious affiliation or the necessary amount of money or social status to enter those networks and take advantage of them—to be entitled to them and their services. Such migration dynamics unfold within societal structures and institutions that are specific to the migration option, and that enable or constrain it. Cross-border migration in particular is subject to strong institutional

regulation by migration regimes as an intervening obstacle. This again mirrors the inequality between nation states and their respective citizens, because it is usually those who come from developing countries that face the greatest restrictions when they want to access economically attractive destinations of the developed world. Once persons have succeeded in crossing borders, there are still various challenges, not the least of which is the problem of transferring educational and occupational credentials. Internal migration is also shaped by societal constraints such as, for example, the lack of recognition of certificates and non-transferability of social security contributions within the states of a federation, or the presence of hostilities between groups.

Although networks facilitate movement, migration is still costly, requires resources and can be physically stressful. Therefore, degradation can just as equally lead to a decrease in migration. During the droughts of the 1980s in the Sahel zone, nomads could no longer follow their traditional trading routes, because the distance to be covered without new water resources became too long for their camels (Spittler 1987). Mobility has been re-established and improved by the wider use of trucks amongst pastoralists to transport livestock, which demands considerable investment by the people themselves or supportive institutions. The necessary resources to invest into migration cannot be mobilized in all cases. Rural-rural migration from arid northwest Ghana to the fertile Brong-Ahafo Region, which is a common local strategy to secure livelihoods and food production, abated during periods of persistent lack of rainfall (Geest 2009). To describe migration as a measure of last resort for the most poor and underprivileged people in third world countries (e.g. Stern 2007, p. 111; IPCC 2007b, p. 57) is therefore highly misleading. The appropriate reverse question is why so few people do not move despite troubling conditions (Faist 2000, p. 1).

Migration is seldom a mass flight that involves the move of entire households. This is also true for environmentally induced migration. As has been emphasized by the Sustainable Livelihood Approach (SLA) and New Economics of Labour Migration (NELM), migration is in many regions a household decision to send out some members to improve household income. Indeed, out-migration potentially can relieve the homestead from population and resource pressure and at the same time generate monetary and non-monetary remittances to ease conditions of life at the place of origin. Thus the fourth strand of the 'climate migrant' debate dealing with issues such as remittances regards migration as exit to be complemented by voice and enlarged capabilities. At the same time, we need to consider that migration is selective and mainly involves the working age population, that is, the same population segment which is usually required for local agricultural labour and other physically challenging work such as digging irrigation channels, which can lead to the deprivation of human resources for coping also with environmental challenges. It can thus equally result in negative impacts such as social fragmentation, or increasing inequalities within and between families, which lowers adaptive capacities of communities of origin to environmental and other stressors.

Migration studies can contribute significant insights not so much into the causes of migration but into the dynamics, that is, the processes and consequences of

movement. The impact of this research in accounting for environmentally induced migration have nevertheless been limited—probably because the mechanisms described have applied predominantly to international labour migration. Climate and environmentally induced migration—in contrast—has with the exception of the fourth strand so far been discussed mainly as a phenomenon distinct from labour migration. However, we need to consider that the processes of cumulative causation, originally developed for labour migration, can also be applied to migration in the context of environmental degradation. This means that we should not distinguish, from a theoretical angle, between labour migration, refugee migration, environmental migration etc. After all, labour migration and asylum are legal distinctions, used by states to classify migrants. Yet they are not useful for understanding the causes and dynamics of migration (Faist 2000, pp. 1–28; Bakewell 2011). Instead we need to study migration in the context of certain conditions, such as searching for additional or alternative sources of income, protection from physical or/and structural violence, or environmental degradation. The basic conceptual tools just mentioned, above all cumulative causation, can be applied to all of these contexts. Although migration research is well suited to account for the dynamics and the manifold social—political, economic and cultural—consequences of migration once it has started, it is not as helpful in predicting the onset of migratory flows. This shortcoming is aggravated by the challenge of double uncertainty due to the great diversity of the relevant factors.

1.6 The Challenge of Double Uncertainty

An improved understanding of environmentally induced migration is a challenge to both fields of science, climate change and migration. As explained above, the difficulties associated with the lack of predictability or generalisations about migration decisions are highly entrenched in the complexity of social structures. Great uncertainties are thus also involved in relation to societal capacities for adaptation, for in situ as well as migration options. Indeed, the solution oriented strands of the ‘climate migrant’ debate are also built upon a number of uncertainties with respect to the problem solving potential of their proposals.

It is toward these uncertainties that we now turn. They arise from both climate sciences and migration studies. As to climate sciences, although today the voices doubting the reality of man-made climate warming can largely be disqualified, there are still considerable imponderabilities in determining future climate change by climate modelling. There are major problems inherent in climate modelling. First, there is the non-linearity of climate change: we do not really know, for example, how reaching the tipping point, i.e. when the warming starts to accelerate further warming in an exponential manner, will feed back into the global climate system. One has only to think, for example, of the warming up of permafrost soils which sets free vast quantities of climate-unfriendly greenhouse gases like methane, or the diminishing of the albedo effect due to melting ice shields.

Second, the complex topographic characteristics that determine local climate and how to model their interaction with global warming must also be considered. Third, existing models face limits in taking into account anthropogenic sources of future climate change, for example, estimating the amount of future emissions that are highly dependent on technological and economic developments. Fourth, there are difficulties in modelling other societal factors that impact upon emissions and availability of carbon sinks, such as demographic factors or changing land-use, which in turn are highly interrelated. Fifth, the models have difficulty in accounting for possible natural sources of climate change such as major volcanic disruptions (Daniela Jacob, Climate Service Center, summarised in Schade and Faist 2011, p. 5). Sixth, and finally, the impact of climate change on some components of the climatic system are less than clear, such as the repercussions of global warming on cloud building and on the change of ocean currents (Björn Stevens, Max-Planck-Institute for Meteorology, in an interview with Vieth 2012).

Accurate predictions of climate change are thus not possible, because climate models are methods of projections in the sense of ‘if ... then ...’ statements. It is therefore not surprising that projections of global warming range between 0.79 and 4.16 °C by 2100 (Union of Concerned Scientists 2010)² and that projections of global circulation models and of regional climate models (though the latter are based on the former) at times do not achieve consistent results for a particular region, or may even reach opposing ones, as is the case regarding rainfall changes in Kenya (Schade 2011, p. 22f.). The uncertainties of climate change projections can be reduced by clustering multiple models. Yet there are also limits to building more complex models: the internal variability of the models serves as an indicator for the robustness of a projection, i.e. the larger, the less robust.

In sum, it is no exaggeration to speak of a challenge of uncertainty pertinent to the two fields of climate change and migration. With respect to the field of ‘climate migration’ this adds up to a double challenge of uncertainty. Attempts to forecast climate migration, i.e. how many people will be potentially displaced and eventually move, usually use simplified ‘equations’ based on a combination of expected impacts of global warming and demographic projections. However, such predictions have to be treated with caution. They are based on uncertain ‘if ... then’ statements regarding changes in eco-systems. An example is projections based on rising sea levels. It is often assumed that a sea level rise of a certain magnitude affects specific parts of coastlands. The number of persons living within the range of a sea level rise is then predicted to emerge as climate refugees. In other words, demographic projections cannot overcome the uncertainties of climate change projections.

It is due to those cumulative uncertainties as well as to the multitude of meanings of ‘environmental migration’ and associated terms that there also exists a broad range of estimates of how many ‘environmental migrants’ we do and will have. Estimates of actual numbers range between: 10 million (Jacobson 1988), 25 million

² The source refers to a range between 2.1 and 11 degrees Fahrenheit (1°F equates 0.378 °C).

(Myers and Kent 1995), 30 million (El-Hinnawi in an interview with Milan 2004), 10 million annually Bogardi quoted in Adam (2005), 17 million in 2009 and 42 million in 2010 (Yenotani 2011; cf. Gemenne 2011a, pp. 2–4, includes an overview on the background and consistency of those estimates and predictions). According to EM-DAT the number of people affected by natural disasters reached a climax in 2002 of about 600 million (EM-DAT 2011).³ Needless to say, like estimates of past and current numbers of ‘environmental migrants’, projections also vary largely depending on the definitions and assumption they are based upon. In 2007 Norman Myers adjusted his forecast of 200 million environmental refugees by 2050 to 250 million people (Myers in an interview, Christian Aid 2007, p. 48). The second most famous projection frequently mentioned in this context is that of Christian Aid amounting to one billion people ‘forced’ to migrate by 2050 (Christian Aid 2007, p. 1). This latter number is highly controversial and its use within the climate and environmental migration discourse is, moreover, misleading, because it is an attempt to predict the number of all kinds of displaced persons including refugees according to the Geneva Convention and internally displaced due to conflicts. It also comprises—and this is the by far largest number—645 million people evicted due to development projects, which fits under the notion of ‘environmental refugee’ coined by Jacobson and Lonergan (see above). ‘Environmental refugees’ in the more narrow sense constitute Myers’s 250 million permanently displaced people as result of climate change and an additional 50 million people displaced by other natural disasters (Christian Aid 2007, p. 6).

This myopic concern with projecting numbers of migrants is probably a result of the attempt to be policy relevant at all costs. Instead of researching the two-way relationships between climate change and migration, including a critical analysis of existing policies that deal with climate change, most research engages in a projection into the future by making doubtful linkages between environmental change, such as x-level amount of sea level rise leading to y-amount of migrants produced by such change. Again, such superficial correlations omit the basic fact that persons are not simply passive victims of environmental change but change their environment by their social practices.

1.7 The Contributions to This Volume

Against the background of hitherto mostly unsystematic efforts to trace the climate change–migration nexus and the policy-driven character of the debate, the contributions to this volume focus on methodological innovations and the politics and policies of this nexus. The preceding discussion on the conceptual and

³ EM-DAT defines, ‘affected people’ as the ‘number of people requiring immediate assistance during a period of emergency which may include displaced or evacuated people’ (CRED 2011, p. 9).

empirical limitations of the ‘climate migrant’ debate leads to reflections on the methodologies and methods appropriate to study the linkages between environmental and climate change and migration. These respective contributions are compiled in part I of this volume. Although not all chapters are explicitly concerned with the survey of migration patterns, the contributions provide for a broad spectrum of approaches that are valuable to consider if inquiries into the environment/climate/migration-nexus are planned. All of them offer pathways to capturing the complexity of the phenomenon in question. The contributions consider how to approach systematically the impact of environmental change on existing labour migration; the different ways in which migration, demographic factors, and adaptive capacities might inter-relate with each other; the difficulties in assessing and tracing the use of remittances as an adaptation strategy; and the potentials of econometric research on vulnerability and unequal coping capacities to study the question of environmentally induced migration. These concerns allow us to look at the issue of climate migration from different disciplinary perspectives and to be more precise about the use and challenges of the methodologies applied.

The second part of the book, on politics and human rights, raises the question of policies and politics in various ways. It portrays how the agendas related to ‘climate migration’ get constituted in the public realm. Transcending predominantly policy oriented approaches dominant in the debate, the contributions here open space to a more fundamental exploration of the subject. The question of vulnerability and the prospects and limits of human rights to protect those vulnerable to climate change figures prominently in this part of the book. It explicitly seeks to deepen analysis of the implications of proposed and implemented policies and adds normative considerations. The second part thus leads back to the question of capabilities—which will be reflected in the concluding chapter.

Richard Black, Dominic Kniveton and Kerstin Schmidt-Verkerk (Chap. 2) open the first section of the book on methodologies and methods by reminding us that even though there is an increasing number of studies on the nexus between climate change and migration, many of these lack a solid conceptual and methodological basis. The approaches most in use are conceptually flawed, as they tend to look at existing migration patterns and try to match these with existing projections on climate and/or environmental change with a clear focus on the places of origin. The authors thus try to break new ground by introducing an alternative approach. Instead of isolating the environmental/climate factor from other pushes to migrate, they take a macro-perspective and explore the sensitivity of existing migration flows to climate change. This approach thus applies basic insights of migration theory to environmentally induced migration. The authors call for inquiry into the susceptibility of the economic basis at the destinations of existing labour migration to climate change in order to draw conclusions on the potential impact of climate change on labour migration.

Robert McLeman and James Ford (Chap. 3) depart from the dominant perspective of the environmental push. Instead of simply asking why and where people move, they analyse the interrelationship between demographic and environmental change in four case studies from Canada—two of them in rural eastern

Ontario, two in Nunavut—using a combination of regional modelling, data from geographic information system (GIS), indigenous knowledge and census data. According to their findings, it would be far too simple to assume a direct causal relationship between environmental change, vulnerability and out-migration. Factors to be taken into consideration include not just the size of demographic change, but also its composition, its impact on social networks and the (possibly negative) impact of migration on in situ adaptation options of those left behind. All these factors influence each other in multiple ways.

Soumyadee Banerjee and his co-authors Jean Yves Gerlitz and Dominic Kinveton (Chap. 4) explore migration as anticipatory behaviour in situations of environmental threat, in particular of water hazards. They conducted a survey among 1,433 households in the Hindu Kush Himalayan region exposed to water stress. It is one of the first large-scale household surveys to focus on water stress as a possible cause for labour migration and target for the use of remittances. While migration may yield negative effects on family life and social cohesion, it also entails certain advantages such as diversification of income sources and better prospects for development, for example, by way of remittances. Throughout, the authors critically discuss the major challenges of data collection and analysis inherent in such a survey of migration patterns that were encountered during the study.

Tanvir Uddin (Chap. 5) presents his qualitative study of the 1998 floods and the interaction between household characteristics and flood exposure in Bangladesh. This is a much-needed longitudinal study which overcomes the cross-sectional bias of most prior research. The sampled data sets cover several years after the floods and include several time periods. The results show that household characteristics have significant influence on short- or long-term capacities, and on the ability to cope with and recover from those floods. In particular, the population's average level of education seems to be decisive for long-term recovery. Moreover, Uddin reflects on ways in which this kind of econometric study could be adopted to inquire into the linkages among hazard exposure, household characteristics, and the proclivity to migrate.

In the first contribution to the politics and policy section, Chloe Vlassopoulos (Chap. 6) addresses the issue of policy relevance of environmentally-induced migration. She identifies three types of political discourse—environmental migration as a multi-causal problem, climate migration as a consequence in an alarmist discourse, and climate migration as a solution. Those three threads of discourse on environmental migration correspond to three competing approaches to problem definition. A problem definition includes the definition of the affected groups/persons, the parties responsible for causing the problem, the design of a solution and identification of those in charge. Vlassopoulos concludes that the last and also most recent problem definition—climate migration as a solution—has turned out to be the most successful so far, because it best fits the existing institutional and political conditions. By elaborating on the institutions supporting those different problem definitions her analysis of political discourses offers insights into the societal construction of climate migration and the actors involved.

Volker Böge (Chap. 7) examines the efforts to resettle citizens from a group of islands, one of which has already completely disappeared due to sea level rise. His

study of an ‘Integrated Relocation Program’ deals with the resettlement from the Carteret Islands to Bougainville, both of which are located in Papua New Guinea. Böge identifies and analyzes five central challenges the program faced: (1) the cultural and spiritual dimension of land acquisition, (2) the weak relations between settlers and recipient communities, resulting in (3) conflict in the local context after relocation, (4) the lack or weakness of governance (e.g. ‘lost’ funds), and (5) the problem of burden sharing. The case shows that even with a high level of consciousness of the affected for the importance of maintaining capability, such kinds of autonomous relocation initiatives easily fail without appropriate institutional support.

Jeanette Schade (Chap. 8) discusses the policy response of planned relocation as a form of adaptation and its flaws. She presents the experiences with relocations in the context of development-based evictions, and early experiences with relocations related to environmental degradation and threats. She shows that not only climate change but the institutional responses to environmental and climatic problems could harm people’s livelihoods. Schade points out that relocation might become a type of second-class adaptation for those who lack voice, or that it can be misused for political or economic purposes not causally related to climate change. As a perspective guiding policy choices, she offers a human rights approach to resettlement measures, with the objective of enhancing capabilities of the affected persons.

Megan Bradley and Roberta Cohen (Chap. 9) discuss an international framework for protecting environmental migrants. In their assessment, the challenges to human rights protection include the lack of conceptual and definitional clarity, limited legal protection and government failure to engage in prevention and protection. While most persons uprooted by environmental disasters will remain within their own countries, entitled to the protections set out in the internationally acknowledged ‘Guiding Principles on Internal Displacement’ of the UN, there is a need for greater clarity regarding the status and protection needs of those displaced by slow onset disasters and of those who cross international borders. In their opinion, a way forward could be the recognition of the need for human rights protection, the strengthening of legal protection, limiting vulnerabilities and maximizing capacities, as well as planning responses to statelessness in the case of disappearing nation states.

The concluding chapter by Jeanette Schade (Chap. 10) finally returns to the subject of capabilities and discusses Sen’s entitlement and capability approach, including its philosophical and ideological underpinnings. She highlights the importance of Sen’s ideas for livelihood research and development planning, which also informed many of the case studies presented here. After considering the contribution of this volume against the background of Sen’s ideas, she offers a reflection on the relationship between Sen’s capabilities approach on the one hand and human rights on the other hand. This allows her to discuss the question whether Sen’s understanding of capability supports human rights-based approaches, the latter of which are proposed by some of the contributions. Though Sen supports human rights as ‘ethical rights’ for normative guidance he is not convinced of them as international legal—that is enforceable—rights, a position that the conclusion challenges.

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Part II
Methodologies and Methods

Chapter 2

Migration and Climate Change: Toward an Integrated Assessment of Sensitivity

Richard Black, Dominic Kniveton and Kerstin Schmidt-Verkerk

Abstract This chapter sets out a new approach to understanding the relationship between migration and climate change. Based on the understanding that migration is a significant, growing, but also complex phenomenon, this approach seeks to address the sensitivity of existing migration drivers in specific contexts to climate change. In contrast to existing approaches which have sought to generate global-level estimates of the numbers of ‘climate migrants’, this integrated assessment approach seeks instead to understand how and why existing flows from and to specific locations may change in the future, and provide a practical tool for climate adaptation planning. Examples of the application of this approach are provided for Ghana and Bangladesh.

Keywords Assessment • Integrated • Bangladesh • Ghana • Migration drivers • Sensitivity

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2.1 Introduction¹

Future climate change is expected to severely affect people's livelihoods worldwide through the intensification of natural disasters; increased warming and drought affecting agricultural production and access to clean water; rising sea levels making coastal areas uninhabitable and increasing the number of sinking island states; and increased competition over natural resources that may lead to conflict (Martin 2009). Although they will vary regionally, these impacts are predicted to impose significant aggregate costs for society, which are likely to increase over time (Parry et al. 2007; Stern 2007; House of Commons 2008). For example, the total cost of adaptation to climate change was estimated at over US \$ 100 billion in the run-up to the Copenhagen Climate Change Conference (Adam 2009).

From a wide array of possible responses to climate change impacts, migration is one response that has received a growing amount of attention from both researchers and policy-makers (Warner et al. 2009; Christian Aid 2007; Action Aid International 2007; Renaud et al. 2007; Stern 2007; Conisbee and Simms 2003). Most of these reports share the underlying assumption that climate-related migration essentially represents either a failure to mitigate climate change, and/or a failure of adaptation, and taken together they have produced some alarming estimates of the total volume of migration that might result from such failures. This issue is also politically and ethically-charged. The effects of climate-related disasters in terms of numbers of people already made homeless fall disproportionately on poor countries in the global South, even though it is the global North that is primarily responsible for anthropogenic climate change (Roberts and Parks 2007). The resulting global injustice is of both ethical and practical policy concern, as climate change negotiators in the global South are increasingly aware of how problematic migration is for states in the global North and newly-industrialising states, to the point that it could play a pivotal role in international environmental negotiations.

Yet migration can also be seen as a valid coping mechanism for increased stresses and shocks that may result from climate change (Laczko and Aghazarm 2009; Tacoli 2009), as well as a range of other factors. Viewing migration as an adaptive response to different combinations of economic, social, political, demographic and environmental 'drivers', it becomes clear that migration may be sensitive to climate change in a variety of ways. Indeed, the impacts of climate change on mobility are mediated through these different drivers with the result that the relationship between migration and climate change becomes highly complex. Complexity also arises from the fact that migration responses to climate change are likely to include moves within countries, as well as international mobility, and may be non-linear, in the sense that migration becomes a learnt behaviour within a population, developing emergent properties as a result.

Bearing in mind this complexity, in this chapter we seek to develop an integrated approach to understanding the nature of climate-migration linkages. We

¹ Reprint of Black et al. (2011). With permission from Pion Ltd, London, www.pion.co.uk.

begin with the principle that migration is already a significant phenomenon in many parts of the world that are likely to be critically affected by climate change, and already takes a variety of forms. Thus, whilst UN estimates of current stocks of international migrants suggest that around 200 million people, or 3 %, of the world's population are living outside their country of origin, the 2009 Human Development Report suggests that at least 740 million people—almost 11 % of the world's population—have migrated within their own countries (UNDP 2009). Simple projection forward of these figures by 40 years would suggest that by 2050 there might be as many as 66 million additional international migrants, and 242 million additional internal migrants, even in the context of no significant climate change, if the proportion of migrants in the population were to stay the same.²

Building on the observation that migration is already occurring, is complex, and is almost certainly growing, our approach seeks to analyse the main drivers of existing migration in specific contexts, and then consider the sensitivity of these drivers to climate change. The aim is to develop a tool to assess the likely consequences of climate change on different forms of migration, allowing for the notion that the net effect on migration could be negative rather than positive, and non-linear instead of linear. Although this approach works best at the local and regional, rather than the global, scale this is arguably of greater relevance to adaptation planning than global estimates of numbers that are almost certainly false.

After reviewing evidence from existing empirical case studies into the relationship between different climate stressors and migration, we discuss what have been identified as the 'drivers' of migration in the literature. This is followed by a presentation of the approach of integrated assessment', and its preliminary application to the case studies of Ghana and Bangladesh. We argue that this integrated approach can provide a basis for wider estimation of future flows, although because of data constraints and the complexity of the world system such analysis almost certainly needs to take place first at regional or country-level.

2.2 Past Studies of Migration and the Climate

Given the volume of recent academic and policy publications about the impacts that climate change might have on migration, the number of empirical studies of contemporary manifestations of the influence of climate on migration is surprisingly small. Beyond the historical and archaeological literature, which is not covered here, most studies have been concerned with the effects of drought or changing rainfall patterns on migratory behaviour, but on the whole these do not provide a convincing basis on which to predict migration trends. Thus, one study of south-west Mexico found a correlation between declining rainfall and rising

² The UN population division projects an increase of the world population from 6.8 billion in 2009 to over 9 billion by 2050.

migration to the US, since many rural communities depend on rain-fed agriculture (Munshi 2003). A more recent study of the relationship between climate change, crop yields and migration went further, suggesting that Mexican migration to the US might increase by between 1.4 and 6.7 million people by 2080 based on a 10 % decline in crop yields (Feng et al. 2010). However, an alternative analysis of migration and rainfall data for the Mexican states of Zacatecas and Durango, suggests the reverse relationship—in other words, migration to the US decreases as rainfall declines (Kniveton et al. 2008), and at the very least, the analysis of Feng et al. relies on extrapolation of data currently available for only two time periods—1995–2000 and 2000–2005.

A rather different picture is provided by findings from studies in Burkina Faso and Mali, where drought in the 1970s and 1980s was associated with decreases in international, long-distance migration (Henry et al. 2004; Findley 1994). These West African studies suggest that food scarcity during drought leads to increased prices, forcing people to spend more money on their basic needs rather than on long-distance migration. They also show, however, that short-distance migration to larger agglomerations increased during drought years, as women and children left in search of work to contribute to household incomes. Similarly, a recent chapter by Barbieri et al. (2010) on internal movement in Brazil estimated relatively small net changes in migration under a range of climate change scenarios, with some scenarios suggesting the possibility of a decrease, rather than an increase in net migration.

Meanwhile a study of migration in El Salvador into responses to adverse agricultural shocks, such as loss of harvest and livestock, found large and positive effects on the household's probability of sending members to the United States when agricultural shocks occurred (Halliday 2006). Yet the same study also found that damage associated with another environmental hazard—earthquakes—was followed by a substantial decrease in net migration to the US. Whilst earthquakes are not a product of climate change, the explanation of this latter relationship—that earthquakes create incentives for households to retain labour at home and disrupt migration financing by depleting savings or restricting access to credit—would appear to be just as applicable to climate change related to sudden events such as floods and hurricanes.

If we turn to an historical example, it is estimated that as many as 2.5 million people were displaced by drought and associated dust storms in the mid-west of the US in the 1930s, with most moving to neighbouring states, but as many as 300,000 moving to California as some of the world's first 'ecomigrants' (Reuveny 2008). Yet here, too, it is important to note that the effects of declining rainfall and drought on migration depended crucially on the socio-economic situation of the people concerned. Such dependence has been demonstrated in relation to the migration decisions of pastoralists in northern Sudan (Haug 2002) and of peasant farmers in northern Ethiopia (Meze-Hausken 2004), where a survey of more than 100 peasant farmers concluded that 'people in marginal regions have developed a great variety of adaptation mechanisms, which strengthen their ability to cope with both, slow climatic changes and extreme climatic events'. In the specific case of the Dust Bowl, there is evidence that longer-distance migration from eastern Oklahoma to California was

dominated by 'young, intact nuclear families with a high level of social capital in the form of pre-existing family connections to California'. Dust Bowl migrants were also more likely to have had no land, or not repaid the mortgage on their land, and to have had agricultural skill sets that were in demand in California at the time. It is also important to note that migration out of the mid-west had already begun before the periods of drought, reflecting over-capitalisation of agriculture in the region and the overall depression of the US economy from 1929 (McLeman 2006). Indeed, far from Dust Bowl migrants being the world's first 'eco-migrants', it could be argued that 'eco-migrancy' is a deeply engrained and traditional response to climatic stress and variability, which goes back well beyond the last century.

There has also been some interest in the phenomenon of migration linked to tropical cyclones and hurricanes, with the consequences of Hurricane Katrina, which hit parts of the US states of Alabama, Mississippi and Louisiana, and destroyed the city of New Orleans in 2005, the most prominent recent example (Gemenne 2009). Several studies of Katrina have highlighted demographic changes as a result of the hurricane, although most have focused on the nature of return migration, and why this has or has not been possible for different groups (Elliott and Pais 2006). One important feature of the displacement associated with Katrina is that initially, at least, as many as 70,000 mainly poorer, black residents of New Orleans were unable to leave (Landry et al. 2007); yet, over time it appears that it is the poorer, black residents who have been least able to return. Similarly, an analysis of the displacement following Hurricane Andrew, which hit parts of Florida in 1994, found that people who lived in the wealthier southern part of the state migrated in much larger numbers than people who lived in the poorer northern part (Smith and McCarty 1996). Whether this was caused by the fact that southern Florida was more severely affected, or by the distribution of wealth in the state, however, is a question left unanswered in the study. The literature on vulnerability and migration points to a complex interplay of factors that influence displacement following natural disasters, including, race/ethnicity, wealth, home ownership, education, age and gender, with evidence for both increased migration and decreased migration for each of these variables in different settings. Part of the difference in how variables such as wealth influence migration decisions in the face of natural disasters can be explained by the timescales over which the migration decision is made. For example wealthier households often make decisions to migrate as considered life choices to move away from disaster prone areas whereas poverty is sometimes related to displacement due to the highly vulnerable physical locations many poor people are forced to live in. Further there is clear evidence that some people actually migrate into disaster prone and affected locations for the economic opportunities they provide (Naik 2009).

Overall, it would seem that empirical studies into the relationship between migration and climate-related and environmental events and are still relatively few, and their results are not conclusive. The studies do show, however, that the assumption that climate-related shocks and stresses lead inevitably to migration in a linear way is not supported by empirical investigation. The relationship is not linear because many other factors play into the nexus between climate factors and migration. It is also not necessarily positive, as several studies found

that international migration decreased as a consequence of environmental stress. Another factor that is implicitly shown in these studies is that migration often pre-existed particular climate-related events as a result of a number of other ‘drivers’, although these drivers may include environmental factors. It is to these broader migration drivers that we now turn.

2.3 Migration Drivers

There is a large literature on the causes of migration, but also a measure of agreement that the key drivers of migration fall into three categories: (a) factors related to the region or country of origin, including political instability and conflict, lack of economic opportunities, high rates of population growth and lack of access to resources (‘push’ factors); (b) factors related to the region or country of destination, including the availability of employment and demand for workers, ageing of populations, higher wages, political stability or access to resources (‘pull’ factors); and (c) intervening factors that facilitate or restrict migration, including ease of transportation, family or social networks, government immigration or emigration policies, economic ties such as trade and investment linkages, or social and cultural exchanges (Arango 2004; Boyle et al. 1998; Portes 1997; Massey et al. 1993; Zolberg 1989).

However, whilst there is a degree of agreement that each of these factors is a potential driver of migration, the devil is in the details: each of the particular ‘push’, ‘pull’ and enabling factors that may apply in one circumstance may not apply elsewhere, whilst the different factors may interact in different ways. For example, some of the most relevant factors are relational across space—thus classic migration theory posits that people will move from poorer to richer regions or from places where there is ‘population pressure on resources’ to places where there is not. Yet this does not tell us whether the ‘push’ of poverty, or the ‘pull’ of economic opportunity is more important, even though this may be critical in terms of understanding whether and how much climate change will influence economic drivers of migration. Similarly, ‘population pressure on resources’ is often cited as a reason for people to leave a particular area, yet this may well lead to migration to an urban area where population densities are much higher, but where economic growth has meant a much larger population density can be supported.

In addition to the distinction between ‘push’, ‘pull’ and ‘intervening’ factors, drivers of migration can be categorised into structural and institutional/network influences, and factors operating at the level of individual human agency; in turn, they can also be broadly divided into ‘economic’, ‘political’, ‘social’, ‘demographic’ and indeed ‘environmental’, although these categories often overlap. Furthermore the multi-causality of migration has been widely acknowledged (Wood 2001; Boyle et al. 1998; Castles and Miller 1993; Kritz et al. 1992).

Migration patterns are not only complex because of the various types of migration drivers that influence them at different levels but also because they depend on individual characteristics and perceptions and a range of institutional opportunities

and constraints. Factors that drive migration of some people might drive other responses or no response at all of other people in the same or other places. Furthermore, as noted above, migration itself is a complex phenomenon, which involves long and short-distance moves, crossing national borders or not, over time-scales that range from a few months to a lifetime, and in circumstances that may be both adaptive and reactive. In particular, there is evidence that migration may accelerate or take on emergent properties in certain situations, as barriers are removed, political or economic conditions deteriorate, or new opportunities emerge.

A particular issue relates to how ‘environmental’ factors can be considered as drivers of migration alongside other types of drivers. Environmental considerations are included in a number of classic migration frameworks, including those posed by Wolpert (1966), Speare (1974), and DeJong and Fawcett (1981) (see also Hunter 2005). These frameworks have tended to treat the environment as a contextual consideration. Yet, it could be argued that environmental factors directly *cause* some forms of migration; for example, in the Sahel, environmental variability is arguably a direct cause of seasonal migrations of pastoralists and agricultural labourers who are seeking grassland or work respectively. Similarly, vulnerability to, or experience of, extreme climatic events such as floods or tropical storms may also directly drive migration, even in the absence of other drivers. Here, the key question in relation to climate change is less whether climatic variability or climate events will drive migration, and more whether climate change will increase climatic variability or the frequency of extreme events, with the result that future flows are likely to be larger than those currently experienced.

Finally, it is predicted that the consequences of climate change will particularly affect the poorest people as they are more vulnerable and least able to adapt, and as a result they will be rendered even poorer (Parry et al. 2007). Yet, there is also an emerging consensus that it is generally not the poorest people who migrate overseas because international migration is an expensive endeavour that demands resources for the journey and for the crossing of borders (Castles 2000; de Haan 2000; Skeldon 2002). Thus, is it conceivable that climate change might deprive some people from the option of migrating, at least over long distances and internationally, even though it might put pressure at the same time on other people to move. Predicting changes in migratory behaviour caused by climate change is thus difficult and needs a number of factors to be taken into account.

2.4 An Integrated Assessment of Climate Change Related Migration

Within the context of multiple drivers of migration, operating in a variety of situations and at different levels, it is not unreasonable to conclude that assessing the influence of uncertain climate changes is a multifaceted task requiring a multidisciplinary approach. Integrated assessments are one method used within the climate impacts and vulnerability assessment literature to attempt to represent the complex

interactions and feedbacks between multiple drivers and impacts for national and global policy analysis. In particular, integrated assessments try to represent interactions across multiple spatial and temporal scales, processes and activities and may involve mathematical models and/or an integrated process of assessment linking different disciplines and groups of people (McGuffie and Henderson-Sellers 2005).

The previous section showed the complexity of migration decisions and the many factors they depend upon. Yet the impact of climate change on people's livelihoods is also uncertain, for a variety of reasons. An example of the level of uncertainty in understanding the impact of climate change is provided by the wide divergence in predicted change in rainfall over the current century depending on the parameters and assumptions of the climate model used. For example, in the last report of the Intergovernmental Panel on Climate Change (IPCC), over much of the Sahel region of Africa different climate models provided divergent rainfall predictions even in terms of the sign of the change—i.e., whether the Sahel would become wetter or drier over the coming century (Solomon et al. 2007).

Uncertainty in climate change not only arises from model uncertainty, but also from different emission scenarios, as well as from the underlying 'natural' uncertainty related to the chaotic nature of the atmosphere. The IPCC's fourth assessment report sought to limit the range of circumstances within which climate change might occur by referring to a series of specific emissions scenarios (SRES), each of which drew on one of four narrative storylines summarising different demographic, economic and technological drivers of global greenhouse gas and sulphur emissions (Nakicenovic et al. 2000). However, work is already under way on new emissions scenarios that use a completely new methodology, reflecting criticism of the rigid nature of the original SRES scenarios.

It is beyond the scope of this chapter to reduce the inherent uncertainty in climate modelling, or from this perspective to give a clearer indication of possible migration outcomes. Instead, we illustrate a methodology that seeks to work the other way around—allowing the integration of climate into explanations of future migration. Thus, rather than being based on developing evidence and models of the interaction of a climate driver and consequent migration, this approach attempts to assess the sensitivity to climate change of existing acknowledged drivers and intervening factors affecting migration. The approach is explicitly aimed at countering the standard assumption that all migration associated with climate change will be new. It therefore focuses on existing migration trends, and how these will be affected by climate change.³

In the following sections, we apply this approach to two case studies. In each case, we present a brief outline of the major migration flows present in the country

³ Of course, the possibility remains that genuinely new flows could be generated by climate change, involving groups of people who have not previously migrated and/or new destinations opening up. However, the emergence of these new flows would depend on various factors, such as the availability and attractiveness of new destinations, and the financial, human, and social capital of prospective migrants.

and their key drivers; we then identify likely trends in terms of climate change, before drawing conclusions on the susceptibility of these drivers to climate change. The two case studies are chosen to illustrate, first, slow-onset changes associated with decreased rainfall in dryland areas, and associated droughts (Ghana); and second, the potentially more rapid-onset changes associated with floods linked to sea-level rise and increased frequency and intensity of tropical storms (Bangladesh). This distinction is not intended to imply that droughts have *only* slow-onset effects, or that floods have *only* rapid-onset effects, but nonetheless the division between drought and flood on the one hand, and slow and rapid-onset effects on the other, is useful in terms of both aiding understanding, as well as identifying key policy implications.

2.5 Slow-Onset Climate Forcing: Climate and Migration in Ghana

One of the iconic images of climate change used repeatedly in both research studies and policy reports is that of drought-stricken farmers and pastoralists in the Sahel, where it is generally assumed that rising temperatures and reductions in rainfall over the coming decades will lead to a significant increase in outward migration (Warner et al. 2009). Furthermore, it is feared that climate change might lead to violent conflicts over the ownership of resources, which in turn could cause the displacement of a large number of people (Christian Aid 2007). For example, the United Nations Environment Programme identifies environmental factors as “one of three major causes of displacement in Sudan” (UNEP 2007, p. 104).

In the Sahel, however, there are a number of migration patterns that are already well-established, and which need to be taken into account in any analysis of the likely impact of climate change. Rain (1999) shows that in Niger these annual movements to cities in the dry season have been part of the life of rural populations in the Sahel for generations. In Ghana, both seasonal labour migration and the movement of pastoralists within and from northern Ghana have long reflected differences in the timing of the rainy season (Primavera 2005), and fluctuating work opportunities in commercial agriculture. In the coastal south, there are also historical patterns of seasonal fishing migrations (Marquette et al. 2002). In addition to seasonal migration, there is also substantial longer-term and longer-distance internal migration, involving both rural–urban and rural–rural moves, and lasting from a few years to a lifetime. Again this migration is oriented primarily from north to south, as well as to urban and mining areas, although evidence on whether it is increasing or decreasing, and the degree of return or circularity, is limited. Movements include substantial rural–rural moves of workers seeking employment in plantation agriculture in the centre and south of the country, movement to the gold mining areas in Ashanti, and significant movement of children and young adults from the north to work in commerce and petty trade in the cities of Accra and Kumasi (Anarfi et al. 2003). There has also been a significant volume of return migration to rural areas.

One of the difficulties here is putting a figure on existing rates of migration, as these have not been robustly measured. Urbanisation statistics for Ghana show that its urban population increased by 235 % between 1970 and 2000, whilst its total population increased by 121 % in the same period (Otiso and Owusu 2008, p. 146, using 2005 data from the Ghana Statistical Service). In 2006, more than 10 million people lived in urban areas, which is 44 % of the total Ghanaian population. By 2015, the urban population in Ghana is expected to reach more than 14 million people, increasing the share of the total population to 47.8 % (Otiso and Owusu 2008, p. 145). Yet a recent review of evidence for Francophone countries in the region suggests that urbanisation rates may be declining in many neighbouring countries (Beauchemin 2011), and whilst there may be clear reasons associated with civil conflict in countries such as Côte d'Ivoire, this does give rise to some caution in assuming that continent-wide projections of urban growth provided, for example, by the UN, are likely to be fulfilled.

Looking more broadly, West Africa and the wider Sahelian region also have a long history of migration across national borders, reflecting freedom of movement within the Economic Community of West African States (ECOWAS). Ghana itself was a major destination for migrants until the 1970s, when economic collapse led to return and expulsions of foreign workers, and more recently this migration has built up again, with some 500,000 West African immigrants estimated to work on cocoa farms and in the hotel industry in Ghana (Hernández-Coss and Bun 2007). Meanwhile, between 900,000 and 1.2 million Ghanaians worked in Nigeria in the late 1970s and early 1980s, and again despite mass expulsions in 1983 (Black et al. 2004), there has been a recovery in these flows. Finally, since the 1970s, large numbers of Ghanaians have moved overseas, initially in response to political instability and economic hardship, or to seek educational opportunities, but increasingly to work, to do business abroad or to follow or join family members. The result is that an estimated 960,000 Ghanaians lived outside Ghana in 2005, the majority, about 71 %, in ECOWAS countries (Quartey 2009). In 2006, according to the OECD migration database, about 190,000 Ghanaians lived in OECD countries, a number which constitutes less than 1 % of the Ghanaian population (Quartey 2009). However, the emigration of Ghanaians has enlarged the Ghanaian diaspora especially within Europe, where there are at least 100,000 Ghanaians and in North America, where there are at least 80,000, but also in the Middle East and in Asia (Bump 2006).

2.5.1 Key Migration Drivers in Ghana and Their Susceptibility to Climate Change

A major driver of migration in Ghana is the significant (and growing) inequality in employment and income-generating opportunities, broadly between the north and the south of the country, but also between West Africa and Europe, which has driven a growing number of people to seek to move internationally. In particular,

the relatively strong economic growth in Ghana over the last decade has been very much concentrated in urban and mining areas, and in areas of commercial cultivation of coffee, cocoa and newer export crops such as pineapples. In contrast, significant areas of the north of the country have witnessed little productive investment and a decline in employment opportunities in public service.

However, inequality in incomes and access to economic opportunities are not the only factors that have driven recent migration. A significant element of this inequality lies in the fragile natural resource base of much of northern Ghana, and the consequent need for diversification. Traditionally, farmers and pastoralists in northern Ghana have sought to mitigate risk associated with living in the marginal Sahel zone by diversifying their sources of income, and migration has long been one such livelihood strategy. In particular, variability in rainfall encourages patterns of seasonal migration in good years, and distress migration in drought years; the growing variability and uncertainty associated with rainfall patterns have arguably encouraged more anticipatory migration, whilst periods of drought in the north have contributed to undermining other forms of social insurance, leaving migration as a primary strategy to support livelihoods.

Also important are social networks and family ties, as the establishment of a Ghanaian diaspora has created an international social network that enables more Ghanaians to travel abroad. Marriage and other family reasons are also major factors which contribute to migration within Ghana. According to the 1998 Ghana Living Standards Survey, around 60 % of migrants from rural to urban areas moved because of family-related factors, although this includes dependants of those who migrated for economic reasons. Conflict, notably between farmers and pastoralists, has been a feature of northern Ghana in recent years, and though less visible internationally than in some other countries of the region (e.g. Nigeria), it has been a driver of both temporary and more permanent displacement.

In looking at the drivers of migration identified above, the key role of differential employment opportunities is striking, yet it is far from clear that this driver is susceptible to climate change. First, a significant volume of rural–urban migration has been driven by urban employment opportunities created as part of the country's economic 'boom', particularly in the middle belt in the region of the former Ashanti Empire, since the mid-1980s (Anarfi et al. 2003). Furthermore, state policies that valued urban areas and industrial production over rural areas and agriculture also attracted migrants to better-paid urban employment (Otiso and Owusu 2008; Anarfi et al. 2003), although there has also been some return to rural areas, both during periods of economic downturns and for personal reasons. Similarly, movement beyond the country's borders relates to factors such as oil production in Nigeria and Gabon, and growing demand in sectors such as health care and other personal services such as social care and cleaning work in the UK and elsewhere, none of which is particularly related to climate change.

Nonetheless, there are some non-negligible ways in which the identified drivers of migration are susceptible or at least related to climate change. For example, rapid economic growth in Ghana's major cities is underpinned by the need for energy; within Ghana, however, hydroelectric power stations generate 80 %

of total national power production. Detailed predictions are not currently possible here, since as noted above, there remains debate over whether West Africa is likely to see an increase or decrease in rainfall under different emissions scenarios (Arnell 2004). What is clear, however, is that reduced rainfall over the last 40 years has already caused a decline in the lake levels, contributing to power crises and concern within the Government of Ghana about the sustainability of urban development (Kuuzegh 2007).

In addition, there is the potential for climate change to influence the productivity of the commercial agricultural sector in central and southern Ghana, and associated employment opportunities via change and variability in rainfall, temperature and the way in which crops and weeds respond to the carbon dioxide (CO₂) fertilisation effect. For example, cocoa is very sensitive to drought; climate change more broadly could alter the geographical distribution of cocoa pests and pathogens, decrease crop yields, and affect farm income; whilst the magnitude of carbon dioxide fertilisation effect—which arises from increased concentrations of carbon dioxide increasing net primary productivity as plants are able to photosynthesize more and use water more efficiently—varies with different crop types (and weed types) and the supply of water and nutrients. However, each of these physical effects related to climate change may remain a relatively small signal in comparison with other forces determining production and employment in the sector, notably the state of world demand and world market prices for cocoa, as well as state export taxes on cocoa, which have had a consistent and long-term impact on production (Bateman et al. 1990).

Related to this, a rise in sea level can be expected to raise the soil moisture content of sandy and silty soils along the coastline of Ghana. These soils could be at risk of collapse during earthquakes that are prone to occur particularly in the Accra and the west coastal areas, where active geologic faults lie and where unconsolidated sedimentary formations occur (Environmental Protection Agency 2000). Salt water intrusion is also expected as a consequence of a rise in sea level. Increased flood risk in the city of Accra and other coastal cities resulting from higher sea levels and increased intensity of tropical storms could also have an impact on economic activity in these areas, and hence on future employment opportunities.

Finally, and perhaps most obviously, in relation to the fragile natural resource base and need for diversification in northern Ghana, increased temperatures—which appear almost certain—and reduced rainfall—which is widely expected but still cannot be predicted with confidence across the country—would be likely to lead to increased water stress, reduced crop productivity, and an increase in drought risk and food insecurity. This could increase the risk of distress migration during times of acute stress, unless there is substantial anticipatory migration to mitigate this risk.

Table 2.1 draws on the above discussion to summarise the major migration flows within and from Ghana and their susceptibility to climate change. In this analysis, there are arguably two key challenges: first, the assessment of sensitivity, and second, the translation of this sensitivity analysis into quantitative figures.

Table 2.1 Main migration flows in and from Ghana and their susceptibility to climate change

Type of migration	Sending area	Destination	Main drivers	Main climate variables of drivers	Sensitivity to climate change
Seasonal circulation of pastoralists	North	Other areas in the North	Seasonal variation in rangeland productivity; conflict	Short term variations in rain and temperature affect rangeland productivity	High—likely changing patterns
Seasonal moves to commercial agriculture	North	South and centre	Difference in labour demand in agriculture	Short term variability in rainfall and temperature in origin and destination; global changes in rainfall and temperature via impact on global agricultural production	Medium—may increase or decrease
Seasonal labour migration	Mainly North	Cities (Accra, Kumasi)	Need to diversify rural livelihoods	Short term variability in rainfall and temperature at origin	High—likely increase in need to move
Seasonal fishing migration	Coastal South	Along the coast	Presence of fish	Variability and change in oceanic circulation	High—likely decrease if fish stocks depleted
Long-term rural–rural	Mainly North	Agricultural areas in the south and centre	Difference in labour demand, conflict	Patterns of short term variations and long term changes in rainfall and temperature and responses to CO ₂ fertilisation effect in sending and receiving regions	Medium—may increase or decrease
Long-term rural–urban	Mainly North	Mining areas (Ashanti), cities (Accra, Kumasi)	Difference in labour demand, family reasons, conflict	Short term variability and long term change in rainfall and temperature and response to CO ₂ fertilisation effect in origin regions all affect labour demand	Medium—likely increase in need to move, but masked by change in urban demand
Long-term urban–rural (return)	Cities	Rural areas	Economic downturn in cities, personal motives	Long term changes in rainfall and temperature and response to CO ₂ fertilisation effect in rural areas could have marginal impact on personal motives to return to rural areas	Low—possible decrease if north becomes drier

(continued)

Table 2.1 (continued)

Type of migration	Sending area	Destination	Main drivers	Main climate variables of drivers	Sensitivity to climate change
Intra-regional (ECOWAS)	Mainly south	Historically Nigeria, Côte d'Ivoire	Difference in labour demand	Pattern of variability and change in rainfall, temperature and response to CO ₂ fertilisation effect could affect labour demand	Low—may increase or decrease
International (to Europe/North America)	Better off households	Mainly UK, USA but also other European countries	Difference in labour demand, diaspora	International changes in rainfall, temperature and sea level rise	Low—may increase or decrease

Source authors

Here, we choose to categorise sensitivity as ‘high’ if the migration flow is driven primarily by an environmental factor that is likely to change in magnitude as a result of a change in temperature or precipitation; ‘medium’ if environmental factors play a part in driving migration alongside other factors; and ‘low’ if environmental factors are only marginal as drivers of migration. We stop short of quantification, however, as the quality of existing data on which to base estimates of change is simply too poor.

As Table 2.1 shows, it is not unreasonable to conclude that international Ghanaian migration, within and outside Africa, is likely to be relatively unaffected by climate change. Still, there is certainly scope for a significant impact on movements that are internal to the country. Changes to precipitation and temperature patterns in the northern savannah are likely to increase the need for seasonal circular migration of pastoralists, as well as the volume of temporary and permanent migrants from the rural north to the agglomerations in the centre and the south of the country. However, rural–rural migration in the north and seasonal labour migration to agricultural regions might either increase or decrease, depending on how the sending and the receiving areas will be affected under future climate change scenarios.

2.6 Rapid-Onset Climate Forcing: Climate Change and Migration in Bangladesh

If migration of farmers and pastoralists in the Sahel is iconic of climate change in Africa, the displacement of populations due to flooding plays a similar role for Asia. In the case of Bangladesh, estimates of existing ‘environmental migration’ have been high, and predictions for the future dire, with Myers and Kent (1995) suggesting 26 million people will become displaced as a result of floods and storms alone by 2050, which equals almost 11 % of the total projected population for the country.

As in the Sahel, however, there are existing migration flows in Bangladesh that have a variety of drivers, not all of which are clearly related to climate stressors. For example, internal migration is important and increasing. For the majority of families, labour migration to local urban areas or to the capital is the most important source of household income, whilst beyond specific source areas such as Sylhet, Comilla, Chittagong and Dhaka, only relatively few better off families can afford international migration. Case studies reveal that seasonal migration to both rural and urban areas provides vital income sources for the rural poor during periods of low local employment opportunity: almost two-fifths of rural households in the Districts of Faridpur and Rajbari send adult members to nearby towns, whilst in the north-west of the country 19 % of households across all wealth groups migrate in the lean agricultural season, rising to 25 % for chronically poor households (Afsar and Baker 1999; cited in Afsar 2003). In some villages, more than 80 % of incomes might come from outside the village, with temporary labour migration becoming increasingly common (Toufique 2002; cited in Afsar 2003).

Long-term migration is dominated by rural–urban flows, largely to the centres of Dhaka and Chittagong. One study attributes nearly two-thirds of internal migration to rural–urban flows, compared to just 10 % for rural–rural migration (Rahman et al. 1996, cited in Afsar 2003). Another has concluded that net migration to urban areas increased dramatically from 1.2 to 16.4 per thousand between 1984 and 1998, compared to an increase from 1.5 to 4 per thousand of rural–rural migration during the same period (Afsar 2003). Economic migrants are typically young, poor and male, although this has changed significantly with the recent increase in demand for female labour in the ready-made garment factories of Dhaka and other metropolitan areas. Most poor migrants live in slums and squatter settlements, which have been growing at 4 % per year and account for 86 % of the urban population (UN-HABITAT 2007). Such areas lack security and basic amenities and are located in ecologically vulnerable areas such as flood plains. As a result they are amongst the first and largest urban casualties of climate shocks (Barkat and Akhter 2003).

Bangladesh is also a major labour-sending country, with international migration playing a considerable role in both livelihoods and the national economy, accounting for some US \$ 10.9 billion in 2009.⁴ Most long-term or permanent emigration is to the UK or US, with some 500,000 Bangladeshis estimated to reside in each country (Siddiqui 2003). Short-term contract migration to the Middle East and South-East Asia has grown considerably since the mid-1970s (aided by the emergence of private recruiting agencies in the 1980s), and is now the dominant form of international migration. More than three million Bangladeshis have migrated overseas for employment during this period, with an annual average of around 226,000 leaving from 1991 to 2002 (Siddiqui 2003). Since 2000, however, substantial increases in the cost of migration and growing competition from other countries have recently led to a small decline. Such migrants are mostly male, and semi-skilled or unskilled, reflecting significant restrictions on the unskilled migration of women (Siddiqui 2003).

Nonetheless, it is also evident that forced migration associated with climatic processes does occur, and is significant. More than one million people are estimated to lose their homesteads or land to river erosion each year (RMMRU 2007). Case studies suggest that displaced people initially try to relocate themselves within the village, or in neighbouring villages, reflecting the fact that the annual cycle of flooding both erodes land, and may slowly create new areas for potential settlement as a result of siltation. But whilst river bank erosion may occur overnight, sedimentation is a considerably longer process and may not necessarily occur in the same location. Local population pressures therefore rise and some of those displaced gradually move to urban areas when no other income options are available (Hossain et al. 2003). However, it was found that those people who own some land, or can rely on supportive kin or richer patrons, benefit more from migration than the poorest people in a region.

⁴ See www.bangladesh-bank.org.

Climate shocks can exert a heavy toll on lives and livelihoods. Floods in 1988 and 1998 in Bangladesh, for example, left 45 million and 30 million homeless respectively, and an estimated combined death toll of 3,000–7,600 (Rayhan 2008, p. 2). Evidence for the impact of rapid-onset disasters on population displacement is mixed. Heavy monsoonal rains in 2007 affected more than 10 million people in 39 of the country's 64 districts, driving a reported 3,000 migrants a day to Dhaka due to inadequate relief and lack of incomes (IRIN 2007). However, where aid has been effectively distributed and food markets supported (e.g. the 2004 tornado and the 1998 floods), out-migration has been minimal (Paul 2005).

2.6.1 Key Migration Drivers in Bangladesh and Their Susceptibility to Climate Change

A major economic driver of migration in Bangladesh is the differential availability of employment opportunities. It is estimated that one-third of the total working-age population of Bangladesh is either unemployed or underemployed, of whom 80 % live in rural areas. International migration has helped to keep the unemployment rate virtually unchanged since the 1980s, although the growth rate of the labour force is almost twice that of the population growth (Siddiqui 2003). The economic pull of urban areas, where non-agricultural incomes grew six times faster than agricultural incomes between 1988 and 1995, is a complementary driver (Afsar and Baker, cited in Afsar 2003). Urban incomes are also more secure. Case studies suggest that, even in slums, employment is commonly found within days of arrival in the city, and provide key remittances back home (Afsar 2003; Barkat and Akhter 2003). Limited employment is not confined exclusively to rural areas: lack of year-round employment has been one of the major reasons for out-migration by adult members in almost two-fifths of the households in small and medium towns (Afsar and Baker 1999).

Alongside economic drivers, there are also a number of social and political drivers of migration in and from Bangladesh. For example, although perhaps not precisely termed a 'driver' of migration, flows of migrants abroad are also significantly steered by family and social networks. In the case of migration from Bangladesh to the UK, colonial era migration flows have been reinforced in particular by the search for marriage partners amongst UK-based Bangladeshis; in the case of the Gulf, movement has depended on employment opportunities generated either through kin networks, or through networks of recruitment agents.

Political security is also often cited as a driver of overseas long-term or permanent migration, as well as being a primary motivation for cross-border migration into India, where some 15 million are estimated to be living illegally (Shamshad 2008), although this figure is highly contested and does not have any empirical basis. Between October and December 2002, for example, an estimated 5,000–20,000 Bangladeshi Hindu and other minorities fled to India to escape violence following the national election which brought a pro-Muslim party to power.

According to an estimate by the West Bengal Border Police Department, about 1,000 people cross the border each day and enter West Bengal, although it is unknown how many stay or return after temporary employment (Datta 2004).

As in Ghana, it is clear that in Bangladesh there is also migration directly related to environmental stress, in this case associated primarily with extreme climatic events—floods—rather than specifically with climatic variability. Thus, Hunter (2005) reports on the work of Zaman (1991), who found in a survey in the mid-1980s that two-thirds of households had been directly displaced by riverbank erosion, with the mean number of displacements during an adult's lifetime being seven. Yet some 88 % of affected households had moved no more than two miles from their original residence, motivated by the strength of local family ties, and a belief that in due course they would be able to reclaim their previous residences and farm land.

Climate change is likely to have a detrimental impact on almost all rural production systems, which, combined with a growing population, may dramatically reduce both productivity of and access to, natural resources. Thus, local access to common resources on which the rural poor depend (e.g. fisheries, forests and river bank cultivation) is likely to decline as a result of increased riverbank erosion, driving further out-migration of the rural poor. Adaptive responses (e.g. development of shrimp farming in response to increasing salinity) currently tend to benefit outside (i.e., urban) investors, whilst local populations are increasingly forced to abandon land and migrate to the city.

In addition, increased volatility of agricultural productivity is likely to widen real and perceived rural–urban differences in income opportunities and access to services. In the drought-prone north west, where rainfall is almost half the national average (1,240 mm/year), the period 1978–1990 has already witnessed trends of increasing temperature (0.05 °C/year) and a decline in the length of the monsoon (Rahman and Alam 2003). Rice, the nation's principal crop, is particularly sensitive to higher temperatures, and in the absence of long-term changes to cropping patterns, may lead to declines in rural incomes. Relatively small deficiencies in the 2006 monsoonal rainfall, for example, generated rice losses of 25–30 % (Rahman et al. 2007). Whilst major investment over the last 2 decades in some regions (e.g. rainfed Barind) has succeeded in raising agricultural productivity, most of these efforts will be challenged by predicted increasing drought in the north-west (Rahman et al. 2007). One can thus expect accelerated rural–urban flows and increased international migration (for those able to access such markets) as urban centres become increasingly over-burdened and competition for employment increasingly scarce.

Once again, putting these elements of susceptibility of migration drivers to climate change together (see Table 2.2), it is not unreasonable to expect that the bulk of any additional migration is likely to take place within Bangladesh, rather than overseas. However, two key factors here that are different to Ghana are, first, the extent of economic inequality between Bangladesh and its neighbour India, in a context where social and cultural ties between East and West Bengal are arguably stronger than those across the West African region, and, second, the extent

Table 2.2 Main migration flows in and from Bangladesh and their susceptibility to climate change

Type of migration	Sending area	Destination	Main drivers	Main climate variables of drivers	Sensitivity to climate change
Localised displacement	All affected regions	Cities (Dhaka)	Flood risk, monsoon	Variability and long term change in sea level tropical storms, oceanic-atmosphere circulation, rain intensity and distribution	High—but depends largely on other factors, e.g., food aid
Localised displacement	River communities	Often inside own or in neighbouring communities, sometimes urban areas	River erosion	Changes in ice and snow melt in upper catchment and rainfall changes in other parts of catchment	High—but in some cases people move back to land after event
Seasonal moves to urban areas	Rural areas	Nearby cities, capital	Need to diversify livelihoods, often main source of income	Same as for localised displacement	Medium—decline of productivity possible, risk of saturation of cities
Long-term rural–urban	Rural areas	Mainly Dhaka and Chittagong	Difference in labour demand, security of employment	Same as for localised displacement	Low—as climate-related effect outweighed by other factors
Cross-border migration	All country, also rural areas	India	Economic differences, political security, social and cultural ties (East–West Bengal)	Same as for localised displacement and also for destination location	Medium—consequence of saturation of cities in Bangladesh
International	Better off households	Gulf and regional centres in SE Asia	Difference in labour demand, recruitment, political security	Same as for localised displacement and also for destination location	Medium—consequence of saturation of cities in Bangladesh
International	Better off households	Europe (mainly UK) and US	Difference in labour demand, networks, marriage, political security	Same as for localised displacement and also for destination location	Medium—consequence of saturation of cities in Bangladesh

Source authors

to which destinations within Bangladesh—especially the capital Dhaka—are themselves vulnerable to future climate change. As a result of the former, it is likely that a significant proportion of any growth in migration that might result from rural impoverishment associated with the negative impacts of climate change could be seen in international migration to India: indeed, such cross-border migration is already arguably the largest bilateral migration flow in the world, larger even than flows from Mexico to the United States. In relation to the latter, it is difficult to estimate the extent to which urban overcrowding in Dhaka and the surrounding region will lead to onward (international) migration, not least because a significant proportion of international migration comes direct from rural areas such as the district of Sylhet (Joarder and Hasanuzzaman 2008). There is also scope for investment in improved urban infrastructure in Dhaka such that significantly larger flows of rural–urban migrants could be absorbed, at least in principle.

2.7 Conclusion

As it is currently formulated, the approach that we have outlined in this chapter does not seek to provide a clear estimate of the number of people who are likely to migrate as a result of climate change, or the direction(s) that such migration will take. However, it does serve as a heuristic device to think about the relationship between the various different drivers of different kinds of migration, and the way that migration might affect these drivers—and therefore also migration itself—into the future. As such, it provides a note of caution in relation to predictions of future migration at a global level. At the same time, we would argue that such an approach also crucially provides a basis for a more detailed assessment of particular case study contexts to directly test the sensitivity of specific drivers to anticipated climate change impacts. Such an assessment is likely to require detailed field verification to ensure that drivers are properly understood, and climate change impacts on these drivers correctly specified.

Such detailed verification could take a number of forms. One way forward is to develop a model of human adaptation in response to likely climate change, building in migration as one of a number of adaptive or reactive responses, and allowing for ‘interaction’ effects between actors that could lead to acceleration (or deceleration) of migration reflecting ‘learned behaviour’. This ‘agent-based modelling’ approach has been developed elsewhere, and we will not dwell on it here (Kniveton et al. 2008). However, other options can also be envisaged; one of the more powerful of these is likely to be a process of scenario building, in which changing influences on the macro- and meso-level drivers of migration are built up through expert and ground-level participatory analysis to build a small number of ‘likely’ future scenarios based on different climate change inputs.

In relation to this latter approach in particular, it is important to note that in addition to understanding migration drivers, there is also a significant gap in the understanding of the likely trends of climate change that will influence these drivers, requiring input from natural as well as social scientists. For example, most existing scenarios of likely future change in the Sahel region are premised on the assumption that there will be a significant decrease in rainfall, but as noted above, this is not a robust prediction, and inter-annual variability of rainfall in recent years provides support for scenarios that could involve both rises and falls in rainfall. Indeed, perhaps the only robust prediction that is currently available in relation to Sahelian rainfall is its likely continued geographic variability, such that even in the face of relatively extreme drought, some areas are significantly more affected than others. Similarly, in the Ganges–Brahmaputra delta, there remains significant debate about the nature of future flooding hazard, associated with uncertainty about the future contribution of snowmelt in the Himalaya region to floods downstream (Mirza 2002; Shaman et al. 2005).

Of course, such uncertainty cuts both ways: it is entirely feasible that climate change could be more extreme than ‘mainstream’ scenarios currently envisage. For example, less likely climate changes include a global temperature rise of more than 3°, the potential that climate change could introduce new pathogens that affect either animals or humans, the risk of ocean acidification, and the potential for large-scale geo-engineering by major powers such as the US or China, to increase rainfall in their own dry lands, but with potentially significant consequences elsewhere. An integrated approach to modelling climate change-migration interactions could seek to reflect some or all of these ‘hard-to-imagine’ climate scenarios—particularly in the context that multiple-degree temperature rises are increasingly seen as more likely by the scientific community.

Another issue relates to the concern of this chapter with understanding climate-migration linkages at a variety of spatial and temporal scales. It is important to provide a corrective to mainstream policy thinking that migration is by definition international and/or long-term or permanent, even if internal migration is usually less politically and ethnically charged and requires more national than international policy responses. In addition, the Ghana and Bangladesh examples above both point to how whether future migration is internal or international may have as much to do with the shifting ways in which borders are constructed and enacted—i.e., whether they are permeable or selectively restrictive—as it does to specific climate changes.

Our final point relates to the policy relevance of such a study. In many respects, what is important for policy-makers is less the number of likely migrants, and more the question of where migrants might go in the future, compared to where they go at present, and what the key ‘tipping points’ might be that are associated with a significant rise (or fall) in migration to a particular destination. The integrated assessment approach provides the basic building block for such analysis, and as such, holds significant potential within the field of policy-making aimed at adaptation to climate change.

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Chapter 3

How Demographic Change and Migration Influence Community-Level Adaptation to Climate Change: Examples from Rural Eastern Ontario and Nunavut, Canada

Robert McLeman and James Ford

Abstract Vulnerability and the capacity to adapt to climatic variability and change are shaped by dynamic interactions between social, economic, cultural, political and institutional processes operating at a variety of scales. Demographic processes and trends are also closely linked to adaptive capacity, as both an influence on vulnerability and as an outcome of adaptation. This chapter outlines the linkages between climate, vulnerability, adaptation and demographic processes, with particular attention to how these play out at the community level. Using case studies from communities in rural eastern Ontario and Nunavut, Canada, this chapter illustrates how various demographic trends affect local level adaptive capacity. Residents of these communities are already engaged in adaptation to changing climatic conditions, but are experiencing very different trends in fertility and migration. Understanding the connections between demographic processes and adaptation facilitates greater understanding of climate change vulnerability more generally, and provides important considerations for policies and programs targeted at building adaptive communities.

Keywords Adaptation • Climate change • Climate migration • Demographic change • Vulnerability

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3.1 Introduction

Given the unequivocal evidence that human activities are driving unprecedented changes to the earth's climate, reducing vulnerability to these changes and building capacity to adapt are of growing public policy concern (Adger et al. 2009). Increasingly, it is being recognized that demographic patterns and processes influence vulnerability and adaptive capacity in various ways (O'Neill et al. 2001; Dyson 2005; McLeman 2011a). Fertility, migration and urbanisation determine the number of people exposed to climate-related risks in particular places (McGranahan et al. 2007; Satterthwaite 2009). Changes in fertility and migration rates are potential outcomes of adaptations made in response to extreme climate-related events such as droughts, floods, and tropical cyclones (Caldwell et al. 1986; Pedersen 1995; McLeman and Hunter 2010). Fertility and migration have particularly significant effects on community-level vulnerability and adaptation. Demographic change within communities has the potential to alter livelihood strategies, distributions of wealth, local institutional arrangements, social networks and capital, and other attributes known to be associated with adaptive capacity (Smit and Pilifosova 2003; Adger 2006; McLeman and Smit 2006).

Successful adaptation to climate change, and planning for it, is context specific. While governments, international organisations and other institutions that function at large scales have important roles to play in building the social, economic and legal infrastructure for adaptation, the particular requirements for building adaptive capacity vary considerably at local levels (Smit and Wandel 2006). Because demographic processes can be both a driver and an outcome of vulnerability, adaptation planning benefits from understanding the influence of demography at regional and local levels. This chapter reviews current scholarly understanding of the linkages between vulnerability, adaptation, fertility and migration, with particular attention to how demographic processes and trends affect the capacity of communities to adapt to climate change. It provides a generalised conceptual representation of how these dynamic interactions are potentially connected, which is then illustrated in greater detail using empirically based case studies of four communities in rural Ontario and Nunavut, Canada. It concludes with suggestions of how understanding the influences of broader demographic processes in climate adaptation is relevant for developing sound legal and policy- recommendations.

3.2 Vulnerability, Adaptation, Fertility and Migration in the Context of Climate Change

3.2.1 *Vulnerability and Adaptation*

The impacts of climatic variability and change on human populations are typically conceptualized in terms of *vulnerability* (Adger 2006; Parry et al. 2007; Smit and

Pilifosova 2003). Vulnerability, which in its simplest form refers to the potential to experience loss or harm (Weichselgartner 2001), is seen to be a function of three general conditions:

- the nature of the biophysical changes to which a given population is exposed (e.g. droughts, storms, extreme heat or cold events);
- the sensitivity of the population to those biophysical changes (e.g. agricultural regions being especially sensitive to fluctuations in precipitation, coastal communities to storm surge events);
- the capacity of the population in question to cope with and adapt to the changes in question (e.g. through technology, through changing of practices).

Vulnerability is not static. The introductory chapter of this book outlines how the biophysical conditions of exposure are rapidly changing in many regions. As is detailed below, such changes are rapidly emerging in the Arctic and in eastern Ontario, Canada. The social, political, economic, cultural and institutional factors that influence sensitivity and adaptive capacity are also continually changing, being driven by systems operating and interacting at scales from the local to the global (Adger et al. 2009; Leichenko et al. 2010; Smit and Wandel 2006). Within this highly dynamic context, adaptation to climatic variability and change can occur at a variety of scales, from the local to the global, and involve a range of actors, from the individual or household on up to the international community (Smit and Pilifosova 2003). Adaptation may be undertaken in anticipation of risks or in response to events after they occur, and may emerge as planned sets of actions or as autonomous responses. The relationship between demographic change, vulnerability and adaptation is complex, and can play out in a variety of ways that vary from one context to another. Demographic change can be an outcome of vulnerability and adaptation processes, and it can exert a strong influence on the formation/transformation of vulnerability and adaptive capacity.

3.2.2 Demographic Change as an Outcome of Vulnerability and Adaptation

There is evidence that, at least among certain populations, fertility rates can temporarily decline during periods of adverse climatic conditions (Caldwell et al. 1986; Pedersen 1995). There are also concerns that climate change could lead to the spread of insect- and water-borne diseases (Cooney 2011), which could conceivably change future mortality patterns. A third outcome, which warrants some additional discussion, is the effect on migration, a subject that has received considerable interest following reports that climate change will create millions of environmental refugees in coming decades (e.g. Myers 2002; Christian Aid 2007). Current scholarship tends to view climate-related migration in the context of adaptation (McLeman and Smit 2006; Bardsley and Hugo 2010; Tacoli 2009) and increasingly seeks to incorporate broader theories of migration, such as economic explanations (e.g. Todaro 1969), household risk diversification strategies

(e.g. Stark 1991), transnational social networks (e.g. Faist 1998), household access to social and cultural capital (e.g. Nee and Sanders 2001; Palloni et al. 2001) and global institutions and networks, among others (Castles and Miller 2003).

Climate-related migration is typically an autonomous adaptation initiated at the local level, although there are past examples of governments being actively involved, such as in drought-stricken rural Alberta in the 1930s (Marchildon et al. 2008) and in the Ethiopian famines of the 1980s (Ezra 2001). We know from past experience that autonomous climate-related migration may take on a variety of different attributes in terms of duration, destination choice, and participation (McLeman and Hunter 2010). A single climatic event may stimulate a variety of different migration responses within the exposed population, as was witnessed, for example, among residents of New Orleans in the wake of Hurricane Katrina (Elliott and Pais 2006; Fussell et al. 2010). Climate-related migration can be generated by conditions of distress or by people seeking to take advantage of particular amenities or opportunities, such as northerners who retire to sunny climes (Happel and Hogan 2002).

Climate-related migration tends to take place over short distances within regions; where it does cover longer distances, it tends to follow pre-established migrant networks, its participants drawing upon the social capital vested in transnational communities (McLeman 2011a). Because it is inherently disruptive and costly, migration is rarely the first response undertaken by people exposed to adverse climatic conditions, and rarely does it unfold as a wholesale outpouring of people. Instead, there tends to be great social differentiation in adaptation, with groups and households within a population responding in a variety of ways, their access to economic, social, and cultural capital influencing the range of potential adaptation options available and the relative desirability of each (McLeman and Smit 2006). For example, ownership of fixed capital (like land) and participation in strong local social networks are factors that discourage migration and facilitate adaptation by other means. Conversely, portable economic capital, readily transferable labour market skills and membership in geographically extensive social networks tend to increase the possibility of migration occurring.

3.2.3 Demographic Processes as Influences on Vulnerability and Adaptation

Demographic processes may also influence the creation (or reduction) of vulnerability. Their most obvious effect is to determine the number of people exposed to climate-related risks. For example, developing countries are seen as generally having less capacity to adapt to climate change relative to other nations (Adger 2006). Many developing nations that have a high physical exposure to risks of drought, extreme storms and sea level change associated with climate change also have relatively high rates of natural population increase (McLeman 2011a). High rates of urbanisation, driven by both natural increase and migration, further serve to create

large concentrations of people in areas particularly at risk, such as flood plains, deltas and low-lying coastal areas (Satterthwaite 2009).

Demographics also have a particularly strong influence on the capacity to adapt to climate variability and change, especially at local levels. Community adaptive capacity is tightly linked to the economic, social and cultural attributes of the individuals and households that make up the community, which are in turn influenced by factors such as age, education, family relations, gender, health, income, occupation (or livelihood) and social connectivity (Smit and Wandel 2006). Consequently, when demographic changes occur at the community level, adaptive capacity changes as well. Depending on the nature and direction of demographic change, community adaptive capacity may be enhanced or eroded. For example, when migration out of a given community occurs, it fundamentally alters the characteristics of the remaining population. In some instances, out-migration has the effect of enhancing the adaptive capacity of those left behind by generating remittances or by reducing pressure on household resources (Adger et al. 2002; Rain 1999). In other cases, the loss of members of key socio-economic groups can lead to a steady decline in community well-being by reducing the availability of key labourers or leaving gaps in local social networks. Over time, these may lead to further out-migration or, in extreme cases, precipitate the eventual abandonment of the settlement (McLeman et al. 2008, 2011b).

3.2.4 Capturing Interactions of Demographic Change, Vulnerability and Adaptation

Figure 3.1 provides a simplified conceptual representation of how climate, socio-economic processes, vulnerability, adaptation and demographic change interconnect at the community level. It captures how demographic processes can both act upon the formation of adaptive capacity and result from adaptation in action. It also highlights for policymakers and planners seeking to build highly adaptive communities the importance of not only identifying current and future climatic and socio-economic pressures communities face—which is the common approach to understanding community vulnerability, and is described in the next section—but also to account for the potential impacts of demographic processes on the community in question.

3.3 Demographic Change and Migration as Influences on Community Vulnerability: Case Studies

To illustrate more clearly the interconnectedness of demographic change, vulnerability and adaptation, we now turn to a detailed discussion of four Canadian communities, two in rural eastern Ontario, Canada, and two in the northern Canadian territory of Nunavut, where we have been conducting empirical research for a number of years now. Beyond our own familiarity with adaptation needs and dynamics in

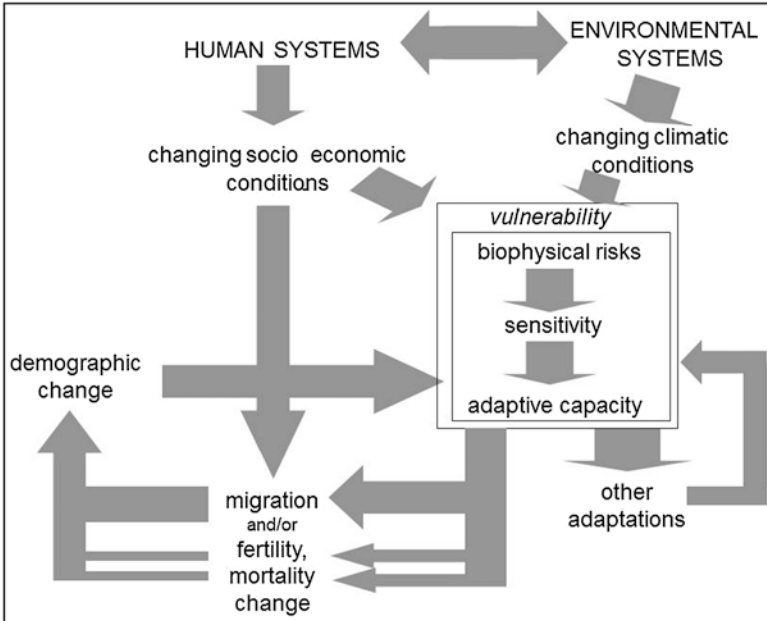


Fig. 3.1 Conceptual diagram linking demographic change to vulnerability, adaptation and migration in the context of climate change

these communities, there are particular reasons why they make for very useful comparisons in this chapter. First, all four communities are currently experiencing documented changes in climatic conditions that pose serious challenges for residents' livelihoods and well-being (Table 3.1). Adaptation is therefore not a hypothetical need, but an actual one. Second, even though the physical trends in climate are similar within each pair of communities, the demographic trends in each one differ, creating differing adaptation challenges in each. While these four cases do not provide anywhere near a comprehensive inventory of all the ways by which demographic trends may interact with vulnerability and adaptation, they do allow us to illustrate the importance of understanding these interactions on a context-specific basis. By doing so, we hope the reader will obtain general insights useful for developing methodologies that may be applied to adaptation planning in communities elsewhere.

3.3.1 Methodology

A similar methodology was used in the collection of data for each of the four case studies. We began with the basic concept of vulnerability as described in Sect. 3.2 above, and through extended periods of community-based research documented and described the biophysical exposures and determinants of adaptive capacity that have shaped past and present vulnerability within the community. In order to understand

Table 3.1 Community case studies: economy, climatic trends, and demographic trends

Community	Type of economy	Climatic trends	Demographic trends
Edwardsburgh -Cardinal, Ontario	Agricultural	Milder winters; hotter summers	Very slow population growth; out-migration by young people; aging population; some in-migration by ex-urban commuters
Addington Highlands, Ontario	Small scale forestry, outdoor recreation	Milder winters; hotter summers; increased risk of fire, storm events	Slow population growth; high-outmigration by young people; in-migration of retirees; very advanced average age
Iqaluit, Nunavut	Government administrative centre; gateway to eastern Arctic	Milder winters; hotter summers; changing snow and ice conditions on land and sea	Rapid population growth; high rates of in-migration within territory; high rates of in-migration by southerners; high birth rates
Iglolik, Nunavut	Regional administrative centre; hunting, fishing	Milder winters; hotter summers; changing snow and ice conditions on land and sea	High natural population growth rate; large average family size; very young average age

these adaptation processes and determinants, we selected a variety of data collection exercises and activities tailored to the particular situations in each community, an approach often described as a “bottom-up” way of understanding the dynamics of vulnerability and adaptation (Dessai et al. 2004; Ford et al. 2010c). Through this approach, we have been able to describe the impacts of climate change not simply as technical measurements (e.g. changes in ice thickness, wind direction, precipitations levels, and so forth) but in terms of what aspects of climate are most challenging for the community in question and why. This contrasts with (and complements) the traditional natural science approach to understanding climate impacts, which is driven by modelling of physical processes, often at fairly coarse spatial scales, and then attempting to downscale these model outputs to the local level and make assumptions about how people are affected and respond (Smit and Wandel 2006).

Once the dynamics of current vulnerability are understood, the researcher then attempts to understand emergent trends in climate and in the socio-economic conditions that will shape future vulnerability in the community of interest (Ford and Smit 2004). Here, again, the data must be meaningful to the community in question. This presents a variety of challenges for the researcher, and may necessitate various methods as one attempts to see over the horizon. In the case of Arctic communities,

for example, there are a number of scientific models of future sea ice conditions, and with the help of community members these can be studied collaboratively to gauge which outcomes are most probable based on past experience, and to single out those that would be most problematic for the community in question. In the case of future adaptive capacity, here, again, a variety of data may be available about social, economic and demographic trends, one of the most easily obtainable in North America being population census data. In the case of Canada, census data are available in five-year intervals, and contain a range of useful information including population change, labour-force characteristics, household income distributions, and so forth. As the research team develops a projection of potential future vulnerability and future influences on adaptive capacity, the findings are ‘ground-truthed’ by having them assessed and critiqued by community members on a periodic or ongoing basis during the analysis. In this way research conclusions are thus ‘policy-ready’ and become planning tools to be used by communities as they see fit. While such methods may seem old hat to those working in the many social science fields where theoretically grounded, consultative and community-based research is the norm, they are relatively new in climate change scholarship (Wandel et al. 2007).

In the following sections, we take information generated through our grassroots research in each of these communities and illustrate how various demographic factors influence local vulnerability, thereby adding detail to some of the processes shown in Fig. 3.1. Particular demographic trends at play in the case studies include:

- High rates of out-migration
- High rates of in-migration
- High fertility rates
- High levels of population growth (through migration and fertility)
- Slow population growth or population decline
- Rising average age of population

3.3.2 Eastern Ontario Case Studies

The first two case studies come from rural eastern Ontario, Canada, a region situated between the Ottawa River, flowing from the northwest, and the St. Lawrence River, flowing from Lake Ontario northeastward (Fig. 3.2). The bulk of the region’s population, and most of its urban population, live in the two river valleys, where the best agricultural land is also found. The central part of the region is rugged upland, increasingly forested as one travels north, with few large settlements. Unlike the urban centres, which have all experienced steady population growth over the last half-century, rural populations in eastern Ontario have been growing more slowly, if at all. Like rural areas in many parts of the world, out-migration by young people to urban centres is very common.

Climate forecasts generated by general circulation models (GCMs) for Ontario project mid-twenty-first century temperatures will be approximately 4 °C on average warmer than present, with the most obvious warming effects being experienced in

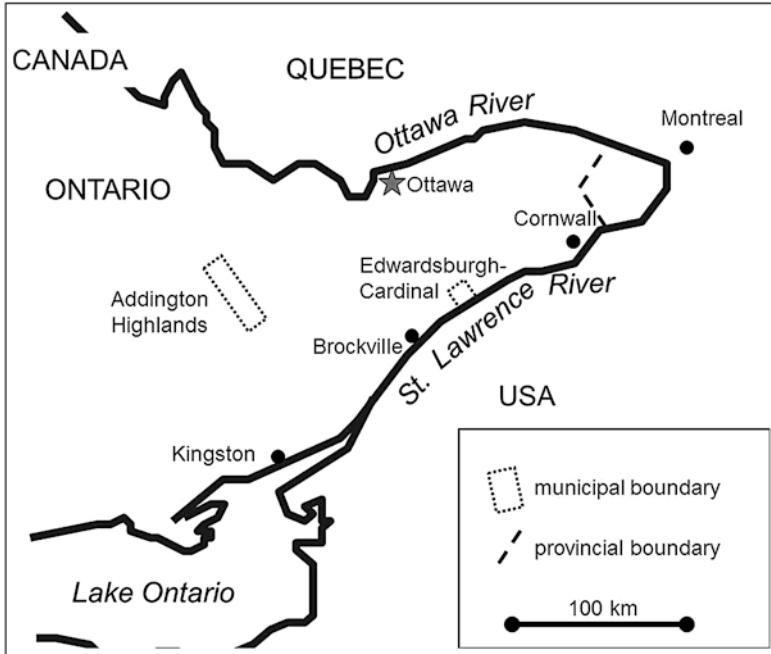


Fig. 3.2 Study locations in Eastern Ontario

winter (Chiotti and Lavender 2008). Extreme summer heat events (i.e. temperatures $>30\text{ }^{\circ}\text{C}$) are expected to double by mid-century (Hengeveld and Whitewood 2005). Precipitation projections from GCMs are less conclusive (Chiotti and Lavender 2008). The past fifty years have seen trends toward warmer average night-time temperatures and more calendar days with precipitation (Vincent and Mekis 2006). Residents of the study area report that winters are becoming increasingly milder, less snowy and shorter in duration, whilst summers are becoming hotter, anecdotal information that is supported by weather station data and proxy data from maple syrup producers¹ (McLeman and Gilbert 2008; McLeman 2008; McLeman 2010; Sander-Regier et al. 2010). Upland residents report that extreme wind events are occurring more frequently than in the past, information for which instrumental or proxy data have not yet been identified. These changes in climatic conditions, and the expected continuance of them, present challenges and opportunities. Rural residents are already adapting, and must continue to do so. Adaptation options and practices in the uplands and agricultural areas differ, as do the impacts of demographic change on adaptation.

¹ Maple syrup is produced commercially across the region from naturally occurring sources by collecting the sap from sugar maples, *Acer saccharum*. The sap is collected during spring conditions when overnight low temperatures are below $0\text{ }^{\circ}\text{C}$ and daytime temperatures are above zero. The timing of the sap collection period in eastern Ontario now occurs approximately 10–14 days earlier than it did 50 years ago (McLeman 2008).

3.3.3 *Demographic Change and Adaptation in Agricultural Areas: Edwardsburgh-Cardinal*

Edwardsburgh-Cardinal is a rural municipality of approximately 6,700 people (Statistics Canada 2007). Agriculture was long the key driver of the area's economy, and small, family operated farms are still found across much of the municipality. Today, however, agriculture provides employment for only a small portion of the population (Fig. 3.3). Most people are employed in the service sector, retail, or at one of the two corn-based product manufacturing plants (one producing ethanol, the other corn starch). Residents are concerned about the potential risks and uncertainty associated with warming temperatures, particularly on crops and livestock, and on groundwater supplies (most households obtain water from wells) (Sander-Regier et al. 2010). The southernmost part of the township borders on the St. Lawrence River, and is home to a small port. Residents have observed significant fluctuations in river levels and worry about possible future impacts of climate change on river transportation, a concern shared in a number of government and academic studies (Chiotti and Lavender 2008). A steady string of mild winters forced the community to abandon a long-standing outdoor winter carnival that attracted tourists and was a significant social event for residents.

As in many rural areas, adaptive capacity in Edwardsburgh-Cardinal with respect to climate change or any other type of stress, regardless of origin, is closely linked to social networks and the social capital present within them (see Wall et al. (1998) for a more detailed review of rural social capital, its creation and importance). This social capital is evident in service clubs, farmer organisations and particularly in a committee that has organized an annual fall agricultural fair for more than a century (Sander-Regier et al. 2010). Members of these organisations are highly active, tightly

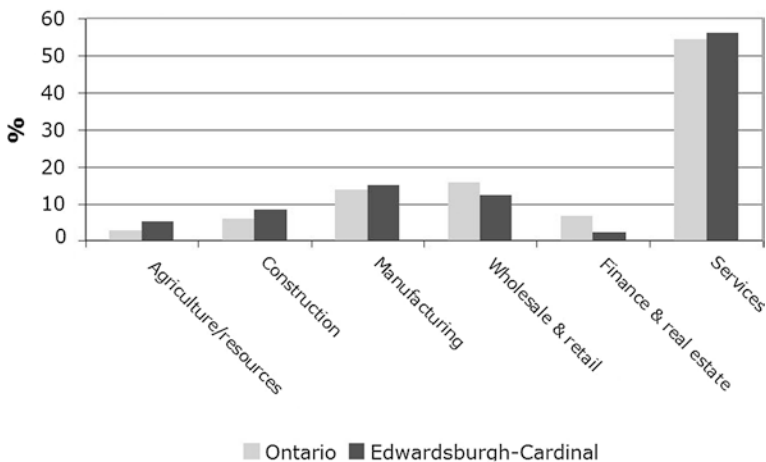


Fig. 3.3 Employment in Edwardsburgh-Cardinal, by sector, compared with Ontario province-wide figures

connected and continuously engaged in activities to promote community well-being. For example, when the municipality’s only bank branch was shut down by its Toronto headquarters, residents organized and persuaded a regional credit union (i.e. a cooperative member-operated financial institution) to open in its place. Residents raised funds to restore a historic grist mill as a tourist attraction and community event centre, which they now use as a focal point for a new community Christmas celebration that can be held in any weather, and which draws even more visitors than the annual winter carnival that was cancelled after years of inadequate snow.

There is reason to be concerned that this social capital may not be sufficient to meet future challenges associated with climate change. Worrisome in the short term for residents is the effect of prevailing demographic trends. The population has ceased growing and the average age is rising (Figs. 3.4, 3.5). Once they complete secondary school, young people tend to go elsewhere for further education, training or employment, and do not return. Their departure is balanced by a small influx of

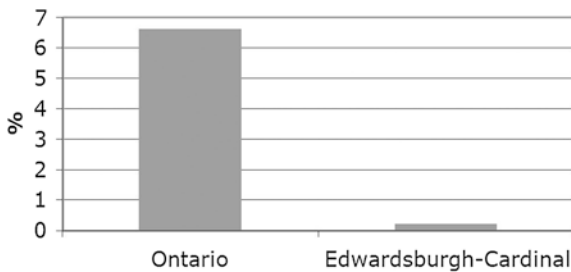


Fig. 3.4 Population change, Edwardsburgh-Cardinal versus provincial average, 2001–2006

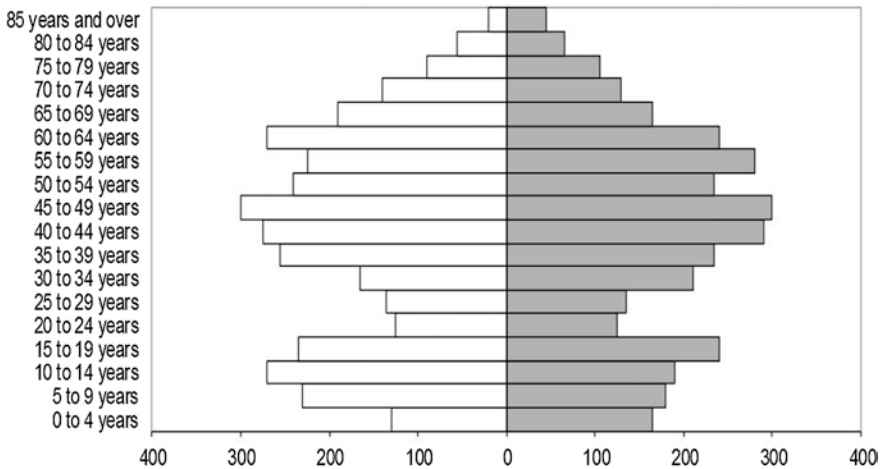


Fig. 3.5 Population profile, Edwardsburgh-Cardinal

people from nearby urban and suburban centres, typically in their 40s or 50s, who are attracted by the affordability of homes and/or perceived amenities of rural living (e.g. larger properties, more space, less ambient noise and traffic). These in-migrants tend not to join local social networks, but maintain their connections to the city through employment, shopping and social activities. With the number of people participating in social networks shrinking, active individuals are becoming burned out and community organisations are saturated in terms of their capacity to take on new challenges. There is no institutional capacity to replace social capital in this community. Like many rural municipalities across Canada and elsewhere, the local government lacks the financial and human resources to do more. Obtaining greater resources from higher levels of government is difficult, given the competition with larger, fast-growing urban municipalities in the region. Building future adaptive capacity in Edwardsburgh-Cardinal consequently entails finding new ways to increase the engagement of newcomers with local social networks.

3.3.4 Demographic Change and Adaptation in Upland Communities: Addington Highlands

In the upland region of eastern Ontario, the average age of the population is even more advanced than in the rural valleys, as seen in the population profile for Addington Highlands township (Fig. 3.6). Over recent years many villages and hamlets have withered away to small collections of lonely houses. Out-migration by young adults is very high here as well. Despite this, overall population numbers are actually increasing in the more accessible upland areas. For example, the

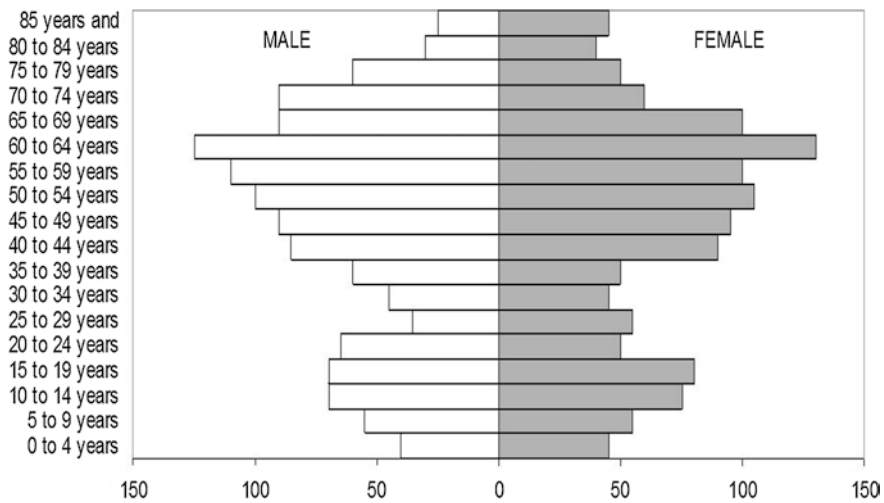


Fig. 3.6 Population profile, Addington Highlands township

population of Addington Highlands township grew by 4.6 % over the period 2001–2005 (Statistics Canada 2007). It may seem counterintuitive that an area of high youth out-migration and rapid aging is growing in population, but it is because of a large influx of environmental amenity-seeking retirees (McLeman 2010). The idea of ‘retiring to the cottage’ (i.e. a waterfront recreational property) is popular among many urban Canadians, and eastern Ontario’s upland region offers impressive scenery, clear lakes and waterfront property prices that are lower than average urban house prices. Some retirees previously visited the region regularly on a seasonal basis or for summer vacations; others have no previous connections.

Socially, economically and culturally, the incoming retirees have little in common with lifelong residents. The uplands are one of Ontario’s poorest regions, with residents’ median incomes being less than half the provincial average (Statistics Canada 2007). Historically, small-scale forestry, mining and other resource-based activities were the main source of employment, but these sectors have declined in the face of global competition. Summer tourism is now the main driver of economic growth and employment. Most people find work in the retail and service sector catering to visitors, typically at minimum wage and often on a seasonal basis.

The impacts of current climate trends are felt quite strongly in the uplands areas (McLeman 2008). Some changes are beneficial. Milder winters mean less firewood is consumed and less snow needs to be cleared from around homes which, given the advanced age of the population, are important considerations. Longer, warmer summers are beneficial to an economy that is increasingly dependent on summertime outdoor tourism. Hot summers do, however, bring increased risk of forest fires, wind and stormy weather. Milder winters shorten the winter forestry season,² and the frequent freeze–thaw conditions they bring are damaging to road infrastructure and require greater expenditure on sand and salt to keep roads safe. The small but important winter tourism industry, based on snowmobiling and ice fishing, suffers in mild winters.

Adaptive capacity in the uplands areas has historically been based on a mix of household self sufficiency and tightly-knit social networks (McLeman 2010). Because of the heavy forest cover, harsh weather events often down trees that knock out electricity wires and close roads. Lifelong residents are prepared to live self-sufficiently for extended periods, and to deal with small emergencies. Their homes are heated with wood stoves, using wood residents split themselves. Most households own a combination of vehicles, including pick-up trucks, snowmobiles and all-terrain vehicles, and most adults can operate chainsaws and other equipment. Many residents supplement their food supplies with wild-caught game and fish. The skills necessary for self-sufficiency are learned through hands-on experience, and through inter-generational participation in outdoor recreation. With these skills distributed widely across the population, community members could safely be relied upon to help one another whenever times of need arose. As in Edwardsburgh-Cardinal, community service clubs, hunting and fishing organisations and church groups have long been key elements in maintaining and reinforcing social networks.

² The ground must be frozen solid to support the weight of the heavy equipment that is used.

Incoming retirees do not mix well socially with lifelong residents. The retirees tend not to hunt or fish, nor join church groups or other organisations popular with residents. Instead, they gravitate toward their own formal and informal organisations centred on activities like horticulture, art and nature appreciation. Retirees typically lack the skills and aptitudes of residents, and must hire others to perform work residents can easily accomplish on their own. Many retirees leave for more southerly climes during the worst parts of winter, a time when lifelong residents most value community social events. Some lifelong residents express contempt for the newcomers, perhaps resentful of their relative affluence. A dialectic situation has arisen whereby the waterfront properties owned by seasonal residents and retirees have risen rapidly in value over past decades, whereas property values of other homes have not changed. In other words, retirees see their wealth continue to grow even in retirement, while lifelong residents, many of whom lack stable employment let alone retirement pensions, remain relatively poor.

Unsurprisingly, significant social fractures now exist within upland communities and these are eroding overall adaptive capacity. Where once people could rely upon their neighbours for help and support whenever needed, now they may know little about their neighbours. Retirees have the financial means to hire others for assistance or to leave during the hardest seasons; lifelong residents do not. As lifelong residents age, their physical robustness and independence ebbs. Splitting wood and hunting game are activities not easily done as one ages. The departure of young people magnifies the vulnerability of older residents, because there are few to take over such responsibilities within households. Participants in the social organisations most relevant to community adaptive capacity are aging. Many of these organisations will wither and disappear within a decade or so if current trends prevail.

The lack of institutional adaptive capacity is even more pronounced in the uplands areas than it is in Edwardsnugh-Cardinal. The large distances, low population densities and small property tax base (which makes up a large percentage of municipal revenues), mean that local government provides few services beyond basic road maintenance, waste disposal and policing. There are no hospitals or emergency medical clinics in the uplands area, and firefighting is done on a volunteer basis. Mobile phones do not work across much of the area, and most homes lack access to broadband internet (McLeman 2008). It is possible in coming years that the impacts of climate change may render the uplands region less attractive to retirees which, were it to reverse present trends, would lead to a precipitous population decline. In the meantime, the situation is one of increasing population, increasing age, increasing social friction, growing vulnerability and fading adaptive capacity.

3.3.5 Nunavut Case Studies

The second set of case studies comes from the Qikiqtaaluk or Baffin Region of Nunavut Territory, in Canada's eastern Arctic. Covering one tenth of the Canadian land mass but with a population of 15,765 and an area of one million km², Nunavut

is one of the least densely populated areas globally (0.015 inhabitants per km²). The population of the region is predominantly Inuit (>90 %), inhabiting 14 settlements, 13 of which are hamlets ranging in size from a few hundred people to nearly 2,000, and one city with approximately 7,000 people (Statistics Canada 2007). Communities are small, remote and invariably situated on the coast, accessible year-round by air, or by boat during the ice-free summer period. The economy of the region is based on a mix of wage employment and subsistence activities. The wage economy is largely based on public administration, resource extraction, and the production of arts and crafts. Tourism is important in some communities. Many Inuit retain a close relationship with and detailed knowledge of the environment, and hunting, fishing and gathering are of great social and cultural importance to them (Ford et al. 2008, 2010a). These activities also provide much of the Inuit diet; over 40 % of Nunavut residents obtain more than half of their food from traditional sources (Poppel et al. 2007). Traditional foods include ringed seal (*Pusa hispida*), caribou (*Rangifer tarandus*), Arctic char (*Salvelinus alpinus*), walrus (*Odobenus rosmarus*), beluga whale (*Delphinapterus leucas*), narwhal (*Monodon monoceros*) and a variety of wild berries.

Once a semi-nomadic hunting people, in the second half of the twentieth century the federal government resettled Inuit (in some instances forcibly) into permanent communities, leading to sweeping social, cultural and economic changes (Wenzel 1995; Damas 2002; Ford et al. 2006b). Today, the socio-economic and demographic characteristics of Inuit communities in Qikiqtaaluk are similar to those associated with developing nations, having relatively high levels of unemployment, poor health, overcrowded and poor quality housing, lower levels of educational achievement and uneven access to basic services like water and sanitation (AHDR 2004; Furgal and Seguin 2006; Ford et al. 2010a, b).

Given the nature of their livelihoods, Inuit communities are highly sensitive to local environmental conditions, wildlife and natural resources (Furgal and Seguin 2006; Ford and Pearce 2010). The climate of the region is characterized by short cold summers and very cold, long winters. The ocean is typically frozen for seven to nine months of the year. Sea ice conditions are a crucial influence on Inuit livelihoods, the ice being used as a route for transportation to hunting areas and as a platform from which to hunt (Eicken et al. 2009). In recent years, climatic conditions have been changing rapidly (Prowse et al. 2009a, b). Temperatures in the region are increasing at twice the global average, leading to a dramatic reduction in summer sea ice cover, and more frequent and intense extreme weather conditions (Moore 2006; Hochheim and Barber 2010). Inuit communities are already having to adapt to these changes, which are projected to continue in the future (Serreze and Francis 2006; Holland et al. 2010).

3.3.6 Demographic Change and Adaptation in a Small Northern Community: Igloolik

Igloolik is a coastal Inuit community of approximately 1,600 people located on an island at the northern end of Foxe Basin (Fig. 3.7). The community's wage

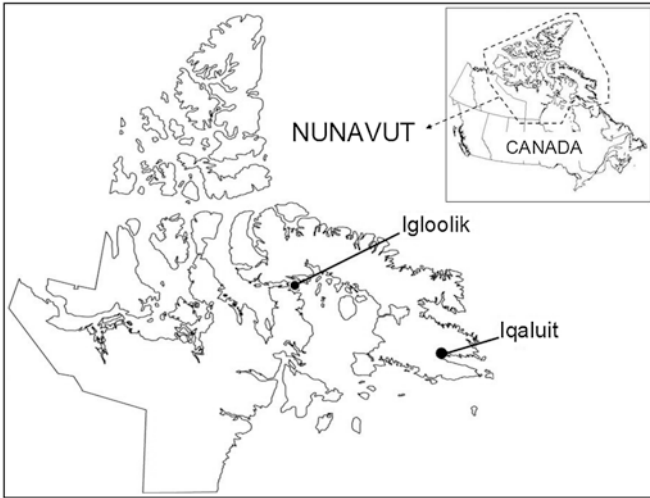


Fig. 3.7 Location of Nunavut case study communities

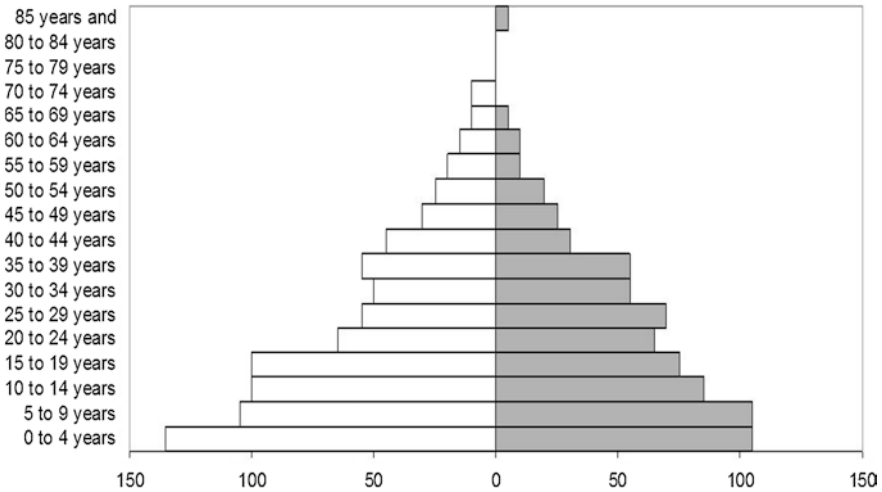


Fig. 3.8 Population profile, Igloolik

economy is largely based on public administration and tourism, including the production of traditional art, the guiding of southern sports hunters and small scale film production. In recent years, mining development has provided well-paying seasonal-jobs in summer. Money earned through wage employment is used to capitalize and support hunting activities (Ford and Beaumier 2011). The community's demographic profile (Fig. 3.8) is similar to that of many small Inuit communities in Nunavut, with over 40 % of the population being under the age of 15, and more than 2/3 under the age of 30 (Statistics Canada 2007). The median age

is 18.9 years. Between 2001 and 2006 the population grew by 20 %, and between 1996 and 2006 by 31 %, largely through natural increase.

Igloodik's environment is changing rapidly. Autumn temperatures have increased by approximately 5 °C over the last 30 years, which in turn causes ice to form nearly a month later and to break up earlier in the spring (Laidler and Ikummaq 2008; Ford et al. 2009). Wind patterns have changed and become more unpredictable, and temperatures in the area are increasingly variable. These changes make hunting more dangerous, make it difficult to access hunting areas at key times of the year, and have affected the area's wildlife, creating acute shortages of traditional foods (Laidler et al. 2009; Beaumier and Ford 2010). Autumn has always been a time of food shortage, and the delay in sea ice formation is exacerbating the hardship by delaying the start of hunting. In the summer, the changing sea ice dynamics are causing walrus to stay at locations much farther from the community (Ford et al. 2009).

Igloodik residents are adapting by adjusting the timing and location of their hunting activities, hunting more caribou inland when the sea is impassable, increasing their fishing and whaling activities, taking greater caution when traveling, and investing in satellite telephones, GPS and other safety equipment (Ford et al. 2006a; Aporta 2009; Laidler et al. 2009; Ford and Pearce 2010). Such adaptations are based upon the acquisition and transfer of traditional knowledge and land skills from one generation to the next, which in turn requires strong social networks within the community (Ford et al. 2009).

Demographics influence adaptive capacity in Igloodik in two main ways. First, across the north, and in Igloodik in particular, younger members of the population are not learning the necessary land skills and knowledge to engage safely in land-based activities. The rapid growth in population means there are too many young people relative to the number of elders and experienced hunters from whom young people would traditionally learn hunting skills from observing and doing (Ford et al. 2006a, b; Laidler et al. 2009). In addition to there being fewer opportunities for interaction between generations, younger residents often have different employment and cultural aspirations, having been more greatly influenced by western culture. In some cases, young people have only a poor knowledge of their traditional language, while elders have a poor knowledge of English.

Second, while social networks within Igloodik remain generally strong, there are signs of erosion. Younger community members exhibit a greater unwillingness to pool resources with extended family members, which is resulting in the emergence of buying and selling of traditional foods, a practice that did not exist previously. While part of this may be evidence of changing cultural values, a demographic reality is that as households become larger and younger, ever more people are dependent on a small number of experienced hunters. These hunters are in turn obliged to divert their financial resources to purchasing new equipment to hunt in the now more difficult conditions, leaving fewer resources to be shared with others. This situation may be sustainable when resources are abundant, but presents real challenges when they are not.

An emerging worry is that the local wildlife population is not sufficiently large enough to support the rapid population growth in Igloodik and other hunting communities. Before being moved to permanent settlements, Inuit lived in

small hunting groups that followed animal migration patterns, a highly effective way of minimizing hunting pressure (Damas 2002). Many communities have begun reporting that animals can no longer be found close by, and harvest data indicate that total catch has not changed despite rising population (Beaumier and Ford 2010). In light of these stresses, some believe there may emerge greater levels of Inuit migration to Iqaluit or southern Canadian cities in coming years. While out-migration from Igloolik and other small settlements is already happening, it is primarily driven by the education and employment opportunities and services available in larger cities. By reducing the ability of community members to partake in hunting, that key mainstay of Inuit culture and tradition, climate change could accelerate out-migration from smaller settlements if present trends continue.

3.3.7 Demographic Change and Adaptation in a Northern Regional Centre: Iqaluit

Iqaluit is the rapidly modernizing and growing territorial capital of Nunavut, with a population of approximately 7,000 (Statistics Canada 2007). It has a large base of wage employment, attracting Inuit and non-Inuit alike (Lardeau et al. 2011). The traditional subsistence economy remains strong, with seal, caribou, walrus, beluga whale and various fish species regularly harvested in the area. Iqaluit has Nunavut's only hospital and prison, and is one of the few communities where students can pursue higher education. A magnet for Inuit from other settlements, Iqaluit's population is more transient than other Nunavut communities. The Inuit population in Iqaluit grew by 17.6 % between 2001 and 2006 through the combined effects of natural increase and migration, as compared to 9.2 % in Nunavut as a whole (Statistics Canada 2007). The community's demographic profile (Fig. 3.9) also differs from smaller communities in the region, although still remains quite youthful compared with population centres in southern Canada. In Iqaluit, 25 % are under the age of 15, 47 % are under 30, with a median age of 28.8 years (Statistics Canada 2007).

Over the last thirty years, annual temperatures in the Iqaluit area have been increasing by 1.3 °C per decade (Ford and Pearce 2010). This has been accompanied by a corresponding decline in sea ice cover, less predictable weather patterns and more intense and variable winds. Additionally, there is less snow on land in winter, making overland trails more treacherous, while in the summer greater amounts of fog affect navigation in small boats. All these changes have impacts on Iqaluit's subsistence hunting sector and the availability of traditional foods in the community. Iqaluit hunters are adapting in ways similar to hunters in Igloolik, with traditional knowledge and land skills, strong social networks and resource use flexibility being critical underpinnings of adaptive capacity.

Unlike Igloolik, hunters in Iqaluit and the families dependent on them have greater access to wage employment. Not only are wage incomes higher, living expenses are lower in Iqaluit because of the better connections to southern Canada. These factors allow Iqaluit hunters to obtain computers and high speed Internet

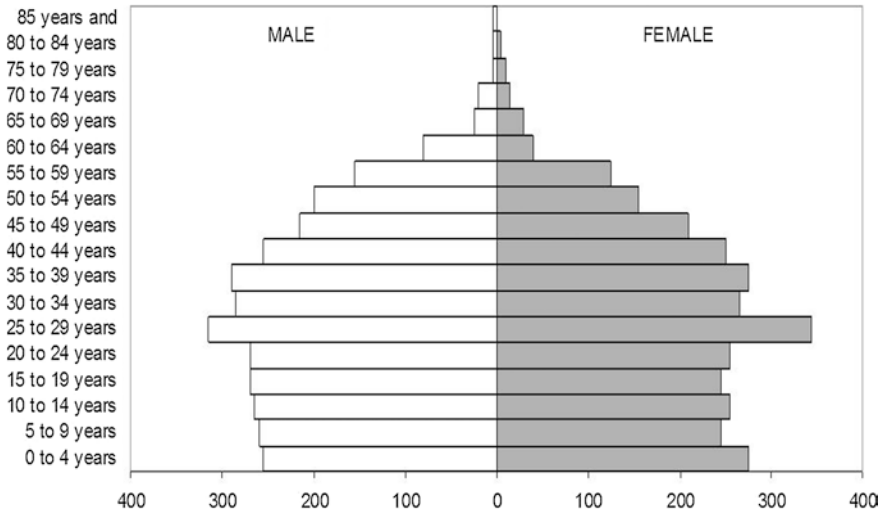


Fig. 3.9 Population profile, Iqaluit

connections to consult weather forecasts and ice conditions before embarking on hunting trips. Iqaluit also has a well-equipped search-and-rescue program should accidents occur.

Social, cultural, economic and demographic factors make vulnerability to climate change in Iqaluit different than in other, smaller settlements in the north. The number of full-time hunters in Iqaluit is small relative to the size of the community. Iqaluit residents who may not have been born and raised in the area nonetheless go out on the land and onto the sea ice for occasional hunting trips or for recreation. They do not have the in-depth knowledge of local environmental conditions and safety awareness of experienced hunters native to the Iqaluit area. This is especially the case with migrants from southern Canada who lack the cultural and linguistic skills to participate in Inuit networks. Deaths have already been linked to a lack of land skills, with young people being particularly at risk of harm.

The ratio of experienced hunters to people dependent on them for traditional foods is even greater in Iqaluit than in smaller communities, and is becoming even larger because of natural population increase and in-migration. Social networks within Iqaluit are also relatively weaker than in the smaller communities (Ford et al. 2007, 2008; Lardeau et al. 2011). Closely intertwined social networks and the presence of successful hunters within them are fundamental to Inuit adaptive capacity. As these erode, the economic and cultural well-being of Inuit households goes into decline, pushing them into a more southern, non-Inuit style of engagement with the environment and with one another. Such an engagement privileges wealth over sharing and technology over tradition, dynamics that are alien to Inuit society and that quickly make some families less able to adapt to climatic change than others. Its emergence in Iqaluit stems partly from the sheer size of the city, where houses may be up to 45 min walk from each other and public transportation

is minimal. Inuit who have migrated from elsewhere may have few pre-existing connections to Iqaluit families. To provide traditional foods to those without access to family-based food sharing networks, some hunters have started to sell food on the Internet, going door-to-door or at an occasional open air market. This commercialisation of the traditional, sharing-based food economy may reinforce and accelerate erosion of social networks in Iqaluit.

3.4 Discussion and Conclusions

Several common themes run through the case studies presented above, ones that are likely to resonate with residents of other resource-dependent communities in other regions. To begin with, even relatively small changes in local climatic and environmental conditions are presenting significant challenges for the case study communities. It is important to recognize this first and foremost, because the scale of these environmental changes may seem modest or even trivial in comparison with the social, economic and demographic changes sweeping over these communities. Nonetheless, even modest climatic changes oblige residents to implement adaptive strategies so as to minimize the harm done to local livelihoods and well-being. Understanding these implications requires methodologies that include active, on-the-ground engagement with individuals and households in the communities at risk.

These adaptation strategies and the resources necessary to implement them are not delivered by governments or through formal institutions; in each example adaptation is undertaken primarily by individuals, households and communities working together. This is consistent with observations of adaptation more generally (Berrang-Ford et al. 2011; Ford et al. 2011). It is therefore unsurprising that social networks and social capital are a key theme in each case study. Adaptation entails costs, and where wealth is lacking social capital provides a substitute. With the exception of Iqaluit, the communities described in the case studies have relatively modest economic infrastructure, making social capital the critical asset for building adaptive capacity. The juncture between social capital and adaptation is one where demographic forces become very influential.

In the case of Nunavut's smaller settlements, a demographic challenge is that there are large numbers of young people relative to their elders. In the subsistence economy of Nunavut, the lack of access to elders means a growing number of young people cannot acquire the skills and aptitudes that have helped Inuit people survive for so long in an incredibly harsh environment. The penetration of western culture into Inuit communities has helped weaken young residents' interest in traditional language and practices, but even so, the lack of access to elders from which to learn has become a growing concern across Inuit communities. The high rate of natural population increase exacerbates the need to rely on technologies and commercialisation of traditional foods, further contributing to the process of social erosion. Such erosion is already plainly evident in Iqaluit. This is not to say

that Inuit communities will disappear from the north, or that the population must inevitably abandon land-based activities for a purely western economy. What it does mean, however, is that socially, culturally and economically, Inuit communities will become very different from what they once were because of the combination of rapid climatic change and rapid demographic change.

In rural eastern Ontario, the demographic challenge is an opposite one: there are too many elders relative to young people. Among the ever diminishing numbers of residents under the age of twenty few will remain in their communities. They may enjoy the social and cultural amenities of their rural home region, but these connections to land and community are not sufficient to overcome the draw of opportunities elsewhere. Once young people leave these rural Ontario communities for higher education or employment, they tend not to return. With the declining importance of forestry, agriculture and other resource-based industries in eastern Ontario, the skills and aptitudes that served their parents' generation have little value on today's job market. However, those traditional skills and aptitudes are still important in terms of the household self-sufficiency on which adaptive capacity is based, and they are becoming increasingly scarce.

In-migration is further changing the face of rural eastern Ontario. Those who were raised in rural communities and those who have migrated to them all place great value on environmental amenities and the rural way of life. However, their cultural background and their ways of experiencing nature differ so greatly the two groups do not mix as they participate in their different social activities. This situation is reminiscent of the famous observation made by Putnam in *Bowling Alone* (1995) that bowling remained a popular social activity in the US even as membership in bowling leagues declined. In rural eastern Ontario, the desire to enjoy a rural lifestyle is, like bowling, as strong as always, but the activities carried out as part of the rural lifestyle no longer bond community members as strongly as they once did.

In-migration is also changing the face of Iqaluit, in similar but more dramatic ways. Southern Canadians entering the community often enjoy hunting, fishing and being on the land, but they do not become members of the broad social networks centred upon those activities, and the food acquired in such ways does not hold the same cultural significance. While Inuit who come to Iqaluit from other settlements share a common cultural appreciation for land-based activities, their challenge is gaining entry to Iqaluit's social networks, where kinship remains important. In aggregate, community adaptive capacity is becoming increasingly tied to imported southern technologies, the commercialisation of traditional foods, and economic linkages with the south—a process that is self-reinforcing.

Demographic change in the north and in rural eastern Ontario is creating populations that are less independent and less resilient in the face of environmental stresses than the people who came before. This increases the need for institutions to play a greater role in future adaptation, something that places rural and remote communities at a distinct disadvantage as they compete with larger urban centres for resources necessary for adaptation. The situation necessitates policies, programs and approaches to adaptive capacity building that are flexible, innovative,

inclusive, low-cost and able to integrate traditional environmental knowledge with emergent technologies. Such attributes do not necessarily come naturally to institutions. They can be helped in this direction by scholars interested in influencing adaptation policy and who recognize that even as climatic conditions change and demand new adaptations, those who must do the adapting are continually changing.

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Chapter 4

A Methodology for Assessing Patterns of Labour Migration in Mountain Communities Exposed to Water Hazards

Soumyadeep Banerjee, Jean-Yves Gerlitz and Dominic Kniveton

Abstract There is a knowledge gap regarding migration in mountain regions, where exposure to environmental stress is the norm, and any increase in such stresses can be expected to have a marked effect on the lives and livelihood of mountain people. At present, there is little understanding of the process through which the impacts of water hazards influence the choice of household response, including the decision to migrate for work; and the role of remittances in shaping the adaptive capacity of recipient household. In 2010, the International Centre for Integrated Mountain Development (ICIMOD) conducted a regional study to examine the labour migration process in communities exposed to too much water (flash and other floods) and too little water (drought and water shortage) in the Hindu Kush Himalayan region. This study aimed to assess the influence of water hazards on the migration behaviour and the role of remittances on the adaptive capacity of recipient households. This chapter outlines the research design, theoretical framework, and research methods; briefly discusses some of the major findings; and the critically discusses the major challenges that were encountered during the study.

Keywords Hindu Kush Himalayas • Migration • Mountain • Remittances • Water hazard

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4.1 Introduction

Livelihoods are susceptible to numerous economic, social, political and environmental stresses and shocks, some of which are influenced by global transformation processes such as globalisation, demographic changes and climate change. There are several options in a household's portfolio of responses to react to such changes, one of which is labour migration. Sending one or more members to work somewhere else is a significant livelihood strategy for many rural households (Afsar 2003; Deshingkar 2004). A growing consensus suggests that labour migration can be an important strategy for reducing vulnerability to different sources of stress as it helps households diversify their livelihoods. In many cases, labour migration not only increases adaptive capacity but also enables individuals and households to accumulate savings and build assets that help them to deal with both known and unexpected challenges (see Adger et al. 2002; Tacoli 2009). Remittance from urban, mainly non-farm sources of employment have become an important component of rural household income, which influences patterns of household expenditure, living conditions, social security, education and health care (Deshingkar and Start 2003; Haque 2005). Remittance provides a safety net for the recipient household in times of environmental hazard (see Savage and Harvey 2007; World Bank 2009, Tacoli 2009).

Recent research (see McLeman and Smit 2006; Perch-Nielsen et al. 2008; Jäger et al. 2009; Kniveton et al. 2009) indicates that migration will be one of the outcomes of the intensification of environmental stressors by climate change. Over the last decade, within the climate change discourse there has been a gradual recognition of the role that migration can play in adaptation (see GMF 2010a, b).

It is not easy to isolate the impacts of environmental drivers of migration from those of non-environmental drivers such as economic, social, demographic and political. In assessing the relationship between environmental hazards and labour migration, it is important to understand the process through which a household selects the response strategies to the perceived impacts of environmental hazards. These responses are often the outcome of a household's vulnerabilities as well as its adaptive capacity. Differential vulnerability to environmental hazards within or between communities is the consequence of unequal exposure of households to environmental shocks and stresses; the sensitivity of their livelihoods to both environmental and non-environmental shocks and stresses; inequalities among households in terms of adaptive capacity such as access to land, housing, financial resources and social networks; and the prevailing socio-economic and institutional structures (Curson 1989; Cannon 1994; Adger 2006; Kniveton et al. 2008). Based on these factors, households can adopt one or more livelihood strategies from a portfolio of responses, which may include migration, to respond to stress and shocks due to environmental hazards.

The overwhelming focus on vulnerabilities in the current discourse on environmental migration has portrayed migration as a failure to adapt to the impacts of environmental stressors, rather than as a possible way of enhancing adaptation. Migration is

perceived to be a manifestation of the lack of adaptive capacity, or a strategy of last resort. This perception assumes that people are driven mainly by external shocks or stresses and are passive entities that are unable to use available options to improve existing livelihoods or create new ones. In contrast, all types of migrants consistently display initiative to resolve the challenges they confront (Skeldon 2003; Barnett and Webber 2009; Laczko and Aghazarm 2009). However, as migration requires resources, it may not be an option for some households; particularly the poorest and most vulnerable people are often unable to migrate (World Bank 2006; Schade and Faist 2010). Any assessment of the relationship between environmental stressors and migration is, therefore, incomplete without an assessment of the household and societal contexts within which the decision to migrate is taken.

The migratory response to environmental stressors varies depending on the frequency, intensity or magnitude of environmental stimulus, the variation in the contexts and perceptions of environmental threat, and the behaviour of people upon whom they have an impact (United Nations High Commissioner for Refugees 2001; Kniveton et al. 2009). An outcome such as the population displacements induced by the 2010 flood in Pakistan is at one extreme (see International Organisation for Migration 2010). Environmental stressors may even slow down long-distance migration by depriving a potential migrant of the necessary resources (Findley 1994; Henry et al. 2004).

The effects of labour migration and remittances on social, economic and gender inequality are still unclear and mixed. The extent to which remittances can be and are used to improve the conditions of the family back home also depends on several factors. The amount remitted clearly plays a role, but so does the existing level of development in the community. Often the poorest households do not have access to income from remittances (United Nations Research Institute for Social Development 2007; Ratha 2007).

There are few studies (see Suleri and Savage 2006; Population Studies Center 2007; Shrestha and Bhandari 2007; Gray 2009) on environmental migration in mountainous regions, where exposure to environmental stress is the norm, and any increase in such stresses can be expected to have a marked effect on the lives and livelihoods of the mountain people. And even fewer studies have been conducted on the role of remittances in shaping the adaptive capacity of recipient households to environmental hazards in this region.

Between 2008 and 2011, the International Centre for Integrated Mountain Development conducted a regional project entitled 'Too much water, too little water—Adaptation strategies to climate induced water stress and hazards in the greater Himalayan region' (hereafter referred as 'the Project'). The primary objective of the first phase of the Project was to improve understanding of the ongoing changes in the Hindu Kush Himalayan region related to climate change and the response strategies adopted by the mountain households to such changes. Diversifying livelihoods through on- and off-farm activities emerged as a central response strategy of the mountain households in communities affected by the impacts of too much (flash and other floods) and too little (drought and water shortage) water. Labour migration was one of the livelihood diversification strategies adopted by some households in

the communities studied (International Centre for Integrated Mountain Development [ICIMOD] 2009). It was still unclear, however, whether the observed labour migration process was in any way related to the impacts of water hazards in the communities studied, and what implications this migration had in the context of the adaptive capacity of affected households. In the second phase of the Project, one of the research themes focused on the patterns of labour migration in communities exposed to water hazards, with an emphasis on quantitative approaches.¹ This thematic study focused on the influence of water hazards on migration behaviour and on the effects of remittance on the adaptive capacity of recipient households. This chapter outlines the research design, theoretical framework and research methods; briefly discusses some of the major findings; and identifies the major challenges that were encountered during the migration study from the second phase of the Project.

4.2 Research objectives and research questions

The overall aim of the study was to understand the process of labour migration in communities exposed to water hazards in the Hindu Kush Himalayan region. The objectives were as follows: First, to understand migration behaviour in communities affected by water hazards; second, to assess the characteristics of those households choosing to partake in labour migration in communities affected by water hazards; third, to assess the potential of labour migration as an adaptation strategy for households in communities exposed to water hazards and fourth, to assess the policy implications of labour migration as a response strategy to water hazards.

A series of research questions were formulated in line with these objectives, as summarised in Table 4.1.

4.3 Scope of the Study

The field assessments were conducted only in origin communities. In these communities, the study covered both migrant and non-migrant households. The following working definition was used to define migrant households and labour migrants:

If during the past 20 years, any member of the household had lived anywhere other than in the origin community for more than two months at a time for work-related reasons, then the household is a migrant household and the migrant household member is a labour migrant.

Households not conforming to the above definition were referred to as non-migrant households.

¹ The other themes studied during the second phase of the Project were the role of tree crops in local adaptations to climate variability; effectiveness of flood mitigation infrastructure to address water hazards; and role of local governance in strengthening adaptive capacity to water stress.

Table 4.1 Research questions

Research questions	Research objectives			
	1	2	3	4
In water hazard affected communities, what is the relative importance of the perceived impact of water hazards on the decision to migrate for work?	x	x	x	x
In water hazard affected communities, how does the household context influence the decision to migrate for work? How does local context influence this migration decision?	x	x	x	x
Who are the labour migrants? Where do these migrants go? What occupations do labour migrants have in the destination communities?	x	x	x	x
What impacts do remittances have on household capacity to respond to water hazards?	–	x	x	x
What impacts does labour migration have on gender roles in migrant households?	x	–	–	–

Source Banerjee et al. (2011)

At any time during the past 20 years, if a household had received financial remittance, irrespective of the relationship of the remittance sender to the household, it was categorised as a recipient household. Both migrant and non-migrant households could, therefore, be recognised as recipient households if they received remittance during the study time-frame. For the purpose of this study, water hazards were classified into two categories: First, rapid onset hazards, such as floods and flash floods; and second, slow onset hazards, such as drought and water shortage, which could take months or even years to become a disaster.

4.4 Study Area

The migration study was conducted in 44 villages in the Upper Salween-Mekong sub-basin in the Yunnan province of China; Eastern Brahmaputra sub-basin in Assam province of India; Koshi sub-basin in eastern Nepal; and Upper Indus sub-basin in the Union Council Area of Chitral in Pakistan (Fig. 4.1). The studied villages were located either in the mountains or lowland adjoining the mountains. Four of the case studies on local responses to water stress and hazards during the first phase of the Project were conducted in the aforementioned river sub-basins of the Hindu Kush Himalayan region (see ICIMOD 2009). A general description of the study sites can be found in Su et al. (2009) for Yunnan province, China; Das et al. (2009) for Assam province, India; Dixit et al. (2009) for eastern Nepal; and Nadeem et al. (2009) for Chitral Union Council Area, Pakistan. The communities covered in the migration study during the second phase of the Project were selected in consultation with key informants based on three major criteria: first, the community's having had a history of at least one of the following types of water

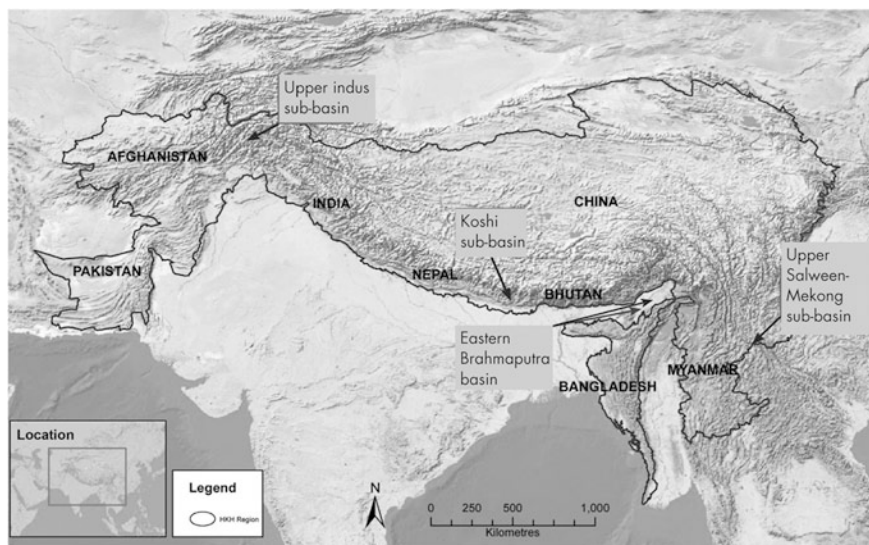


Fig. 4.1 The study sites within the Hindu Kush Himalayan region

hazard: floods, flash floods, drought, or water shortage; second, the perceived intensity and frequency of impacts of the water hazards; and third, the community's having had a history of labour migration. Prior to the commencement of the migration study in the second phase, brief field visits were carried out to observe the frequency and magnitude of water hazards, and the pattern of labour migration.

4.5 Theoretical Background

Overall this study is driven by an understanding of household decisions to migrate from a Sustainable Livelihoods Approach (SLA) and the New Economics of Labour Migration (NELM) perspective. Sustainable Livelihood Approaches attempt to explain the causal linkages between stressors (environmental and non-environmental) and household responses in terms of the household asset base. This asset base is composed of a variety of natural, physical, financial, human and social assets that are complementary to each other. The SLA recognises the extrinsic influence of institutions and policies operating at different levels (international, national and sub-national) and in different sectors (private and public) in shaping livelihoods (Carney 1998; Department of International Development 2000; Kniveton et al. 2008). The NELM approach provides insights into the household decision-making process. The decision to migrate for work is often made at the household level, which involves the migrating and non-migrating members of the household. The household overcomes constraints to spread the risks posed by its limited size by broadening the relevant geographical

space through the migration of one or more household members in search of work. The costs and returns of migration are shared by the migrant and the household, which expects remittances in return for the initial investment in the migration of the household member (Stark and Bloom 1985; Stark and Lucas 1988; Faist 2000). These two theoretical standpoints were used to formulate the design of the quantitative and qualitative data collection in the study and the questions on motivations behind the migration decision, the household assets at disposal for migration, the institutional setting of the household and the role of migration as a household risk management and diversification strategy.

Agriculture, which is the primary source of income in the rural areas of developing countries, is characterised by low and volatile productivity, and disguised unemployment is high. The capacity of agriculture to employ a large proportion of the expanding labour force is limited. Hence, not only income, but sectoral diversification is necessary to maximise the productivity of the labour force (Krishna 2002; Kundu et al. 2003; International Fund for Agricultural Development 2008). Migration provides an opportunity for sectoral diversification of the sending household's livelihoods. Since rural households are dependent on multiple sources of income, the family left behind in the community of origin continues to be engaged in farming (Kreutzmann 1993). The farm sector is highly sensitive to the impacts of environmental hazards (Barnett and Webber 2009). Migration assists vulnerable farm households to address the impacts of environmental hazards, including climate variability (Tacoli 2009). In the destination, rural migrants generally find employment in the non-farm sector (Deshingkar 2004). This sector is comparatively less sensitive to environmental hazards. A geographical diversification of livelihoods occurs when the catchment within which the sources of household livelihoods are located is broadened. Remittance becomes an alternative income stream for the recipient household at the time of natural disasters (World Bank 2009). The primary means of livelihood in the origin community and in the destination community are rarely disrupted by natural disasters simultaneously. Income, sectoral and geographical diversification of livelihoods, in turn, reduces risks posed to household livelihoods by environmental as well as non-environmental stressors. Though income or sectoral diversification may be a positive development, many migrants may still be employed in low-income, informal sector activities in the destination communities, wherein the economic returns are only marginally higher than that from the farm activities in the origin community and access to formal social-protection measures in the destination locale is minimal (see Seddon et al. 1998; Rogaly et al. 2002; Afsar 2003).

To assess the nexus between environmental stressors and human migration it is necessary to understand the multiple causes of migration. This study envisages that the decision to migrate for work is taken at the household level, and therefore households are the primary unit of analysis. Drivers of migration operate at various levels such as the national level, e.g., policies which facilitate or hinder migration; the community level, e.g., employment opportunities in origin community; the household level, e.g., resources to pay for the costs of migration; and the individual level, e.g., the willingness to migrate. The diverse drivers of migration can be grouped into five categories: economic, social, demographic, environmental and political.

The presence of migration drivers alone does not necessarily ensure that migration will occur. A series of intervening obstacles or facilitators influences the migration outcome in any particular place. Intervening factors may include access to transport and communication infrastructure, border controls, migration cost and recruitment agencies. Drivers of migration and intervening obstacles and facilitators influence the migration decision-making process in combination with one another (Kniveton et al. 2008; Foresight: Migration and Global Environmental Change 2011).

Past research has shown that the economic situation in the origin community is an important determinant of migration; if employment opportunities in the origin community are insufficient, it is more likely that people will migrate elsewhere in search of employment (Ezra 2001). Similarly, the economic status of a household has been shown to influence the migration decision. Increases in wealth raise the return to domestic production, which on the one hand increases the opportunity costs of migration, but on the other hand also relaxes resource constraints that restrict access to costly migration. At the same time, increases in wealth raise the maximum number of migrants a household could afford, but decrease the optimal number. Thus, migration would initially increase and then decrease with the corresponding rise in wealth. In aggregate terms, this is referred as the 'migration hump' (Chan 1995; World Bank 2006). Migration requires social resources. Social networks can facilitate migration by offsetting the disadvantages due to the lack of financial means in various ways such as extending loans at low interest rates, assisting in logistics and arranging jobs in the destination community (Goodall 2004; Thieme 2006). Population structure can influence migration behaviour. The higher the number of male household members of working age, it has been suggested, the higher the probability that one of them will migrate (Gray 2009). The type of environmental stressor, whether rapid or slow onset hazard, and the intensity and magnitude of the environmental stressor have also been suggested as having a significant bearing on the impact on the exposed community, perception of threat from the water hazard, and in turn on the choice of response strategy. Due to the immediacy and explicit nature of the impacts, rapid onset hazards have a stronger influence on the decision to migrate than slow onset hazards, the effects of which are staggered over time (Curson 1989; GMF 2010b). Low income households whose livelihoods depend heavily on natural capital, such as farming, animal husbandry, fishing, forestry and other primary sector-based livelihoods, are most vulnerable to the effects of environmental stressors on the ecosystem goods and services (Reuveny 2007; Barnett and Webber 2009). Vulnerability is even more pronounced when such people live in fragile environments like mountains. Political determinants such as institutional policies and conflicts can also influence migration behaviour. Institutional policies can seek to control (Wang and Zuo 1999; Liang and Ma 2004) or facilitate (International Food Policy Research Institute 2008) migration in an implicit or explicit manner. In addition, conflicts of various kinds such as insurgencies, political instability and religious or ethnic persecution, continue to uproot many across world, including mountainous regions (Baral 2003; The Energy Research Institute 2008; United Nations High Commissioner for Refugees 2010). Intervening factors such as access to information, presence of transport and communication infrastructure, and cost

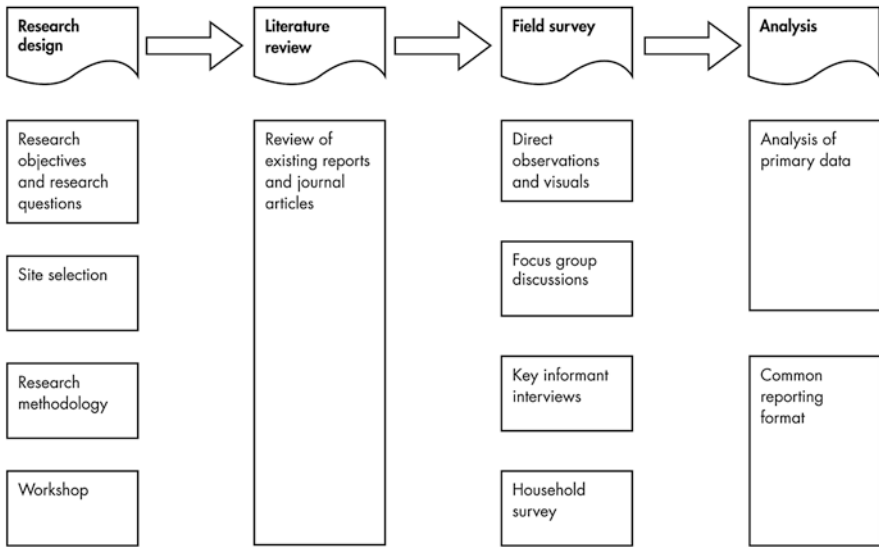


Fig. 4.2 Research schematic for water hazards and labour migration study in the Hindu Kush Himalayas

of migration can also determine whether migration is an available option (Rozelle et al. 1999; Bhandari 2004). The overall research schematic had four components: research design, a literature review, research methods and analysis (Fig. 4.2).

4.6 Methodology

4.6.1 Qualitative Data Collection

Information on community perception and attitude to the impacts of water hazards on livelihoods and household response strategies, determinants of labour migration, the contribution of remittances to the recipient household’s welfare, the community’s perception of labour migration, and the impact of migration on gender roles and the community was collected through focus group discussions (FGDs). Guidelines for open-ended questions provided the broad framework within which the FGDs were conducted, and, where required, the FGD facilitator asked follow-up questions. FGDs with different interest groups such as migrants, non-migrants, community elders and various female members of the migrant households were conducted separately. Each FGD comprised 6–8 people.

Knowledgeable individuals from the study area were interviewed in order to document in-depth information on the frequency and impact of water hazards,

local livelihood opportunities, migration behaviour, the role of remittances and the impacts of migration on migrant households, gender roles and origin community. Overall, 300 such individuals were interviewed across the four river sub-basins, which included migrants, non-migrants, female members of the migrant households, community elders, teachers, local public representatives and NGO workers. This information was used to verify the feedback from the focus group discussions and the findings from the household survey. Three separate interview guidelines consisting of open-ended questions provided the broad framework for the interviews with the migrants or male members of the migrant household, the female members of the migrant household and community representatives.

4.6.2 Quantitative Data Collection

A household survey was conducted to collect quantitative data on access to basic amenities and services, local livelihood opportunities, determinants of labour migration, migrant profiles, impacts of remittances and living and working condition of migrants in the destination communities. The household survey covered 1,433 households in 44 villages across the four river sub-basins in the Hindu Kush Himalayas (Table 4.2). The primary aim of the study was to understand the influence of water hazards on migration behaviour and assess the role of remittances in the adaptive capacity of the recipient households. Hence, labour migrants and migrant households were the main focus of the study. The sample design had envisaged that two-thirds of the overall sample would be made up of migrant households and the remaining of non-migrant households. The rationale was to have a substantial control group of non-migrant households. Based on the working definition of a migrant household, and in consultation with the key informants, all the households in each of the communities studied were classified into two major categories: migrant households and non-migrant households. Households within these two categories were then selected at random for the household survey. In the communities studied the percentage of migrant

Table 4.2 Number of surveyed households in different sub-basins/basins

River sub-basin/basins	Province/District/Union Council Area	Surveyed households		
		Total	Migrant (%)	Non-migrant (%)
Upper Salween-Mekong	Yunnan	363	60	40
Eastern Brahmaputra	Assam	336	71	29
Koshi	Dhankuta, Sunsari and Saptari	365	69	31
Upper Indus	Chitral	369	69	31
	Total	1433		

Source Banerjee et al. (2011)

households ranged between 5 and 97 % of the total households, the average was 48 %. In five communities the percentage of migrant households was less than 20 %, in seven communities it was higher than 80 %. Overall, migrant households were oversampled during the household survey. To correct possible errors the oversampling might have caused, design weights were constructed and used for the quantitative analyses.

The instruments for the household survey included a household schedule, a migrant questionnaire and a non-migrant questionnaire. In every surveyed household, depending on whether the household had been classified as a migrant or non-migrant household, information was gathered using a the household schedule and the migrant (or non-migrant) questionnaire

The design of the household survey instruments incorporated some relevant aspects of the Environmental Change and Forced Migration Scenarios (EACH-FOR) project² and the National Family Health Survey—3 (NFHS—3) of India.³ Researchers from the Hindu Kush Himalayan region and in other parts of the world were consulted during the questionnaire development process. These exchanges contributed to an understanding of the physical and socio-economic aspects of the study area. The input from researchers involved in ongoing studies on climate change and migration behaviour in Mexico and Burkina Faso were incorporated to improve the survey instruments.⁴ The survey instruments were pre-tested and revised during the first week of field study in each of the four sub-basins studied. Orientation and training sessions were conducted in each of the four sub-basins to explain the objectives of the study and train enumerators on the survey procedure. A field supervisor along with the study coordinator supervised the data collection in each region.

The completed questionnaires were cleaned by the respective enumerators in consultation with other enumerators and the field supervisor. Further verification of the data was conducted in the field through random check, comparison of inter- and intra-community responses and feedback from key informants and focus group discussions. In cases where discrepancies due to human error had been identified during the post-enumeration stage, the enumerator concerned re-visited the particular households to seek clarification.

In each of the villages studied, community level information on demographic attributes, availability and accessibility to basic amenities and services, socio-economic conditions and occurrence of natural hazards was collected through a village schedule. This information was collected from local public representatives or community elders.

² http://www.each-for.eu/index.php?module=project_outline.

³ http://www.nfhsindia.org/nfhs3_national_report.shtml.

⁴ Personal correspondence with Kerstin Schmidt-Verkerk (study in Mexico) and Christopher Smith (study in Burkina Faso).

4.7 Processing of Primary Data

The data collected from the household survey were compiled, analysed and interpreted to prepare the study report. Household survey data were entered in a data entry mask designed with the statistical software package STATA. After entering the data a plausibility check was performed to remove entry errors and inconsistencies. The data analyses were conducted using the statistical software package STATA. Analyses were carried out along two lines of inquiry. First, differences between the impacts of two types of water hazard reported in the study region, i.e. rapid onset and slow onset water hazards, was studied. Second, cross-country analysis as well as country-wide analysis was performed and the findings were compared. The analyses were adjusted with weights based on the proportion of migrant and non-migrant households in the communities studied. The ratio between migrant and non-migrant households was obtained from the village schedule. The qualitative data collected from interviews and FGDs were mainly used to build discussions and explanations.

4.8 Summary of Research Findings

Analyses of the quantitative and qualitative data revealed a number of findings around the nature of labour migration in water hazard prone communities in the Hindu Kush Himalayas. First, as expected from the NELM, labour migration is generally recognized as a livelihood strategy chosen by households of their own accord to diversify income, increase their overall opportunities or create new possibilities for earning a living by using available assets. The majority of migrant households in this study perceived economic reasons to be the most important determinant of labour migration, with non-environmental factors such as inadequate income, unemployment, insufficient land for farming or grazing, and dissatisfaction with livelihoods also noted as significant motives of migration for work. Figure 4.3 summarises the perception of households of different factors influencing their migration behaviour. However, nearly 80 % of the migrant households surveyed also considered water hazards as an important influence on the decision to migrate for work. It should also be noted that many of the non-environmental determinants of labour migration are also sensitive to the impacts of rapid or slow onset water hazards. While recognising the multi-causal nature of migration, it is clear that the impacts of water hazards do influence the decision to migrate for work in the communities studied.

Second, it was found that the option of labour migration was not available in the portfolio of livelihood strategies of some households for economic and non-economic reasons. This finding is in line with the theoretical basis of SLA which argues that livelihood choices result from access to a variety of capitals and assets, and thus conversely a lack of these assets restricts certain households from partaking in a particular livelihood strategy. Among the non-migrant households surveyed, a lack of economic resources prevented 28 % of households from partaking

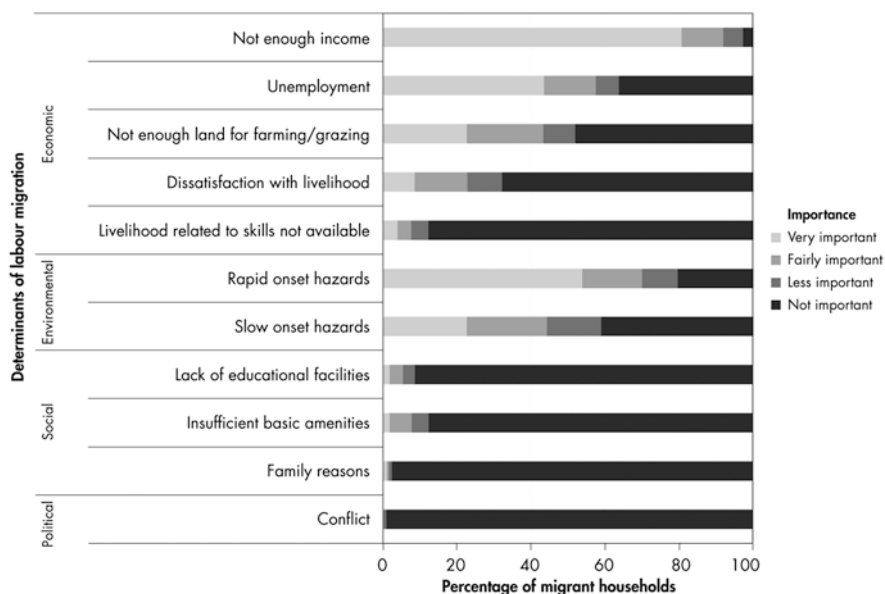


Fig. 4.3 Determinants of labour migration and their perceived importance in the migration decision

in labour migration. Family obligations (12 %), lack of additional household members (13 %) and acceptance of losses due to water hazards as a cost of gaining locational benefits (9 %) were other major reasons for not migrating in search of work. At the same time, some non-migrant households responded to the impacts of water hazards without recourse to labour migration. These households included those that had sources of livelihood that were not completely disrupted by water hazards (9 %); households that were aware of the risk of water hazard but did not expect a disaster (8 %); households that did not anticipate any losses or, at least, not serious ones (7 %); or households that were either planning or had undertaken loss reduction measures in anticipation of serious losses (5 %).

Third, remittance is the most tangible link between labour migration and the capacity of households to adapt to stresses and shocks. In the recipient households surveyed, the volume of remittance was generally low, with workers sending an average of US\$214 back to the recipient households at each transaction, and the frequency of remittance transfer was, usually, irregular. Recipient households were predominantly the migrant households but some non-migrant households received remittances from their social networks as well. The average volume of remittance per transfer was US\$248 in Yunnan province of China, US\$80 in Assam in India, US\$350 in east Nepal and US\$179 in Chitral in Pakistan. Even these small amounts made a significant difference to the households and their capacity to deal with the impacts of environmental and non-environmental stressors, and had positive effects on the wider community.

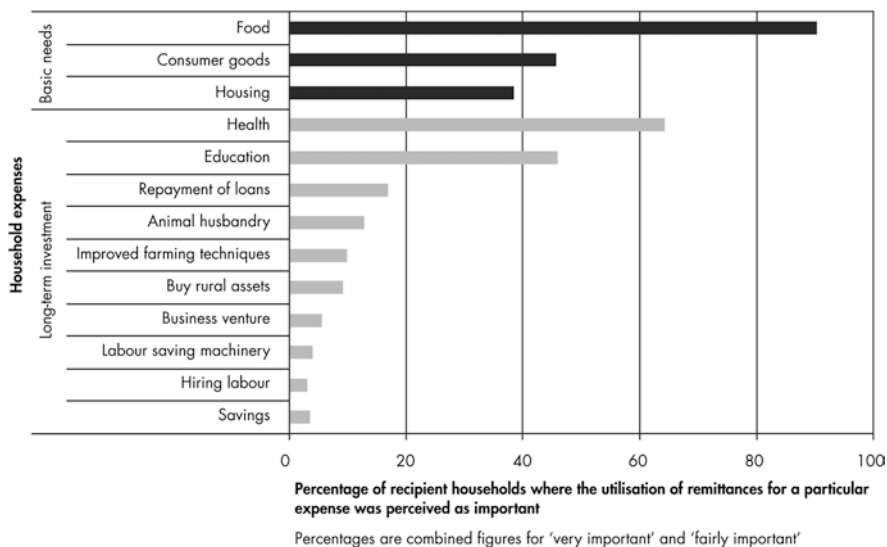


Fig. 4.4 Perceived importance of remittance utilisation for different household expenses

Remittance made a significant contribution to the recipient household's income. On average, more than half of the recipient household's income was contributed by remittance, supplementing income from other sources: agriculture, animal husbandry, daily wage employment, salaried employment and business. Remittance contributed to household welfare by contributing to basic nutritional needs, improving living conditions, and increasing purchasing power for consumer goods (Fig. 4.4). The recipient households were spending a major share of the remittance to procure food, making remittance an important factor in ensuring food security of these households, while the spending on health and education could improve the quality of life and future potential of the recipient households. Actual investment in business and infrastructure was minimal due to the low volume of the remittances, lack of supporting infrastructure or absence of a long-term perspective.

Remittance provides a safety net for households under stress during or in the immediate aftermath of water induced disasters, but also contributes to disaster preparedness. In the recipient households studied, remittance was used to buy food and cover the expenses of other basic needs during emergencies, and to recover after disasters. Remittance cash was also used to rebuild livelihoods, reconstruct houses and pay for basic amenities. Remittance was used to procure irrigation facilities in drought affected households, and to improve housing quality and procure boats in households affected by floods. However, the contribution of remittance to disaster preparedness was still sporadic unlike its role in disaster relief or recovery.

The benefits of remittance are not limited to the recipient families but can also affect the wider community. Most of the recipient households spent a major share

of the remittance cash within the community to procure goods and services, thus benefiting these local service providers. However, examining its impacts among these service providers was beyond the scope of this study.

4.9 Limitations

There are certain limitations to this study. First, the research findings represent a river sub-basin, not the entire area of the countries studied. Research findings from Assam, for example, are representative of areas in the eastern Brahmaputra sub-basin in Northeast India, not of India in general. As the study covered a wide area within the Hindu Kush Himalayan region, the findings are representative of areas within this region that are affected by the same types of water hazard and have similar socio-economic characteristics. Second, current climatic variability is often used as a proxy for future climate change impacts. To a certain extent, the influence of current climatic variability on the decision to migrate is useful in understanding the future impacts of water hazards intensified by climate change. Nevertheless, the future effects of environmental stressors intensified by climate change could be more complex than the impacts of current variability due to their constant nature. Not only will climate change intensify future water hazards, but the impacts of the water hazards will be complicated by changes in demographic, economic, social and political scenarios. Third, most of the surveyed communities had a long history of water hazards. The households in these communities were generally responding to actual hazard experience. Others may have been responding to anticipated future hazards, but the study did not make a distinction between responses to actual hazard experiences or anticipated hazards. Fourth, although this study had a non-migrant household sample as a control group for the migrant household sample, it did not have control sites in the context of water hazards, i.e. communities that did not experience any kind of water hazard. Thus, it is difficult to quantify the net importance of the influence of water hazards on migration behaviour. Instead, the study focused on the differences in migration behaviour and patterns in communities affected by rapid onset and slow onset water hazards.

4.10 Major Challenges in Research Operationalisation

Certain challenges were encountered during the course of the study: some were resolved while others need to be reflected upon for future studies. Some of the major challenges were as follows. The river sub-basins studied are water hazard prone areas. In the short time frame of this study it was difficult to identify communities that had not been affected by water hazards within the research timeframe, that is, during the past 20 years. In the absence of control sites for water hazards,

this study could not assess the net effect of water hazards on migration behaviour. Identification of control sites for water hazards will be imperative for future studies.

In many parts of the Hindu Kush Himalayan region, affiliation with particular social groups (e.g., caste or ethnicity or religion) influences the social capital of a household. Such affiliation could determine access to natural, physical, human and financial resources, which could have far reaching effect on adaptive capacity of households, including migration behaviour. On the other hand, the same social structure could be exclusionary in nature relative to certain marginalised social groups. While information on the caste, ethnicity and religious affiliations of the households surveyed was collected, these social indicators could not be incorporated in the regional level analyses because of the lack of a comparative framework of social groups across the region. For example, a reference framework does not exist to compare the social capital of a tribal household in India to that in Pakistan. Instead, using a Maximum Likelihood factor analysis a social capital factor based on help received from formal and non-formal institutions as well as membership in social networks was created, which served as a cross country proxy for social capital.

Several factors are instrumental in building trust and confidence of the community. Many of the enumerators and facilitators belonged to the same area as the communities studied or were associated with local institutions (e.g. NGOs, schools and colleges). The field teams were transparent with the communities about the study's objectives and outcomes. Prior to the survey, the field team briefed the village headman in each of the communities studied about the aims and contents of the research. Similar clarifications were provided to any community member who showed interest in learning about the various aspects of the study. Because there are many development organisations active in the Hindu Kush Himalayan region, it is common to conduct surveys prior to development interventions. Thus initially the communities studied expected some forthcoming benefits in return for their participation in this study. The field teams clarified that the study would not lead to any direct development intervention but could precipitate indirect benefits as the findings were to be shared with policy-makers at various levels. The study was presented as a means to bring some issues of the community members to the attention of policy-makers. Without the assistance of local facilitators a replication of the study within a short time frame will not be easy. As trust of respondents and access within communities are important issues.

Due to cultural sensitivities, social norms and general curiosity about the survey in the communities studied, it was difficult to conduct one-on-one interviews with female respondents in some communities. During the household survey and key informant interviews, the female respondent was often surrounded by other women or children from the same household or neighbourhood. In some instances, even the male members of the household were present. In such circumstances the respondents were often reluctant to respond frankly to gender sensitive questions, or onlookers tried to influence the respondent's opinion. In communities studied in Pakistan, the female respondents were accompanied by male household members, who often provided answers for the former. The presence of female enumerators was able to resolve this only to a limited extent.

4.11 Critical Discussion

Communities with a history of labour migration and which are already exposed to water-related hazards provide a useful analogy to what might be expected of communities exposed to increased water hazard stresses and shocks from future climate change. With a shift in perspective on the migration response to climate stress and shocks as failure to adapt, to a view of migration as adaptation strategy, the notion of households being trapped in locations exposed to the impacts of climate change and unable to migrate has started to gain wider recognition within the migration-adaptation discourse (Foresight: Migration and Global Environmental Change 2011). Interestingly the present study found that 28 % of the non-migrant households in communities exposed to water hazards in the four sub-basins sampled reported being prevented from migrating due to a lack of resources. Given that this study also found that, where households had at least one member partaking in labour migration, more than half of the recipient household's income was contributed by remittances, the findings suggest the existence of a vicious circle of increasing vulnerability in households unable to partake in labour migration. Further analysis of the data collected will help identify the characteristics of these trapped households and contribute to the development of policy interventions designed to increase their adaptive capacity. Furthermore the characteristics of the households migrating may be determined from the data collected in order to help develop policies that facilitate the process of migration, increase the levels of remittances and leverage the use of remittances to increase adaptive capacity of the households in origin locations and the community as a whole.

Despite the limitations and challenges, this study is a pioneering research initiative in the Hindu Kush Himalayan region to assess the patterns of labour migration in mountain and lowland communities vulnerable to rapid and slow onset water hazards. The results of the study act as a baseline to assess how changes in water hazard frequencies and magnitudes may contribute to changing patterns of migration. The methodology of the study forms a reference to future research designs for migration studies in general and for those using quantitative methods in particular.

Acknowledgments The authors would like to thank Dr. Brigitte Hoermann (ICIMOD), Dr. Michael Kollmair (ICIMOD), Prof. Richard Black (University of Sussex, United Kingdom) and Dr. Jeanette Schade (Bielefeld University) for their insightful feedback at various stages during the research. The authors will like to thank Dr. Partha Das (Aaranyak, India), Mr. Muhammad Younus (Aga Khan Rural Support Programme, Pakistan), Mr. Dev Narayan Yadav (Koshi Victims' Society, Nepal), and Dr. Caizhen Lu (Kunming Institute of Botany, China) for their invaluable support during the fieldwork. The authors would like to thank Mr. Dharma Maharjan (ICIMOD) for his assistance in creating the illustrations. The authors will also like to thank the anonymous reviewers for their helpful comments. The research was funded by the Swedish International Development Authority (SIDA).

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Chapter 5

Which Household Characteristics Help Mitigate the Effects of Extreme Weather Events? Evidence from the 1998 Floods in Bangladesh

Tanvir Ahmed Uddin

Abstract Climate change is predicted to increase the frequency and intensity of natural disasters. Bangladesh is a vulnerable country due to its geography, topography, poverty and low adaptive capacity. This chapter focuses on the potential for household characteristics to mitigate the effects of natural shocks. Using a panel dataset of the 1998 floods from the International Food Policy Research Institute, an econometric methodology was developed using three ordinary least squares (OLS) models. This approach helped identify the effects of the floods and to assess which characteristics influenced household welfare outcomes. The primary focus was on household calorie consumption but we also reflected on local migration (as both a dependent and independent variable). However, limitations in the dataset restricted a full investigation of migration.

Keywords 1998 floods • Adaptation • Bangladesh • Household characteristics • Interaction effects

5.1 Introduction¹

Global climate change (GCC) is one of the most significant challenges facing the world today. GCC refers to the long-term change in the statistical distribution of weather patterns over periods of time that range from decades to millions of years

¹ The author wishes to thank his Honours thesis supervisor, Dr. C. Bidner; T. Muqem for assisting with improving the expression of ideas; and C. D. Ninno who assisted in understanding the dataset. The author also thanks the editors, J. Schade and T. Faist, for their ongoing support in this publication.

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(IPCC 2007a).² In practical terms, GCC is understood as the change in average weather conditions such as temperature, precipitation and wind as well as a change in the frequency of events such as more or fewer extreme weather events (EWE). The worldwide impacts of climate change are increasingly evident through the extensive record of devastating natural disasters in the past few decades. There is now a global consensus that climate change poses a serious threat to the social and economic well-being of people in both developed and developing countries (World Bank 2010).³ GCC is predicted to increase the intensity and frequency of natural disasters, which will result in significant economic and social ramifications globally. For underdeveloped countries that already face considerable economic and social challenges, climate change will further compound their ability to develop (Mirza 2003). Specifically, the most threatened societies are those that engage in a mixture of subsistence farming and agricultural production for domestic use.

This chapter studies the case of severe flooding because this is the most recurrent and widespread type of natural disaster in Bangladesh. Whilst long-term climatic change is difficult to study, the onset of natural disasters provides some insights into such phenomena. The 1998 floods affected households in two main ways: households incurred substantial damage to crops and assets as a direct result of floodwaters and were also indirectly affected by higher prices and lower wages. Subsequently, households experienced lower calorie consumption, while income and the general nutrition of adults and children declined greatly (Del Ninno et al. 2001). Meanwhile, livestock assets, female education and credit (to varying degrees) were found to have positive associated benefits in limiting the fall in household calorie consumption.

5.2 Literature Review

5.2.1 *Climatic Change and Natural Disasters*

According to the IPCC (2007a) there have been large shifts in long-term temperatures, rainfall averages, sea levels as well as the frequency and intensity of droughts and floods. Changes in climate are expected to result in greater intensity and frequency of EWEs and natural disasters (Mirza 2003). Scientific evidence indicates that increased sea surface temperature will subsequently intensify

² The classical length of time is considered to be 30 years by the world meteorological organisation (WMO) (as cited in Dasgupta et al. 2010).

³ Unless specified otherwise, the World Bank classifications are based on the World Bank Atlas Method which groups countries as: low income, US\$995 or less and lower middle income, US\$3,945–\$12,195 (developing) and high income, US\$12,196 or more (developed) (see World Bank 2011).

cyclone activity and heightened storm surges all over the world (Dasgupta et al. 2010).⁴ Subsequently, storm surges can create damaging flood conditions in coastal zones and adjoining low-lying areas.⁵ According to Nicholls (2003) (as cited in Dasgupta et al. 2010), in the past 200 years, 2.6 million people may have drowned during storm surge events. The international workshop on tropical cyclones (IWTC) has noted that the vulnerability to flooding from tropical cyclones would increase if global warming causes a projected rise in sea levels (IWTC 2006, as cited in Dasgupta et al. 2010). The destruction caused by tropical cyclone Sidr⁶ in Bangladesh (November 2007) and cyclone Nargis⁷ in the Irrawaddy Delta of Myanmar (May 2008) provide recent examples of devastating storm-surge impacts in vulnerable developing countries such as Bangladesh. Additionally, the intensity and frequency of extreme precipitation events are likely to increase resulting in more numerous floods and mudslides (IPCC 2007a). Recent examples of this phenomenon were the devastating Pakistani floods in 2010 and 2011. As a result, Bangladesh is an important case study because of the intensity and frequency of numerous natural factors ranging from heavy monsoonal rains, coastal cyclones and storm-surge related activities.

5.2.2 The 1998 Bangladesh Floods and Impacts

The 1998 flood event that swept through Bangladesh in late summer was dubbed the ‘flood of the century’ because of its prolonged duration and the depth of water. At its peak in early September, the floods had covered two-thirds of Bangladesh. This caused severe damage to the *aman* monsoon rice crop, which was due to be harvested in November/December.⁸ Consequently, the total rice production losses exceeded 2.2 million tons which was equivalent to about 10 % of the annual rice consumption in Bangladesh (Del Ninno et al. 2001). The situation threatened the food security of tens of millions of households. The unusually long duration of

⁴ A sea-temperature of 28 °C is considered an important threshold for the development of major hurricanes of categories three, four and five (Michaels, Knappenberger, and Davis 2005 and Knutson and Tuleya 2004, as cited in Dasgupta et al. 2010).

⁵ Storm surge refers to the temporary increase, at a particular locality, in the height of the sea due to extreme meteorological conditions: Low atmospheric pressure and/or strong winds (IPCC 2007a).

⁶ According to Bangladesh Disaster Management Information Centre (report dated 26 November 2007) 3,243 people were reported to have died and the livelihoods of seven million people were affected by Sidr.

⁷ In Myanmar, 1,00,000 people were reported to have died and the livelihoods of 1.5 million people were affected by Cyclone Nargis.

⁸ The three crops of rice that are cultivated in Bangladesh are: *aman*, typically transplanted during the monsoon season in June-July and harvested in November–December; *boro*, transplanted in December–January and harvested in May–June; and *aus*, often directly sown in March–April and harvested in April–August.

the flood forestalled any possibility of re-planting rice seedlings which were destroyed in the standing water. The unusually high floodwaters resulted in substantial crop losses: 69 % of *aus* production, 82 % of deep water *aman* and 91 % of transplanted *aman* (Del Ninno et al. 2001). Due to losses of 24 % of the total value of anticipated agricultural production, the prolonged adverse effects of the flood proceeded long after the floodwaters had receded.

5.2.3 Departure from Existing Literature: The Role of Household Characteristics as Mitigating Factors

Previous studies of the 1998 Bangladesh floods have not specifically considered household characteristics as a potential source for the mitigation of the effects of floods. Although incomplete, existing literature provides useful starting points for further research. For instance, Skoufias (2003a) has explained that floods can both directly destroy crops and assets as well as create additional suffering due to the resulting higher prices and lower wages. He also documents examples of how ex-ante preparations for EWEs are more effective than ex-post responses. Khandker (2007) identified that 60 % of all households adopted one of several different coping mechanisms including borrowing, skipping meals or selling assets. Although outside the scope of his study, Khandker (2007) did not undertake econometric testing of the ability of characteristics to directly mitigate the effects of flooding.

This chapter attempts to extend the existing analysis by considering various household characteristics with respect to flood mitigation. In addition to identifying beneficial household characteristics, the research investigates whether the effectiveness of these characteristics varies depending on the level of flood exposure. The IPCC (2007b) has stressed that households can play a major role in adapting to GCC and mitigating some of the adverse effects of GCC and EWEs. Various researchers have also identified the mechanisms through which households overcome the advent of a natural shock. These include accumulation of human capital (Baez and Santos 2007; Gitter and Barham 2007; and Portner 2008, as cited in van den Berg 2010), access to microcredit (Khandker 2007), livelihood strategies (van den Berg 2010) and asset-smoothing strategies (Hoddinott 2006; Zimmerman and Carter 2003). Consequently, this study will shed light on whether household characteristics assist in mitigating the effects of natural disasters.

5.3 Data

The micro-level analysis for this chapter is based on the IFPRI-FMRSP household survey. The 1998 floods survey was designed to evaluate the impact of the natural disaster. The survey covers a large sample ($n = 757$) of spatially-dispersed

households in seven flood-affected *thanas*.⁹ The panel consists of four rounds: (1) November–December 1998 (2) April–May 1999 (3) November–December 1999 and (4) April–May 2004. Only the first three rounds of data were relevant to the scope of this research, because these rounds were recorded within a year of the floods and provided information on the immediate effects of the floods and the role of household characteristics. The survey collected an array of household and community information including demographics, consumption, assets, employment, agricultural production practices and borrowing. A fair representation of different parts of the country was sought using multiple criteria.¹⁰ Furthermore, households were selected using a multiple-stage probability sampling technique (see Del Ninno et al. 2001).

5.4 Conceptual Definitions

5.4.1 Definition of Flood Exposure

A measure of flood exposure is required to ascertain how households experienced the floods. This forms a crucial variable for the analysis that we undertake in this chapter. The survey utilises the Bangladesh Water Development Board's (BWDB) traditional measures of flood impact (see below). Geographical location is often not the best indicator of flood exposure as not all households were exposed to floods to the same extent in any given area. In the 1998 floods, there were varying degrees of flooding in homesteads and some households even had to abandon their houses for days or weeks at the peak of the flooding. To a certain extent, the direct exposure and intensity depended on the height of the homestead and the presence of an embankment or road.

5.4.2 Measuring Flood Impact

As one cannot accurately observe and measure flood exposure, the surveyors created an ordered qualitative index called *FAFFECT* as illustrated in Table 5.1 below. This was in fact a simplified version of a larger qualitative index called *FEINDEX*. Three measures were used to construct the index: the depth of water in the homestead, the depth of water in the home and the number of days that water was in

⁹ A *thana* (referred to as *upazila* by the present government) is an administrative unit that is smaller than a sub-district and larger than a village.

¹⁰ The criteria were: the severity of flooding and level of poverty; from the first two criteria, those *thanas* would give a good geographic balance were chosen.

Table 5.1 Formation of flood exposure index

Variable	Original variable		Created category variable	
	Range	Unit of measure	Range	Categories
Depth of water in the homestead	0–12	Feet	0–5	0–4: number of feet 5: more than 4 feet
Depth of water in the home	0–45	Feet	0–6	0–5: number of feet 6: more than 5 feet
Number of days of water in the home	0–120	Days	0–5	0: None 1: $> 0 \leq 1$ week 2: $> 1 \leq 2$ week 3: > 2 weeks ≤ 1 month 4: > 1 month ≤ 2 months 5: > 2
Flood index (<i>FEINDEX</i>)			0–16	
Flood-exposed categories (<i>FAFFECT</i>)			0	Not exposed
			1–5	Moderate
			6–10	Severe
			11–16	Very severe

the house. The totals for each of these measures were aggregated and threshold categories were created to distinguish levels of flooding. The threshold levels were given categorical values in order to classify households as:

- not exposed to the flood (0)
- moderately exposed to the flood (1)
- severely exposed to the flood (2); or
- very severely exposed to the flood (3).

There are two forms of flood exposure that were utilised in the modelling and analysis.

5.4.2.1 Household-Level Flood Exposure (FVAR)

The formation of the *FAFFECT* index had a degree of arbitrariness in terms of the thresholds for the various measures used as well as the way that it was aggregated. For ease of interpretation, the categorical flood exposure variable (*FAFFECT*) was transformed into a flood exposure dummy (*FVAR*). This approach also avoided the complications with comparing the four categories in the *FAFFECT* index. Households that recorded moderate, severe and very severe exposure (*FAFFECT* = 1, 2 or 3) were considered to be exposed as indicated by *FVAR* = 1 whilst non-exposed households were indicated by *FVAR* = 0. This construction was helpful in comparing outcomes between exposed and non-exposed households as well as in determining the positive/negative sign and size of the interaction effects between households with varying levels of exposure and characteristics. As

the first round collected survey data within a couple of months of the flood, the *FVAR* was available only for Round 1.

5.4.2.2 Village-Level Flood Exposure (VFVAR)

Additionally, using the village-mean of *FVAR* of all households, a village-level variable of flood exposure (*VFVAR*) was created. In the econometric analysis, *VFVAR* is able to capture village-level unobservable characteristics relating to the flood. For instance, *VFVAR* captures the general equilibrium effects that influence household outcomes. The general equilibrium effects arise due to changing market conditions such as supply constraints (of food) as well as demand constraints (lower wages and disposable income).

5.4.3 Measuring Household Welfare

There is a considerable degree of contention with regard to the measure of household welfare. Nonetheless, it is now considered that income—which has dominated much of poverty and well-being analysis in the past—provides a (limited) one-dimensional view of welfare (Alkire and Foster 2010).¹¹ In the aftermath of natural disasters, broader definitions of welfare are more appropriate because in such situations consumption, nutrition and health all deteriorate rapidly (Skoufias 2003a). Within welfare literature, various measures have been suggested to evaluate outcomes amongst individuals, households or nations. Anand and Harris (1994) provide five potential indicators of individual welfare.¹² Ultimately they suggest that perhaps the single most important aspect, particularly for developing countries, is calorie intake.¹³ In this chapter, adult equivalent

¹¹ The ‘uni-dimensional’ method of utilising a single cardinal variable of ‘income’ aggregates various dimensions of a person’s life and develops an aggregate cut-off to determine who is poor. Typically the cut-offs will vary for different dimensions (e.g. health, education, security etc.) and between people and communities (Alkire and Foster 2010).

¹² The five indicators are: household per capita income, household total expenditure per capita, household food expenditure per capita, household calorie intake per capita and household inverse-food share (defined as the ratio of total expenditure to food expenditure).

¹³ Whilst calorie consumption is a popular measure in the literature, some caveats need to be noted. According to Skoufias (2003b), there is now a consensus that the total caloric availability provides only limited insights about how the availability within households responds to changes in income and other resources. For example, when household income drops, caloric availability may be maintained more or less constant through substitutions within and between food groups. The outcome could be that whilst caloric consumption is maintained, the consumption of essential micronutrients may fall as households consume less meat, vegetables, egg and milk (Behrman 1995, as cited in Skoufias 2003b).

calorie measure is used to account for the types of occupants so that a more accurate indicator is obtained for the household. After a weather shock, an extreme outcome can be famine and widespread hunger. Often, this is the most crucial issue that needs to be addressed before income and other social measures such as housing and education. Rural citizens in developing countries remain highly vulnerable to fluctuations in the weather which can affect their welfare because a large percentage of their budget is allocated to food (Burgess and Donaldson 2010).

5.5 Conceptual Framework

The central proposition that this research tested is that household welfare is a function of household characteristics. For ease of description, the characteristics are categorised as physical capital (e.g. ownership of various assets), human capital (e.g. education levels) and financial capital (e.g. borrowing). Consequently, the following estimable model of determinants of household welfare can be tested:

$$HW = f(PC, HC, FC) \quad (5.1)$$

where, HW is household welfare and PC , HC and FC stand for physical, human and financial capital respectively. In the discussion, the physical capital and human capital variables are also referred to as asset and demographic variables. The dependent variables and the explanatory variables are discussed in detail in the following section.

5.5.1 Dependent Variable

The calorie dependent variable is recorded in adult-equivalent calorie consumption ($AECAL$) form. This allows one to account for the composition of adults and children in each household. Moreover, the logarithmic form [$LNAECAL$, or in short notation, $\ln(c)$] was utilised in all of the models because it corresponded better to the data structure in the regression model. The log-form also has the added benefit that it can be interpreted as an elasticity (Wooldridge 2006). An elasticity calculation helps one to easily measure by how much the dependent variable varies for a small change in the dependent variable.

5.5.2 Description of the Explanatory Variables

This section describes the explanatory variables for each category along with the prior expectations (hypotheses) about their relationship with household welfare.

5.5.2.1 Human Capital

Human capital is represented by years of education attained by the household head (*EDUCA*), total education of all females in the household (*FMAXEDUCA*) and age of the household head (*AGEY*). It is widely acknowledged that education plays a crucial role in socio-economic development and growth (see McMahon 2000). Many recent endogenous growth and Solow models now incorporate aspects of human capital (Barro 2007). Education also has significant returns for individuals and the household collectively (Psacharopoulos and Patrinos 2004). Particularly in Bangladesh, returns to education for females are higher than for males (Asadullah 2006). Aggregate female education is also expected to lower the adverse costs of natural disasters (Blankespoor et al. 2010). Thus, this chapter hypothesises that a household with a literate head and with higher aggregated female education will consume more calories, consequently mitigating some of the effects of the flood. This is because they may be more skilled at managing the crisis and seeking sources of support. However, it is also possible that education may not be very beneficial in the aftermath of the floods because the economy was slow to recover (especially for skilled sectors). For instance, employment and wages of salaried workers fell dramatically in affected regions and remained low for a long time (Mueller and Quisumbing 2010).

The relationship between age and calorie consumption cannot be determined a priori. The household head's age can affect calorie consumption through asset accumulation, technology adoption or risk aversion (Demeke et al. 2011). Age can also be considered a proxy for experience of prior natural disasters and knowledge of coping strategies (Glewwe 1991). Behaviourally, individuals who have experience of natural disasters are less likely to experience a negative outcome resulting from that event than individuals without such experience (Halpern-Felsher et al. 2001). However, age could be negatively correlated with calorie consumption as older heads may be less efficient in carrying out demanding activities (e.g. farm operations) resulting in lower production and productivity (Demeke et al. 2011).

5.5.2.2 Additional Demographic Control Variables

Two additional controls that are included in Model 2 and 3 regressions are sex of the household head (*SEX*) and the size of the household (*HHSIZEA*). These are introduced to prevent bias in the ordinary least squares (OLS) estimators. *SEX* has to be controlled because male-headed households are expected to consume more calories than their female-headed counterparts. This inequality is likely since most female-headed households in the Bangladesh rural system are formed as a result of the death of the male household head or divorce. This situation usually leaves women with insufficient resources such as land, livestock and other productive assets (Demeke et al. 2011). *HHSIZEA* has to be controlled because the dependent variable adjusts the household-level calorie consumption through accounting for

the composition of members. From preliminary estimation testing, there appears to be a systematic relationship between *AECAL* and *HHSIZEA* which biases the results.

5.5.2.3 Physical Capital

Three asset variables, *LIVESTOCK*, *CONSASSETS* and *HTOTLAND*, are included to provide various measures of household asset ownership and to control for wealth effects which may influence calorie consumption. They are expected to have positive effects on calorie consumption. All of the three assets studied here can be used as collateral or sold to obtain urgent funds to cope with the disaster. Specifically, *LIVESTOCK* is an important physical capital for farming activities in rural Bangladesh. Livestock can be a store of wealth, a source of income and can also be a means to cope with difficult economic times (Hoddinott 2006). Furthermore, landholding (*HTOTLAND*) is a resource to grow food for subsistence and to be sold in the market. It is possible, however, that greater landholding can make households more susceptible to flooding. Where households are dependent on land, they can suffer from crop failure and loss of feed for livestock.

5.5.2.4 Financial Capital

Financial capital is represented by borrowing (*LNLOANTOTAL*) and purchase of food on credit (*FOODCRED*). Borrowing is anticipated to have a positive influence because it enables households to address the immediate damage and costs of the flood (such as repairs). Loans also resolve short term liquidity constraints for households. Thus, inputs can be purchased to continue food production. Borrowing can also be used to smooth consumption in the event of food shortages in the household (Zeller and Sharma 2000). Similarly, the purchase of food on credit represents an ability to maintain consumption through deferring payment. However, loans are expected to provide only temporary benefits as households would soon need to make repayments and could face a severe debt-burden (Del Ninno et al. 2003). If households had access to greater remittances, that could serve as a substitute for borrowing and lower the negative repercussions from indebtedness.

5.5.2.5 Food Prices

Food prices are included in the analysis as additional explanatory variables. The food price variables, as described in Table 5.2, were recorded as the mean village-level per-kilo price. This was calculated by first dividing the total value of purchases of the particular food group by total quantity bought. Thereafter, the mean of all purchases of food within a particular food group was calculated. Finally, the

Table 5.2 Definitions and summary statistics of the variables (panel form)

Variable name ^a	Description	Mean	SD
Dependent variable			
<i>AECAL</i>	Adult equivalent calorie consumption	3,331.881	1,175.361
<i>LNAECAL</i>	Logarithm of <i>AECAL</i>	8.049795	0.3579022
Independent variables			
Flood variables			
<i>FVAR</i>	Dummy = 1 if household was moderately, severely or very severely exposed to the flood	0.7133421	0.4524993
<i>VFVAR</i>	Village-level mean of <i>FVAR</i> (each household in a village has same value)	0.7133421	0.3645893
Physical capital			
<i>CONSASSETS</i>	Total value of three consumer assets that are measured: wall clock, tv and radio (in 100's of taka)	1.491986	10.72747
<i>HTOTLAND</i>	Total amount of land owned by the household (including homestead, ponds and farming or other lands) (in 100's of decimals) ^b	1.266664	1.89445
<i>LIVESTOCK</i>	The number of cows, bullocks and sheep in the household	0.8071334	1.265873
Human capital			
<i>EDUCA</i>	Total years of education attained by the household head	2.607013	3.73519
<i>FMAXEDUCA</i>	Total years of education attained by all females in the household	4.98975	6.544568
<i>AGEY</i>	Age of household head (in 10 s of years). The regression models also include <i>AGEY2</i> –age-squared of household head (in 100 s of years)	4.502109	1.249097
Financial capital			
<i>FOODCRED</i>	Total amount of food purchased on credit by household (in 100's of taka)	2.444551	5.758981
<i>LNLOANTOTAL</i>	Logarithm of total value of outstanding household loans through various lending schemes (microfinance programs, money lenders and personal borrowing)	0.7800688	1.163526

(continued)

Table 5.2 (continued)

Variable name ^a	Description	Mean	SD
Other control variables			
<i>SEX</i>	Dummy, = 1 if the household head is male	0.9590054	0.1980395
<i>HHSIZEA</i>	The number of household members	5.730838	2.198105
Food price variables			
<i>RICEPRICE</i>	Mean village-level per-kilo price of food purchases of all households	15.18259	2.788722
<i>ATTAPRICE</i>	“	11.89998	1.944583
<i>VEGEPRICE</i>	“	16.12201	6.581636

^aOutliers for the following variables were removed: *AECAL* (>10,000 or <800), *RICEPRICE* (>60 or <3) and *ATTAPRICE* (>100 or <5). Outliers were adjusted because they can adversely influence the OLS estimates (Wooldridge 2006)

^bAn ancient South Asian unit of area measurement (1 decimal \approx 436 sq. feet)

village-level mean was obtained by taking the average of all households in each village.

5.5.2.6 Excursus on Migration

It was originally intended that this research would also study the relationships between household characteristics and domestic migration. This could have added an interesting dimension to EWE mitigation strategies. However, with little useful data comparing the changes in household size and composition, this line of inquiry could not be pursued adequately.¹⁴ This section discusses some of the ideas linking EWE to migration. In addition, we present a potential methodology to study migration as a strategy to mitigate the effects of EWEs.

With or without climate change, people move for many different reasons. Banerjee writes in this book, based on research from flood-prone Nepal, that migration can be seen as a form of anticipatory behaviour in situations of environmental threat. Previously, Banerjee et al. (2011) explained the use of migration-based remittances as a tool for adaptation. Meanwhile, it can be seen that numerous authors have also questioned the direct linkages between climate change and migration (see Montreux and Barnett 2009). In this book, McLeman makes a stark departure from the dominant perspective of the environmental push. According to his findings, it would be far too simple to assume a direct causal relationship between environmental change and out-migration. Previously, he developed a typology of the complex system in which these and other factors influence one another (see McLeman 2010). Similarly, Gosh (1992) and Lohmann (1994) (as cited in Meze-Hausken 2000) also present a non-uniform typology of migrants based on four root causes of migration which include: survival migration, opportunity-seeking migration, environmental migration and flight due to persecution and conflict. As a result of these studies, the factors that McLeman (2010), Gosh (1992) and Lohmann (1994) (as cited in Meze-Hausken 2000) identify should be taken into consideration when undertaking econometric modelling of migration to avoid potential omitted variable bias¹⁵ and endogeneity issues (e.g. where a factor causing migration is determined within the model).¹⁶

¹⁴ When the difference in *HHSIZEA* was compared, both negative and positive values were generated (i.e. some households grew in size whilst others fell). This made it difficult to test the change in *HHSIZEA* as a dependent variable econometrically.

¹⁵ Omitted variable bias is the bias that appears in estimates of parameters in a regression analysis in that the regression omits an independent variable that should be in the model.

¹⁶ Those factors include not just the size of demographic change, but also its composition, its impact on social networks, and the (possibly negative) impact of migration on in situ adaptation options of those left behind.

5.5.2.7 Migration: Dependent Variable

The dependent variable could have been created by taking the physical difference of the household size (*HHSIZE*) between two consecutive rounds. Thus, migration after Round 1 could be measured as:

$$\Delta HHSIZEA = HHSIZEA_{t+1} - HHSIZEA_t \quad (5.2)$$

The change in *HHSIZEA* could have been a useful dependent variable because it measures the population in each community at a particular round. A change in this could reveal whether people moved to another location (after controlling for factors such as death and illness) due to the floods and if other household characteristics could explain that change.

5.5.2.8 Migration: Independent Variable

Additionally, migration could also be considered as an explanatory variable. In this sense, individuals and households migrate in order to mitigate the adverse effects of flooding. One of the strongest reasons that explain why people migrate locally and internationally is the possibility of making remittance payments back 'home'. In the context of least-developed countries (LDCs), Stark and Levhari (1982) have found that remittances can be used as: a tool for risk aversion, a substitute for failing local financial markets and for income diversification. The availability of remittances as another source of income could also limit the requirement for local loans or food credits as well as their associated negative repercussions on future welfare through indebtedness. In the context of flood-prone Bangladesh, amongst various reasons, migration could assist in finding higher ground, rescuing farm animals or moving to relatives and friends' houses for shelter and food.

5.5.2.9 Additional Explanatory Variables

When considering migration as either a dependent or independent variable, some additional explanatory variables could strengthen the model. For instance, because remittances are an important feature of migration, it must be included in the model to control for any income effects.¹⁷ Also, when studying changes in income, remittance payments need to be included as a control variable.

Further to the previous discussion linking human capital to household welfare, in terms of migration, there are possibly strong linkages between education and skilled migration. In a recent World Bank report on African migration, Ratha et al. (2011) explain that emigration of skilled workers has several general benefits including remittances, contacts with foreign markets, technology

¹⁷ In economics, income effects refer to the change in consumption that arises from a change in income.

transfer, enhanced skills and perhaps increased demand for education in the origin country. At the same time, the authors also acknowledge some of the disadvantages of this process including the reduction in ‘supply of critical services; limiting productivity spill-overs to both high-and low-skilled workers; reducing the potential for innovative and creative activities that are at the core of long-term growth; and limiting contributions to the health of social, political and economic institutions’ (Ratha et al. 2011: p. 7). It must also be noted that migration rates can be predicted to vary depending on where wages fall. Wages may fall only in the affected regions or all over the country—the latter through aggregated shocks to the economy. This might lead to an increase in migration to further distances within the country (in the first case) or to a decrease in migration (in the second case).

As a result, any successful modelling strategy needs to address the relationships between education and skilled migration to delineate the benefits and costs of skilled migration. Therefore, it is suggested that the aforementioned approaches (migration as either a dependent or independent variable) could be tested in further research using other datasets that adequately measure changes in household size, remittance payments and changes in these variables across time periods.

5.6 Summary Statistics

The summary statistics (in panel form) for each of the variables used in the analysis are provided in the following Tables (5.3, 5.4, 5.5).

Table 5.3 Summary statistics across rounds: round 1

Variable	N	Mean	Standard deviation
<i>LNAECAL</i>	743	7.972746	0.3743848
<i>FVAR</i>	757	0.7133421	0.4524993
<i>VFVAR</i>	757	0.7133421	0.3645893
<i>CONSASSETS</i>	757	4.055746	17.91208
<i>HTOTLAND</i>	757	1.163405	1.771432
<i>LIVESTOCK</i>	757	0.8956407	1.354375
<i>EDUCA</i>	721	2.676838	3.753832
<i>FMAXEDUCA</i>	757	4.779392	6.434464
<i>AGEY</i>	753	4.502258	1.249705
<i>AGEY2</i>	753	21.83001	12.29169
<i>FOODCRED</i>	757	4.857075	7.802658
<i>LNLOANTOTAL</i>	757	1.156797	1.232893
<i>HHSIZEA</i>	757	5.59181	2.107203
<i>SEX</i>	753	0.9561753	0.204841

Table 5.4 Summary statistics across rounds: round 2

Variable	N	Mean	Standard deviation
<i>LNAECAL</i>	743	8.089613	0.3535889
<i>CONSASSETS</i>	757	0.0176354	0.2292646
<i>HTOTLAND</i>	757	1.295518	1.948423
<i>LIVESTOCK</i>	757	0.7886394	1.245193
<i>EDUCA</i>	745	2.565101	3.720239
<i>FMAXEDUCA</i>	753	5.01328	6.565937
<i>AGEY</i>	746	4.494504	1.247487
<i>AGEY2</i>	746	21.75471	12.27235
<i>FOODCRED</i>	753	2.184525	4.916344
<i>LNLOANTOTAL</i>	757	0.6266557	1.082649
<i>HHSIZEA</i>	753	5.746348	2.206299
<i>SEX</i>	748	0.9625668	0.1899478

Table 5.5 Summary statistics across rounds: round 3

Variable	N	Mean	Standard deviation
<i>LNAECAL</i>	725	8.087952	0.3317309
<i>CONSASSETS</i>	757	0.402576	3.833811
<i>HTOTLAND</i>	757	1.34107	1.955745
<i>LIVESTOCK</i>	757	0.7371202	1.188952
<i>EDUCA</i>	730	2.580822	3.736105
<i>FMAXEDUCA</i>	734	5.182561	6.637109
<i>AGEY</i>	730	4.509726	1.251776
<i>AGEY2</i>	730	21.90242	12.32728
<i>FOODCRED</i>	734	0.2231866	1.696526
<i>LNLOANTOTAL</i>	757	0.5567541	1.07573
<i>HHSIZEA</i>	734	5.858311	2.274859
<i>SEX</i>	731	0.9582763	0.1992363

5.7 Econometric Framework and Methodology

The following sections explain the econometric framework that was developed for the analysis.

5.7.1 Simple Panel Data Model

The OLS regression models in the analysis are based on the following simple panel data model. The estimation model is repeated for each of the three rounds, $t \in 1, 2, 3$:

$$Y_{it} = \alpha_0 + \gamma F_i + \beta X_{it} + \theta (F_i \times X_{it}) + \varepsilon_{it} \quad (5.3)$$

where

- Y_{it} is the dependent variable observed for household i at time t
- F_i is an indicator of flood exposure for household i at time $t=1$ only
- γ is the estimated coefficient of floods across rounds
- X_{it} is a vector of explanatory variables for household i at time t
- β is a vector of estimated coefficients
- θ is a vector of estimated interaction term coefficients
- α_0 is the constant of the equation
- ϵ_{it} is the error term.

In this research, the analysis is gradually expanded by examining the following three OLS models.

5.7.2 Model 1: Effect of Flood Exposure on Calorie Consumption

To evaluate the effect of flood exposure, the following OLS regression model is estimated:

$$Y_{it} = \alpha_0 + \gamma F_i + \epsilon_{it} \quad (5.4)$$

It is also possible to study the effects of the flood through several different variables: *FVAR* (household level), *VFVAR* (village level) or through various food price variables. Thus, in order to identify the most significant channels for the flood effects, several variations of the model in Eq. 5.4 are used by substituting the aforementioned variables for F . It must be noted that whilst F does not vary across rounds (only when one is specifically considering the flood index variable), $\hat{\gamma}$ will vary according to the marginal effect (short, medium and long term) of the flood for all rounds.

5.7.3 Model 2: Flood Effects Controlling for Household Characteristics

It is feasible that Model 1 does not provide a realistic indication of the relationship between flood exposure and calorie consumption. Thus, other possible determinants of calorie consumption cannot be assumed to exist in the error term and remain uncorrelated with the flood exposure variable. Leaving out important variables can cause omitted variable bias. Even correlation between a single explanatory variable and the error term can generally result in all OLS estimators being biased (Wooldridge 2006).

5.7.3.1 Endogeneity of Flood Exposure

It is also possible that the flood exposure variable exhibits endogeneity in the model. By endogeneity, we mean that an explanatory variable is correlated with the error term. The existence of endogeneity creates bias in the coefficient estimates of the explanatory variables (especially the flood variables) and diminishes the ability to make inferences about the characteristics (Wooldridge 2006). One highly likely source of endogeneity arises from omitting measures of household wealth. It could well be that poorer households lived in marginal lands such as near rivers and waterways, and this would have increased their chances of being flooded.¹⁸ For analytical purposes, the impact of floods cannot be confounded by the effects of initial endowments and characteristics. It must be noted that Del Ninno et al. (2001) did not find any strong evidence to support the hypothesis of a correlation between household flood exposure and endowments.¹⁹

Hence, the Model 2 specifications make direct comparisons between combinations of household characteristics (such as wealth factors) to determine if the predicted effect of flood exposure in Model 1 varies in size and significance. The addition of explanatory variables also helps identify the determinants of calorie consumption and whether they were confounding the relationship between the floods and the dependent variable. Consequently, Model 2 includes the aforementioned explanatory variables and estimates the following:

$$Y_{it} = a_0 + \gamma F_i + \beta X_{it} + \varepsilon_{it} \quad (5.5)$$

5.7.4 Model 3: Interaction Effects

Model 3 tests the assumption that some households will be better able to cope than others (with a given level of flood exposure) based on their characteristics. Also, the effects of the characteristics can be distinguished based on the level of flood exposure. For instance, it can be hypothesised that education may be more beneficial for non-exposed households than exposed ones. Hence, we wish to identify not only what the marginal effect of X is (conditional on F) but also how X affects the marginal effect of F on Y_{it} .

Thus, the following model can be estimated²⁰:

$$Y_{it} = \alpha_0 + \gamma F_i + \beta X_{it} + \theta(F_i \cdot X_{it}) + \varepsilon_{it} \quad (5.6)$$

¹⁸ On this point, it is interesting to note that there has been much discussion and research into how human-induced vulnerability escalates natural hazards into disasters (see Cannon 1994).

¹⁹ They concluded this after running several comprehensive regression models including probit, logit, fixed and random effects models to account for various forms of possible endogeneity. On an aggregate basis, they found that even though some unions and *thanas* were exposed more than others to the floods, these do not appear to be poorer. Hence, based on our results and Del Ninno et al. (2001) conclusion, we can assume with substantial certainty that the floods were not endogenous.

²⁰ This approach is based on Burgess and Donaldson (2010) study of the interaction between railroads and rainfall in determining famine intensity.

5.7.4.1 Marginal Effects

Based on this model, we are interested in studying the marginal effects of the flood and the household characteristics. The following presents the assumptions for each of these marginal calculations.

a. marginal effect of flood exposure

When discussing the VFVAR (a continuous variable), the marginal effect of flood exposure in Eq. 5.6 can be calculated as follows:

$$\frac{\partial Y}{\partial F} = \hat{\gamma} + \hat{\theta}X_{it} \quad (5.7)$$

In the results, one would expect that $\hat{\gamma} < 0$ as the flood contributes to lower household calorie consumption. Meanwhile, the coefficient estimate, $\hat{\beta}$ presents the relationship between household characteristics and calorie consumption. Finally, taking the partial effect of the flood in Eq. 5.6 will help determine the interaction effect's size and direction, i.e. whether the household characteristics mitigate ($\hat{\theta} > 0$) or exacerbate ($\hat{\theta} < 0$) the flood effect.

b. marginal effect of household characteristic

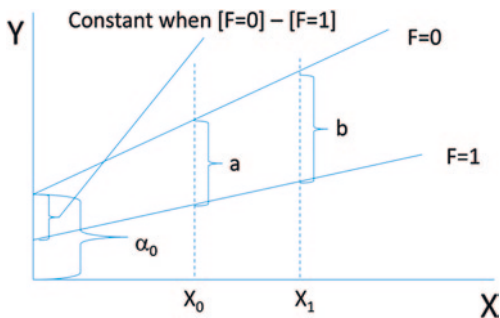
In addition, the marginal effect of a household characteristic in Eq. 5.6 is:

$$\frac{\partial Y}{\partial F} = \hat{\beta} + \hat{\theta}F_i \quad (5.8)$$

This expression allows one to identify the values of $\hat{\beta}$ and $\hat{\theta}$ in order to distinguish between the effects of each characteristic depending on flood exposure. For instance, when $F = 0$, the marginal effect of a characteristic (i.e. $\partial Y / \partial X$) is $\hat{\beta}$; whereas if $F = 1$, the marginal effect is $\hat{\beta} + \hat{\theta}$. Depending on the sign restrictions on the parameters, the interpretation will vary. For instance if one assumes the following situation: $\hat{\gamma} < 0$ but $\hat{\alpha}_0 + \hat{\gamma} > 0$; then logically $\hat{\beta} > 0$ and $\hat{\theta} > 0$. The interpretation of these particular parameter restrictions imply that the flood has a negative effect, but this is mitigated by the characteristic. Also the characteristic has a positive effect regardless of flood exposure.

A negative sign on $\hat{\theta}$ does not necessarily indicate that the characteristics are not predicted to be useful for households. It simply means that it does not mitigate the effect of the floods in a direct manner. As long as $\hat{\beta} + \hat{\theta} > 0$, the cumulative effect of the characteristics is still positive. When the signs do alternate, this shows that the sign and size of the effect of the household characteristics can vary depending on the level of flood exposure. For example if $\hat{\beta} > 0$ and $\hat{\theta} < 0$ (and $\hat{\theta} > \hat{\beta}$) the characteristic has a positive relationship with calories for non-exposed households but a negative relationship for exposed households. This is an interesting result in itself as one can make more specific conclusions about the characteristics rather than grouping exposed and non-exposed households together. The distinction between marginal effects of household characteristics based on flood exposure is represented diagrammatically in Fig. 5.1.

Fig. 5.1 Marginal effects of household characteristics for a given level of flood exposure



5.7.5 Econometric Issues

See Appendix 5.1 for further discussion about specific econometric and specification issues relating to the model.

5.8 Results and Discussion

5.8.1 Model 1 Results

Model 1 was used to investigate the effects of the floods on household welfare.

5.8.1.1 Household-Level Flood Exposure

The household-level flood exposure variable (*FVAR*) captures the direct effects on households through loss of either assets or crops. To identify the relationship between flood exposure and welfare, a simple linear regression (SLR) model was used. The level form of calorie consumption was used because it allows a ‘comparison of means test’ to be performed. After this, subsequent models utilise the logarithmic form of calorie consumption as discussed earlier. The results are presented in Table 5.6.

The constant term represents the mean calories consumed by households that were not exposed to the floods. In Round 1 there was a difference of 228.50 calories between the exposed (i.e. $[\bar{y}|F = 1] = 3230.22$) and non-exposed households (i.e. $[\bar{y}|F = 0] = 3258.72$). However, there appeared to be evidence of ‘catch-up’ where the gap between flood exposure categories fell to 174.41 and 141.59 calories in Round 2 and 3 respectively.

5.8.1.2 Village-Level Flood Exposure Effects

It is highly likely that even if households were not affected by the floods directly, they would be affected at the village level through indirect effects. If parts of a village are affected, the indirect effects can result from higher prices due to supply shortages,

Table 5.6 Household flood exposure effects on welfare

Variables	(1)	(2)	(3)
	R1_aecal	R2_aecal	R3_aecal
<i>FVAR</i>	−228.50** (99.08)	−174.41* (103.03)	−141.59 (99.09)
Cons	3,258.72*** (83.70)	3,598.55*** (90.76)	3,545.11*** (82.36)
N	743	731	712
Adj. R-sq	0.008	0.003	0.002

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note There are fewer observations of calorie consumption in Rounds 2 and 3. According to Mueller and Quisumbing (2010) attrition was only a possible problem when the fourth round of data was considered. Even then, only 5 % of the original households in the first round were not followed in the last survey round. Hence, the missing data in rounds subsequent to Round 1 are not likely to cause bias in the OLS coefficient estimates

Table 5.7 Results of effects of flood exposure (round 1)

Variables	(1)	(2)	(3)
<i>FVAR</i>	0.0085 (0.0441)	–	−0.0091 (0.0516)
<i>VFVAR</i>	−0.1504** (0.0616)	–	−0.1090 (0.0734)
<i>RICE</i>	–	−0.0269* (0.0156)	−0.0168 (0.0156)
<i>ATTA</i>	–	−0.0050 (0.0089)	−0.0038 (0.0079)
<i>VEGETABLES</i>	–	−0.0061*** (0.0014)	−0.0050*** (0.0014)
Cons	8.0175*** (0.0764)	8.5907*** (0.3999)	8.4812*** (0.3790)
N	739	612	612
Adj. R-sq	0.020	0.031	0.039

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note Additional regressors that were included in but not reported were *HHSIZEA* and *SEX* (all columns) and *VOILPRICE* (columns 2 and 3). Oil was included because it is a key complement in cooking. There were fewer observations in columns 2 and 3 because some villages did not report purchases of *atta*

damage to roads and bridges, and closure of markets (Del Ninno et al. 2001). Table 5.7 presents the results from an OLS regression when *LNAECAL* was regressed on *FVAR* and *VFVAR* in column 1, on key food prices in column 2 and then on all of these variables in column 3. In the following table, the analysis is restricted to Round 1 because the survey was conducted just a few months after the floods began. Round 1 was also the time when prices were highest (Del Ninno et al. 2003).

5.8.1.3 Analysis and Discussion

From the regression results above, the constant estimate represents the calorie consumption of households that were neither directly exposed to the flood nor were living in villages where at least one household was exposed to the flood. The coefficient on *VFVAR* represents the marginal effects of exposure for households that were living in flood-exposed villages. However, the actual partial effect depended on the proportion of households that were individually flood-exposed. For example, if only 50 % of households in a village were flood-exposed, the interpretation of the coefficient estimate must also be 50 %. Overall, households were predicted to consume up to 15.04 % (2 d.p.) fewer calories than households in non-exposed villages. For households that were partially flooded, the net effect was calculated by multiplying the proportion of households that were flooded in the village by the coefficient estimate. The coefficient on *FVAR* is an estimate of the difference between households within a village that were and were not individually exposed. Here, the difference in calorie consumption is relatively small (0.85 %) and is not significant. These results indicate that *VFVAR* is more significant and has a larger effect on household welfare than *FVAR*. Once one controlled for village-level flood exposure, exposure to flooding by each household did not influence their subsequent welfare.

5.8.2 Model 2 Results

Whilst flood exposure was found to be a significant determinant of calorie outcomes in Model 1 (Round 1), Model 2 was required to address omitted variable bias and concerns about possible endogeneity of the floods.

5.8.2.1 Model Specification

Due to its significance in Model 1, the aggregated *VFVAR* was used and *FVAR* was included to control for household-level direct flood exposure. Household characteristics were gradually incorporated into the models and were grouped together for ease of analysis and presentation purposes. For instance, in column 1 of the Model 2 result tables, we tested whether after controlling for various asset variables, flood exposure was still significant. Each column considered different combinations of the characteristics and gradually aggregated them to the full model (column 5 of the result tables). This specification is the most robust in testing endogeneity because it included the full set of controls.

The setup, presented in the results Tables (5.8, 5.9, 5.10) in below, is as follows:

- column 1 includes only physical capital variables to immediately address the endogeneity concern arising from wealth endowments
- column 2 includes only human capital variables

Table 5.8 Round 1 determinants of household welfare across characteristics groups

Explanatory variables	(1)	(2)	(3)	(4)	(5)
<i>FVAR</i>	0.0133 (0.0424)	0.0166 (0.0452)	0.0232 (0.0429)	-0.0078 (0.0436)	0.0061 (0.0425)
<i>VFVAR</i>	-0.1344** (0.0601)	-0.1392** (0.0648)	-0.1246** (0.0626)	-0.1671*** (0.0622)	-0.1448** (0.0627)
<i>CONSASSETS</i>	0.0016*** (0.0005)	-	0.0011** (0.0005)	-	0.0012** (0.0005)
<i>HTOTLAND</i>	0.0146 (0.0173)	-	0.0079 (0.0178)	-	0.0087 (0.0165)
<i>LIVESTOCK</i>	0.0381** (0.0151)	-	0.0462*** (0.0154)	-	0.0517*** (0.0146)
<i>AGEY</i>	-	-0.1072 (0.0717)	-0.1155 (0.0727)	-	-0.1764** (0.0740)
<i>AGEY2</i>	-	0.0140* (0.0073)	0.0141* (0.0074)	-	0.0197** (0.0076)
<i>EDUCA</i>	-	0.0055 (0.0045)	0.0032 (0.0045)	-	-0.0000 (0.0044)
<i>FMAXEDUCA</i>	-	0.0048 (0.0029)	0.0036 (0.0028)	-	0.0050* (0.0026)
<i>FOODCRED</i>	-	-	-	0.0078*** (0.0017)	0.0093*** (0.0016)
<i>LNLOANTOTAL</i>	-	-	-	0.0473*** (0.0120)	0.0479*** (0.0130)
Cons	8.0462*** (0.0749)	8.1914*** (0.1694)	8.2461*** (0.1729)	8.0255*** (0.0746)	8.4092*** (0.1731)
N	739	709	709	739	709
Adj. R-sq	0.053	0.039	0.070	0.065	0.125

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes *HHSIZE* and *SEX* were included in the regression but not reported. There are more reported observations in columns 2 and 3 compared to 1 and 4 due to fewer observations of *EDUCA*

Table 5.9 Round 2 determinants of household welfare across characteristics groups

Explanatory variables	(1)	(2)	(3)	(4)	(5)
<i>FVAR</i>	-0.0254 (0.0410)	-0.0270 (0.0384)	-0.0236 (0.0387)	-0.0337 (0.0401)	-0.0247 (0.0376)
<i>VFVAR</i>	-0.0291 (0.0603)	-0.0317 (0.0601)	-0.0358 (0.0591)	-0.0221 (0.0621)	-0.0312 (0.0589)
<i>CONSASSETS</i>	0.1793** (0.0770)	-	0.1514** (0.0741)	-	0.1376* (0.0750)
<i>HTOTLAND</i>	0.0499*** (0.0082)	-	0.0461*** (0.0087)	-	0.0473*** (0.0088)
<i>LIVESTOCK</i>	0.0150 (0.0123)	-	0.0058 (0.0118)	-	0.0073 (0.0119)
<i>AGEY</i>	-	-0.0449 (0.0628)	-0.0375 (0.0567)	-	-0.0406 (0.0570)
<i>AGEY2</i>	-	0.0094 (0.0061)	0.0073 (0.0055)	-	0.0075 (0.0056)
<i>EDUCA</i>	-	0.0068* (0.0035)	0.0027 (0.0034)	-	0.0022 (0.0035)
<i>FMAXEDUCA</i>	-	0.0067*** (0.0024)	0.0049** (0.0023)	-	0.0053** (0.0023)
<i>FOODCRED</i>	-	-	-	0.0067*** (0.0023)	0.0066*** (0.0020)
<i>LNLOANTOTAL</i>	-	-	-	0.0017 (0.0134)	-0.0116 (0.0130)
Cons	8.1431*** (0.0996)	8.1131*** (0.1670)	8.1628*** (0.1557)	8.0844*** (0.1004)	8.1662*** (0.1544)
N	738	736	736	738	736
Adj. R-sq	0.088	0.055	0.116	0.005	0.123

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ Note *HHSIZE* and *SEX* were included in the regression but not reported

Table 5.10 Round 3 determinants of household welfare across characteristics groups

Explanatory variables	(1)	(2)	(3)	(4)	(5)
<i>FVAR</i>	0.0191 (0.0412)	0.0244 (0.0435)	0.0279 (0.0402)	0.0122 (0.0453)	0.0276 (0.0405)
<i>VFVAR</i>	-0.0931*	-0.1089** (0.0541)	-0.0995* (0.0513)	-0.0967* (0.0568)	-0.0948* (0.0516)
<i>CONSASSETS</i>	0.0052** (0.0025)	-	0.0049* (0.0025)	-	0.0050** (0.0024)
<i>HTOTLAND</i>	0.0481*** (0.0075)	-	0.0409*** (0.0077)	-	0.0409*** (0.0078)
<i>LIVESTOCK</i>	0.0261*** (0.0099)	-	0.0240** (0.0095)	-	0.0241** (0.0095)
<i>AGEY</i>	-	-0.0805 (0.0608)	-0.0798 (0.0514)	-	-0.0882* (0.0522)
<i>AGEY2</i>	-	0.0122* (0.0063)	0.0108** (0.0054)	-	0.0117** (0.0055)
<i>EDUCA</i>	-	0.0030 (0.0030)	-0.0006 (0.0030)	-	-0.0012 (0.0030)
<i>FMAXEDUCA</i>	-	0.0076*** (0.0019)	0.0063*** (0.0018)	-	0.0061*** (0.0018)
<i>FOODCRED</i>	-	-	-	0.0101* (0.0057)	0.0090 (0.0057)
<i>LNLOANTOTAL</i>	-	-	-	0.0118 (0.0120)	0.0099 (0.0117)
Cons	8.1326*** (0.0791)	8.1992*** (0.1618)	8.2646*** (0.1498)	8.0765*** (0.0779)	8.2797*** (0.1510)
N	722	721	721	722	721
Adj. R-sq	0.095	0.055	0.117	0.006	0.117

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ Note *HHSIZE* and *SEX* were included in the regression but not reported

- column 3 includes physical and human capital variables
- column 4 includes only financial capital variables
- column 5 includes all of the variables.

5.8.2.2 Analysis and Discussion

Overall, the Model 2 analysis revealed that the floods were not endogenous in the specifications that were tested. The main flood exposure variable (*VFVAR*) remained significant and strong despite the inclusion of additional control variables such as assets and demographic variables. This was most evident in Round 1: when asset variables were controlled, the coefficient estimate of *VFVAR* was -0.1344 and was significant at the 5 % level. The result in column 1 is similar to the result when only *EDUCA*, *FMAXEDUCA* and *AGEY* were controlled in column 2 (-0.1392) and only slightly lower (whilst maintaining similar significance) than the full model in column 5 (-0.1448). This finding, which showed a very significant flood effect, was helpful for comparing the results of the explanatory variables between exposed and non-exposed households. Moreover, we are able to identify several of the characteristics that are significant in determining the calorie outcomes for households. This provides justification to proceed to Model 3 to interact the household characteristics with flood exposure.

When comparing the results across the rounds, there was some consistency in terms of the significant variables that determined household calorie consumption. The consistent significant variables across all of the rounds were consumer assets, female education and food credit purchases. Borrowing money was a temporary coping strategy that had an immediate effect only in Round 1. Age had a positive relationship with welfare in Rounds 1 and 3 but was insignificant in Round 2. Household landholding and livestock were significant in some rounds but not in others. It is unclear what caused the fluctuation but it may be that in some rounds crops were not able to be grown (e.g. *HTOTLAND*) and markets were not favourable for drawing-down assets (e.g. *LIVESTOCK*).

5.8.3 Model 3 Results

Extending further with Model 2, in this section interaction terms were included.

5.8.3.1 Model Specification

From the specification in Model 2, interaction terms were included individually across the columns for each characteristic. The full interactions model incorporating all of the characteristics is presented in the final column of each of the result tables (see the results Tables 5.11, 5.12, 5.13 for Model 3 below). It must be noted that the household characteristics were interacted with *VFVAR* only.

Table 5.11 Results for round one models

Explanatory variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>FVAR</i>	0.0048 (0.0432)	0.0050 (0.0434)	-0.0001 (0.0430)	0.0045 (0.0432)	0.0050 (0.0427)	0.0055 (0.0428)	0.0087 (0.0442)	0.0086 (0.0439)
<i>VFVAR</i>	-0.1426** (0.0647)	-0.1393** (0.0686)	-0.1901*** (0.0687)	-0.1393* (0.0733)	-0.1702** (0.0672)	-0.1532** (0.0672)	-0.2836*** (0.0844)	-0.3184*** (0.0904)
<i>CONSASSETS</i>	0.0015** (0.0006)	0.0014** (0.0005)	0.0015*** (0.0006)	0.0014** (0.0005)	0.0014*** (0.0005)	0.0014*** (0.0005)	0.0013** (0.0006)	0.0024*** (0.0007)
<i>CONSASSETS*VFVAR</i>	-0.0003 (0.0010)	-	-	-	-	-	-	-0.0013 (0.0011)
<i>HTOTLAND</i>	0.0001 (0.0002)	0.0002 (0.0002)	0.0001 (0.0002)	0.0001 (0.0002)	0.0001 (0.0002)	0.0001 (0.0002)	0.0001 (0.0002)	0.0005** (0.0003)
<i>HTOTLAND*VFVAR</i>	-	-0.0000 (0.0003)	-	-	-	-	-	-0.0006 (0.0004)
<i>LIVESTOCK</i>	0.0500*** (0.0149)	0.0499*** (0.0149)	0.0107 (0.0251)	0.0503*** (0.0147)	0.0513*** (0.0149)	0.0502*** (0.0148)	0.0526*** (0.0147)	-0.0104 (0.0327)
<i>LIVESTOCK*VFVAR</i>	-	-	0.0548* (0.0319)	-	-	-	-	0.0839*** (0.0420)
<i>EDUCA</i>	0.0019 (0.0045)	0.0019 (0.0045)	0.0014 (0.0046)	0.0031 (0.0075)	0.0017 (0.0045)	0.0020 (0.0045)	0.0031 (0.0045)	0.0070 (0.0091)
<i>EDUCA*VFVAR</i>	-	-	-	-0.0016 (0.0087)	-	-	-	-0.0078 (0.0117)
<i>FMAXEDUCA</i>	0.0048* (0.0027)	0.0048* (0.0027)	0.0051* (0.0027)	0.0048* (0.0027)	0.0010 (0.0040)	0.0049* (0.0027)	0.0048* (0.0026)	-0.0005 (0.0050)
<i>FMAXEDUCA*VFVAR</i>	-	-	-	-	0.0056 (0.0047)	-	-	0.0085 (0.0060)
<i>FOODCRED</i>	0.0091*** (0.0017)	0.0091*** (0.0016)	0.0092*** (0.0017)	0.0091*** (0.0016)	0.0093*** (0.0017)	0.0069* (0.0039)	0.0090*** (0.0016)	0.0079*** (0.0039)

(continued)

Table 5.11 (continued)

Explanatory variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>FOODCKED*VFVAR</i>	-	-	-	-	-	0.0026 (0.0046)	-	0.0015 (0.0047)
<i>LNLOANTOTAL</i>	0.0081** (0.0039)	0.0080** (0.0039)	0.0087** (0.0039)	0.0080** (0.0039)	0.0083** (0.0039)	0.0081** (0.0039)	-0.0076 (0.0061)	-0.0064 (0.0061)
<i>LNLOANTOTAL*VFVAR</i>	-	-	-	-	-	-	0.0227** (0.0088)	0.0217** (0.0089)
Cons	8.3250*** (0.1758)	8.3223*** (0.1827)	8.3499*** (0.1796)	8.3223*** (0.1746)	8.3458*** (0.1790)	8.3282*** (0.1745)	8.4046*** (0.1715)	8.4016*** (0.1774)
N	709	709	709	709	709	709	709	709
Adj. R-sq	0.107	0.107	0.111	0.107	0.108	0.107	0.115	0.117

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ Note *HHSIZE*, *AGEY*, *AGEY2* and *SEX* were included in the regression but not reportedThe Chow test statistic in the full model (column 8) was 2.18 with an associated p value of 0.0407

Table 5.12 Results for round two models

Explanatory variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>FVAR</i>	-0.0258 (0.0380)	-0.0209 (0.0383)	-0.0256 (0.0382)	-0.0264 (0.0380)	-0.0264 (0.0372)	-0.0251 (0.0378)	-0.0261 (0.0382)	-0.0264 (0.0383)
<i>VFVAR</i>	-0.0279 (0.0588)	0.0097 (0.0652)	-0.0309 (0.0652)	-0.0008 (0.0633)	0.0138 (0.0608)	-0.0199 (0.0625)	0.0060 (0.0712)	0.0620 (0.0837)
<i>CONSASSETS</i>	0.2639*** (0.0343)	0.1364* (0.0762)	0.1389* (0.0766)	0.1429* (0.0761)	0.1446* (0.0776)	0.1367* (0.0765)	0.1408* (0.0767)	0.2344*** (0.0567)
<i>CONSASSETS*VFVAR</i>	-0.1400* (0.0985)	-	-	-	-	-	-	-0.1022 (0.1036)
<i>HTOTLAND</i>	0.0005*** (0.0001)	0.0008*** (0.0002)	0.0005*** (0.0001)	0.0005*** (0.0001)	0.0005*** (0.0001)	0.0005*** (0.0001)	0.0005*** (0.0001)	0.0010*** (0.0003)
<i>HTOTLAND*VFVAR</i>	-	-0.0004** (0.0002)	-	-	-	-	-	-0.0006** (0.0003)
<i>LIVESTOCK</i>	0.0064 (0.0118)	0.0036 (0.0119)	0.0062 (0.0252)	0.0061 (0.0118)	0.0044 (0.0120)	0.0060 (0.0119)	0.0067 (0.0119)	-0.0566* (0.0362)
<i>LIVESTOCK*VFVAR</i>	-	-	0.0007 (0.0289)	-	-	-	-	0.0757* (0.0421)
<i>EDUCA</i>	0.0018 (0.0035)	0.0013 (0.0035)	0.0017 (0.0035)	0.0097 (0.0087)	0.0017 (0.0035)	0.0015 (0.0034)	0.0017 (0.0034)	0.0003 (0.0090)
<i>EDUCA*VFVAR</i>	-	-	-	-0.0111 (0.0107)	-	-	-	0.0009 (0.0112)
<i>FMAXEDUCA</i>	0.0053** (0.0023)	0.xc*** (0.0022)	0.0053** (0.0023)	0.0053*** (0.0023)	0.0121*** (0.0045)	0.0052** (0.0023)	0.0052** (0.0023)	0.0117*** (0.0044)
<i>FMAXEDUCA*VFVAR</i>	-	-	-	-	-0.0093* (0.0055)	-	-	-0.0083* (0.0055)
<i>FOODCRED</i>	0.0063*** (0.0021)	0.0067*** (0.0020)	0.0066*** (0.0020)	0.0062*** (0.0020)	0.0061*** (0.0020)	0.0100** (0.0049)	0.0067*** (0.0020)	0.0092* (0.0051)

(continued)

Table 5.12 (continued)

Explanatory variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>FOODCRED*VFVAR</i>						-0.0048 (0.0060)		-0.0036 (0.0060)
<i>LNLOANTOTAL</i>	-0.0012 (0.0031)	-0.0016 (0.0031)	-0.0013 (0.0031)	-0.0014 (0.0031)	-0.0015 (0.0031)	-0.0012 (0.0031)	0.0046 (0.0063)	0.0037 (0.0065)
<i>LNLOANTOTAL*VFVAR</i>	-	-	-	-	-	-	-0.0083 (0.0079)	-0.0076 (0.0081)
Cons	8.1714*** (0.1549)	8.1414*** (0.1560)	8.1791*** (0.1549)	8.1511*** (0.1617)	8.1416*** (0.1567)	8.1626*** (0.1575)	8.1584*** (0.1555)	8.0734*** (0.1609)
N	736	736	736	736	736	736	736	736
Adj. R-sq	0.122	0.125	0.121	0.123	0.125	0.122	0.122	0.126

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ Note *HHSIZE*, *AGEY*, *AGEY2* and *SEX* were included in the regression but not reportedThe Chow test statistic in the full model (column 8) was 1.81 with an associated p value of 0.0920

Table 5.13 Results for round three models

Explanatory variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>FVAR</i>	0.0303 (0.0409)	0.0346 (0.0415)	0.0314 (0.0410)	0.0296 (0.0415)	0.0298 (0.0414)	0.0317 (0.0409)	0.0309 (0.0412)	0.0302 (0.0426)
<i>VFVAR</i>	-0.0980* (0.0516)	-0.0648* (0.0555)	-0.0926* (0.0567)	-0.0586* (0.0552)	-0.0573 (0.0554)	-0.0892* (0.0517)	-0.0771* (0.0651)	-0.0235 (0.0719)
<i>CONSASSETS</i>	0.0026 (0.0032)	0.0052** (0.0024)	0.0051** (0.0025)	0.0047* (0.0025)	0.0046* (0.0025)	0.0051** (0.0024)	0.0049* (0.0025)	0.0008 (0.0030)
<i>CONSASSETS*VFVAR</i>	0.0046* (0.0042)	-	-	-	-	-	-	0.0068* (0.0042)
<i>HTOTLAND</i>	0.0004*** (0.0001)	0.0006*** (0.0002)	0.0004*** (0.0001)	0.0004*** (0.0001)	0.0004*** (0.0001)	0.0004*** (0.0001)	0.0004*** (0.0001)	0.0007*** (0.0002)
<i>HTOTLAND*VFVAR</i>	-	-0.0003* (0.0002)	-	-	-	-	-	-0.0003* (0.0002)
<i>LIVESTOCK</i>	0.0238*** (0.0097)	0.0235*** (0.0094)	0.0274* (0.0189)	0.0247*** (0.0095)	0.0236*** (0.0096)	0.0240*** (0.0096)	0.0240*** (0.0095)	-0.0037 (0.0212)
<i>LIVESTOCK*VFVAR</i>	-	-	-0.0037 (0.0223)	-	-	-	-	0.0323* (0.0261)
<i>EDUCA</i>	-0.0009 (0.0030)	-0.0012 (0.0030)	-0.0009 (0.0030)	0.0091* (0.0051)	-0.0009 (0.0030)	-0.0008 (0.0030)	-0.0010 (0.0030)	0.0034 (0.0073)
<i>EDUCA*VFVAR</i>	-	-	-	-0.0138** (0.0065)	-	-	-	-0.0066 (0.0090)
<i>FMAXEDUCA</i>	0.0064*** (0.0018)	0.0065*** (0.0018)	0.0064*** (0.0018)	0.0065*** (0.0018)	0.0121*** (0.0032)	0.0062*** (0.0018)	0.0064*** (0.0018)	0.0107*** (0.0038)
<i>FMAXEDUCA*VFVAR</i>	-	-	-	-	-0.0078** (0.0036)	-	-	-0.0055* (0.0046)
<i>FOODCRED</i>	0.0086* (0.0030)	0.0090* (0.0030)	0.0087* (0.0030)	0.0079* (0.0030)	0.0081* (0.0030)	0.0165*** (0.0030)	0.0086* (0.0030)	0.0149*** (0.0030)

(continued)

Table 5.13 (continued)

Explanatory variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>FOODCRED*VFVAR</i>	–	(0.0054)	(0.0056)	–	(0.0055)	(0.0039)	(0.0056)	(0.0036)
						–0.0218***	–	–0.0195***
						(0.0052)		(0.0050)
<i>LNLOANTOTAL</i>	–0.0016	–0.0018	–0.0018	–0.0021	–0.0018	–0.0017	0.0015	0.0013
	(0.0031)	(0.0031)	(0.0031)	(0.0032)	(0.0031)	(0.0031)	(0.0063)	(0.0066)
<i>LNLOANTOTAL*VFVAR</i>	–	–	–	–	–	–	–0.0045	–0.0042
							(0.0077)	(0.0080)
Cons	8.2711***	8.2434***	8.2677***	8.2386***	8.2409***	8.2617***	8.2553***	8.2005***
	(0.1513)	(0.1540)	(0.1510)	(0.1506)	(0.1515)	(0.1510)	(0.1489)	(0.1525)
N	721	721	721	721	721	721	721	721
Adj. R-sq	0.116	0.118	0.115	0.118	0.118	0.118	0.116	0.117

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ Note *HHSIZE*, *AGEY*, *AGEY2* and *SEX* were included in the regression but not reportedThe Chow test statistic in the full model (column 8) was 3.44 with an associated p value of 0.00

This is because, based on the Model 2 results, when compared to *FVAR*, *VFVAR* was more significant and was a stronger determinant of the effect of the floods on household welfare. *HHSIZE* and *SEX*, *AGEY* and *AGEY2* are included as controls without being interacted. Interacting age variables tended to distort the significance of *VFVAR* and further were not significant even at the generous 10 % level.

5.8.3.2 Analytical Methods

To determine which characteristics mitigate the effects of the flood, either individually or collectively, *t* and *F* tests were used. In addition, the *Chow* test was used to test the slopes across the exposed and non-exposed categories.²¹ To further assist in interpreting the effects of the interactions (of certain explanatory variables) on calorie consumption, we derived an elasticity equation. The elasticity helps measure how much the percentage of calories consumed changes when there is a small change in one of the household characteristic variables (holding the flood variable constant). However, to focus on a specific level of the explanatory variable, we are interested in calculating the elasticity at the *mean* value of the dependent variable (holding flooding constant).

Using the point-elasticity formula, the (units-free) elasticity at the mean value of any given variable is given by²²:

$$\eta M(\bar{X}) = \hat{\theta} \cdot \left(\frac{\bar{X}}{\hat{Y} + \hat{\theta} \cdot \bar{X}} \right) \quad (5.9)$$

5.8.3.3 Analysis and Discussion

After introducing interaction effects in Model 3, the characteristics that mainly influenced the effect of the floods across rounds were livestock assets, consumer assets, total landholding, female education and food credit purchases. Particularly in Round 1, livestock assets were found to directly mitigate the effects of the floods in all rounds. When we considered the partial effect of the flood alone (dY/dF), an additional unit of livestock raised consumption by up to 8.39 % (5 % significance level). This meant that livestock assets mitigated approximately one quarter of the effect of flood exposure (if $F = 1$). The elasticity for livestock at the mean of 0.6069 was calculated as:

$$\eta M(0.6069) = 0.0839 \left(\frac{0.6069}{-0.3184 + 0.0839 \times 0.6069} \right) = -0.1904.$$

²¹ This is a statistical and econometric test of whether the coefficients in two linear regressions (exposed and non-exposed households) are equal.

²² The derivation of the elasticity at the mean value ($\eta M(\bar{X}) = \hat{\theta} \cdot \left(\frac{\bar{X}}{\hat{Y} + \hat{\theta} \cdot \bar{X}} \right)$) is illustrated in Appendix 5.2.

Thus, holding all other factors constant, another 1 % of livestock (at the within sample mean level [0.6069]) was expected to reduce the (adverse) effects of the flood by 19.04 %. This was quite a large effect when compared to the actual size of the effect of the floods in the same regression model results (-0.3184).

Another significant factor which proved to be beneficial for households across Rounds 2 and 3 was total female education (*FMAXEDUCA*). Particularly for non-exposed households in Round 3, the effects were most significant where an additional year of total female education was estimated to raise calorie consumption by 1.07 % (1 % significance level). These results perhaps suggest more long-term effects of education taking into account the delays in a slowly-recovering labour market. However, the beneficial effect for exposed households was almost half of the effect for non-exposed households ($1.07 - 0.55 = 0.52$ %, 10 % significance level). It is not clear what the cause for the disparity was, but one could perhaps expect that skilled workers were cut off from their usual occupations due to the floods compared to low skilled, rural workers.

Meanwhile, borrowing loans or purchasing food on credit were temporary measures, and their associated benefits were limited to Round 1 only (there was a positive and significant effect across most of the columns in the Round 1 results). When distinguishing between categories of households, the results of the coefficient estimates of consumer assets, landholding and female education showed that these benefitted both exposed and non-exposed households. However, the coefficient estimates also indicated that the net beneficial effect of these characteristics on exposed households were lower than for non-exposed households. With respect to food credit, the coefficient estimate of the interaction term in Round 3 was negative and highly significant. As a result, food credit appeared to benefit non-exposed households (0.0149 with 1 % significance level) but actually exacerbated the effects of the floods for exposed households ($0.0149 \cdot 0.0195 = 0.0046$, 1 % significance level) because they incurred far greater long-term costs on their well-being.

This research has been able to identify certain important household characteristics that influence a household's ability to mitigate the effects of flooding on welfare. However, the precise policy implications of the characteristics are difficult to identify based on this research. For instance, access to credit may be an important short-term coping strategy but could also delay household misery by creating a debt trap. Also, without further research, we are unable to readily explain the significant differences in outcomes between exposed and non-exposed households. Nonetheless, the results suggest that merely identifying the determinants of household welfare masked the differences between exposure categories. For instance, as a whole, a certain characteristic may show a positive or negative effect on welfare but the experiences of exposed and non-exposed households could vary starkly. Policy-makers should consider this as an important distinction when designing appropriate response strategies in the aftermath of natural shocks.

5.9 Conclusion

Large parts of the developing world lie in areas that are substantially at risk of being impacted by natural disasters such as floods, droughts, storm surges and cyclones. Under even modest projections of climate change, more intense and frequent natural disasters are predicted globally. The associated adverse impacts of these extreme weather events are predicted to increase disproportionately more in developing countries (IPCC 2007a). Furthermore, the people living in underdeveloped areas have limited capacity to cope with natural shocks. Consequently, extreme weather events can have persistent effects on their welfare. This research undertook a case study of Bangladesh, which is one of the countries most vulnerable to global climate change and associated extreme weather events. Bangladesh's geography, topography and poverty make it particularly prone to regular flooding and cyclone-induced storm surges. With very little overall contribution to greenhouse gas emissions, Bangladesh's only protective response is through adaptation—though it is currently lacking in adaptive capacity. Specifically, the 1998 floods were studied because it was one of the most severe natural disasters in Bangladesh's history. Whilst the 1998 floods had significant effects on income, consumption, nutrition, employment and wages, households also employed various coping strategies to maintain well-being. These included borrowing, skipping meals and selling assets.

This chapter presented a simple empirical framework to study how a diverse set of household characteristics can influence welfare in the context of an environmental shock. Preliminary results indicated that the floods had significant effects on household welfare. When household and village-level flood effects were compared, only the village-level effects had a significant and strong adverse effect on household welfare. In terms of mitigation, household calorie intake was positively influenced by a number of factors including livestock assets, female education, food credit purchases and loans. Moreover, there was a significant difference in the effects of several household characteristics between exposed and non-exposed households.

The research in this chapter proceeded on the premise that a better understanding of household characteristics (which encompasses endowments and coping responses) can assist policymakers and researchers. Using the findings, practitioners may be able to develop suitable strategies to help vulnerable nations to adapt to extreme weather events associated with global climate change.

5.10 Further Testing and Research

From the basic model presented here, there is ample scope for further research using other sophisticated econometric methods. Concrete panel and instrument variables models could be constructed which can deal with time-invariant omitted variables and fixed effects concerns. Additionally, alternative forms of endogeneity

testing could help comprehensively settle the issue regarding the endogeneity of flood effects. Econometric models can also assist in testing other interesting variables such as health outcomes and migration. The framework in this chapter could perhaps be utilised in further research using a more suitable dataset. Nonetheless, this chapter has illustrated how an econometric framework can assist in determining the relationships between mitigation of flood effects on household welfare through various household characteristics.

Appendixes

Appendix 5.1: Discussion of Econometric and Specification Issues

In attempting to develop robust econometric modelling and interpretation techniques, several econometric issues that were peculiar to the dataset were considered.

Heteroskedasticity Testing and Standard Errors

To justify the use of heteroskedasticity-robust methods, the *BREUSCH-PAGAN* test was used to test for possible heteroskedasticity in the variance error term. The test was applied to the Model 2 specification because it contained the full set of explanatory variables. The *BREUSCH-PAGAN* test revealed a Chi square value of 2.92 and an associated p-value of 0.0876. The hypothesis that there was constant variance in the error term was rejected at the 9 % significance level. Hence, heteroskedastic robust methods were preferred.

In the presence of heteroskedasticity (non-constant variance of the error term), inferences cannot be made because the OLS standard errors are no longer valid for constructing confidence intervals and t statistics (Wooldridge 2006). Hence, robust standard errors were used in all of the models to account for heteroskedasticity of unknown form (Wooldridge 2006).

Clustering

The use of sampling clusters in the IFPRI-FMRSP dataset required an additional adjustment of the standard errors. It is assumed that there are ‘clustered errors’ in the IFPRI-FMRSP dataset due to the cluster-sampling technique that was used. This means that observations within in each group are correlated in some way. In the presence of cluster errors, OLS estimates are still unbiased but standard errors may be wrong, leading to incorrect inferences (Wooldridge 2006). In this chapter,

the village-level cluster size is used because it is a sufficiently high cluster-level. A higher cluster level is preferred because it aggregates the correlated standard errors. Kézdi (2003) showed that 50 clusters (with roughly equal cluster sizes) are often sufficient for purposes of forming accurate inferences. This requirement is satisfied in this dataset because there are roughly 117 equal village clusters.

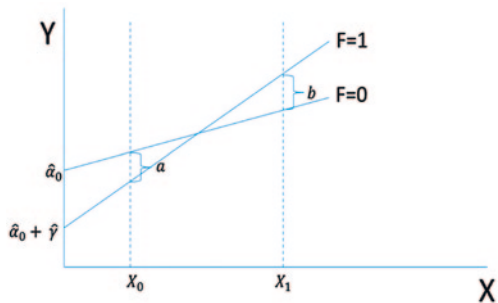
Specifications Testing

To justify the use of logarithmic form for the dependent variable (*AECAL*) specification testing was conducted using the *RAMSEY-RESET* test. Again the test was applied to only the full Model 2 specification. The *RAMSEY-RESET* statistic for the level form was 2.42 and had an associated p-value of 0.0648. Thus we do not reject this specification at the 7 % significance level. The *RAMSEY-RESET* statistic for the logarithmic form was 2.21 and had an associated p-value of 0.0857. In this case, we do not reject this specification at the 9 % significance level. With a higher significance level, the logarithmic specification was preferred.

Appendix 5.2: Deriving an Elasticity Measure of Interactive Effects

It is possible to develop an elasticity-based interpretation using our parameters, $\hat{\gamma}_{it}$, $\hat{\beta}_{it}$ and $\hat{\theta}_{it}$, with two values of any household characteristic (X_1 and X_2). For instance, one may choose to note the percentage change in the effect of the flood on $\ln(c_{it})$ when education is 5 years (completion of primary school) compared to 10 years (completion of Matriculation level in Bangladesh). The following diagram illustrates the difference in marginal effects of the flood for two arbitrary values of the X characteristic. This diagram compares the outcomes between exposed and non-exposed households. Here, the most ideal situation is assumed: where $\hat{\gamma} < 0$ but $\hat{\alpha}_0 + \hat{\gamma} > 0$, $\hat{\beta} > 0$ and $\hat{\theta} > 0$ (Fig. 5.2).

Fig. 5.2 Variance in marginal effects of household characteristics for varying flood exposure

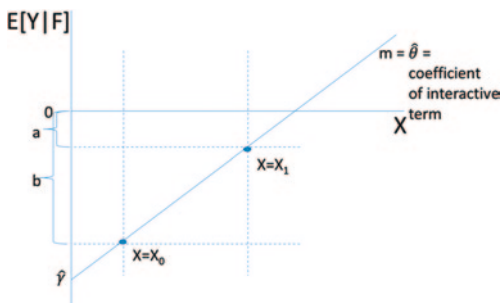


Based on the diagram above, the predicted percentage change in calorie consumption based on the X can be calculated as follows:

$$\% \Delta = \frac{b - a}{a} \times \frac{100}{1} \tag{5.10}$$

However, for ease of comparison, a units-free elasticity measure can be developed. First, it can be noted that Eq. 5.1 can be draw as a line curve (assuming that $\hat{\theta} > 0$) (Fig. 5.3).

Fig. 5.3 Line curve of the coefficient of interactive terms



The equation of the line simply reveals that X influences the marginal effects of the flood. The y -intercept, $\hat{\gamma}$, is the constant term of the marginal function. Also, the slope of this curve is the coefficient estimate, $\hat{\theta}$, because $\partial Y / \partial F$ is allowed to vary with changes in X .

It is hypothesised that if $\hat{\gamma} < 0$ and $\hat{\theta} > 0$, then as X increases, the (adverse) effect of the flood diminishes.

However, from the figure above, the change in the marginal effects of the flood—between any two values of X —will result in different measures of responsiveness. To simplify interpretation, the elasticity at the mean (\bar{X}) can be used. It is also possible to calculate the elasticity at corresponding quintile levels to distinguish the effects based on household expenditure.

Calculating Units-Free Elasticity Measures

Starting with Eq. 5.1, $M(X) = \hat{\gamma} + \hat{\theta} \cdot X$; the mean value of the X , the point elasticity measure of the responsiveness of the marginal effect of the X characteristic is:

$$\eta M(\bar{X}) = \hat{\theta} \cdot \left(\frac{\bar{X}}{\hat{\gamma} + \hat{\theta} \cdot \bar{X}} \right) \tag{5.11}$$

This units-free measure enumerates the effect of a 1% change in X (at the mean) on the percentage change in the effect of the floods on $\ln(c_{it})$.

Functional Forms and Types of x-Characteristics

When calculating elasticities and to better enable interpretation of the various characteristics, alternative approaches need to be undertaken depending on the functional form of the characteristic. The following describes how different functional forms may be analysed:

- *discrete variables*: directly apply the formula above
- *logarithmic variables*: the coefficient estimates already reveal an elasticity measure but a similar calculation can still be made.
- *dummy variables*: calculate the difference in outcomes between the two groups

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Part III
Areas of Concern: Politics
and Human Rights

Chapter 6

Defining Environmental Migration in the Climate Change Era: Problem, Consequence or Solution?

Chloé Anne Vlassopoulos

Abstract Environmental migration for the last 25 years has been the object of many debates and scientific controversies, mobilising different categories of policy actors. This contribution identifies the alternative definitions of the issue dominating this period, by analysing the discourse of those who were present at their origin. In accordance with their belief systems, knowledge and policy attributions, advocates support competing scenarios, whose interaction structures the definitional process. This process can be presented as a continuous effort to construct, a policy relevant issue recognised by the international community and leading to specific policy measures. At first perceived as an autonomous public problem, environmental migration has been redefined as a consequence of climate change, and lastly as a solution to climate induced vulnerability.

Keywords Climate migration • Environmental migration • Policy relevance • Problem definition

6.1 Introduction

Since the U.N. report of El-Hinnawi in (1985), environmental migration has known a long period of scientific investigation and debate without, however, being placed on the policy agenda as a ‘new’ public problem to be dealt with by local, national and international authorities. The most important controversy concerning

I would like to express my gratitude to the editors of this volume for their very enriching comments during the preparation of this article.

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environmental migration has centred on the relevance of the issue (Black 2001): Should environmental migrants be considered as a specific category of forced migration and thus call for specific measures, or should they be seen as one form of economic voluntary migration? A better appreciation of the importance of the phenomenon requires, still today, more data.

Throughout this period, different policy actors, public and private, have taken part in the debate. The fact that the problem has as yet not received an official definition (like that established by the 1951 Convention for ‘political’ refugees), stabilising its place on the international policy agenda, gives great flexibility to advocates trying to influence the definitional process according to their belief systems, knowledge and/or policy attributions. The study of this process can be seen as a continuous search for policy relevance aiming for the construction of an issue that will be recognised by the international community and taken charge of by public authorities.

This chapter is based on a ‘definitional approach’ and attempts to identify, in historical perspective, the successive definitions attributed to environmental migration over the last 25 years. Following D. Stone (1988, p. 197) we consider that problem definition is an eminently political process in which ‘the different sides act as if they are trying to find the “true” causes, but they are always struggling to influence which idea is selected to guide policy in order to impose their control and guide the assignment of responsibility’. The Sect. 6.2 discusses problem definition and redefinition as a means for achieving policy relevance. The Sect. 6.3 presents the effort to define environmental migration as an autonomous public problem. The Sect. 6.4 examines the redefinition of the issue as a consequence of the climate change problem. In the Sect. 6.5 we present a recent evolution of the definitional process in which ‘climate’ migration is perceived as a solution to climate vulnerability.

6.2 The Quest for Policy Relevance

Problem definition is an essential dimension of the policy process. Without a consensus on the way to frame and name the problem no policy measures can emerge. As Rein and Schön (1993) put it, ‘a “frame” is a perspective from which an amorphous, ill-defined, problematic situation can be made sense of and acted upon’ (p. 146). Through different arenas of public debate (assemblies, conferences, media, publications), policy actors exchange their views and arguments in order to influence the construction of the problem. The way the problem is framed has a direct impact on its policy relevance: It can meet the support of a large majority of stakeholders and, without difficulty, be put onto the policy agenda for policy-making, or become a controversial issue requiring many adjustments and compromises in order to be recognised as a ‘public’ problem to be dealt with by public authorities.

Constructivist sociology perceives problem definition primarily as the activity of social actors (Spector and Kitsuse 1987). According to the democratic ideal, associations of citizens, unions, scientists, lobbies, etc., define ‘social’ problems to be addressed by the state. Their institutionalisation as official categories

transforms them into ‘public’ problems. We consider that public problems are not simply social constructions dealt with by public authorities. The intervention of political and administrative actors (referred to here as public actors) at the local, national and/or international level is indispensable during the definitional process which starts before the problem is put onto the policy agenda and continues even after. This is because the passage from a social to a public problem places public actors in the position of the leading authority charged with orchestrating the policy process and adopting policy measures. In that sense the construction of public problems must be compatible with the beliefs, interests and attributions of official authorities. Even if a situation is considered as serious by the victims or defenders, policy relevance is not guaranteed without the endorsement of, at least, certain public actors ready to promote the issue into the political arena.

The construction of public problems operates through a double definitional process: One that defines the causes of the problem and describes those responsible who should pay for problem resolution; and one that defines the consequences of the problem, describing the victims to be protected (Vlassopoulos 2000, p. 118). Schematically we can present public problems as a succession of interlinked sequences of ‘cause—problem—consequence—solution’. An example of such a continuum could be: (1) Industrial production (*cause*) produces, inter alia, greenhouse gases (*problem*) which generate climate change (*consequence*); (2) climate change (*problem*), caused by greenhouse gas emissions (*cause*), produces drought [part of climate change effects] (*consequence*); (3) drought (*problem*) caused by climate change (*cause*) engenders [amongst other negative effects] migration (*consequence*), etc. In that sense, each one of the components of this continuum can be simultaneously debated as a cause of different problems, as an autonomous problem and as a consequence of other problems. Many definitional scenarios compete in order to influence the dominant perception of a situation. Each one contains its own rationale of victimisation and responsibility attribution; it legitimises different authorities as the most appropriate makers of public policy, engenders specific policy solutions, and has a different degree of policy relevance. Policy relevance depends first on the consensus that one definitional scenario can stimulate. A large consensus guarantees conflict reduction. The mobilisation of public actors is also important as they are the sole actors having the requisite legal skills to promote policy solutions. Last, the case of environmental migration shows that an alarmist discourse, presenting a situation as a major threat, could restrain public actors from promoting an issue. Faced with something difficult to cope with, authorities may prefer inaction to official recognition.

The sections that follow represent the definitional process of environmental migration during the past 25 years as a series of three discourses which gradually strengthen the policy relevance of the issue. Each discourse is based on a different ‘cause—problem—consequence—solution’ scenario, defended by diverging coalitions who try to impose their perception of the situation by adapting to the constraints imposed by other actors present. Different discourses may coexist but one of them will potentially receive larger and/or stronger support to become institutionalised (Fischer and Forester 1993, p. 9) (Fig. 6.1).

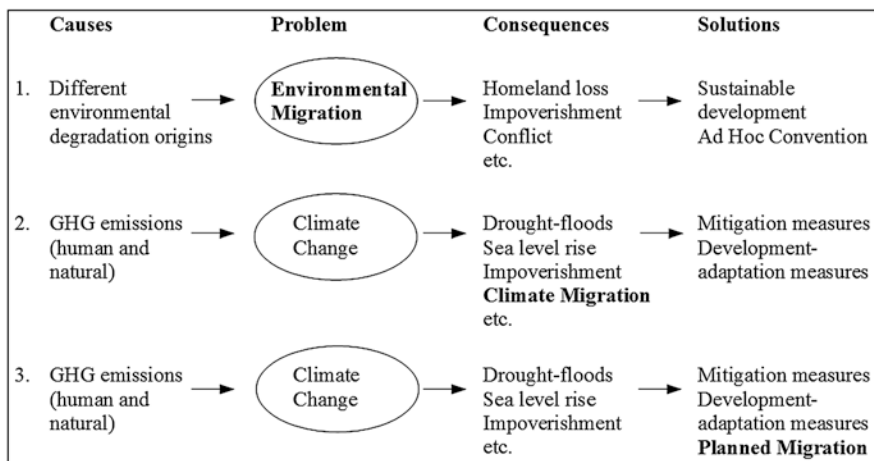


Fig. 6.1 Three definitional cause—problem—consequence—solution scenarios of the climate—migrant debate

The first definitional scenario corresponds to the construction of an autonomous multi-causal problem of environmental migrants (or refugees) that must be dealt with by the adoption of an ad hoc public policy. This effort has proved to be maladapted to the prevailing political and institutional context and its inscription into the policy agenda failed (Sect. 6.3). The second scenario corresponds to the restrictive definition of environmental migration as climate migration. Although efforts have been made to impose climate migration as an autonomous problem, official discourse redefined migration as a consequence of the climate change problem. The importance of climate change on the international policy agenda served as a means for the official recognition of migration as one of the potential consequences to be prevented by adapting to climate change (Sect. 6.4). The third scenario corresponds to the definition of climate migration no longer as a problem or consequence but as a solution to social vulnerability generated by climate change. The alarmist discourse on environmental (climate) victims seems weakened and the policy relevance on the issue reinforced (Sect. 6.5).

6.3 Environmental Migrants as an Autonomous Problem

The publication of the United Nations Environmental Programme (UNEP) report on ‘Environmental refugees’ by Essam El-Hinnawi in (1985), initiates a period of interest on behalf of different social science disciplines. During this first period, up until 2000, environmental migration is discussed only amongst a rather small scientific community and exceptionally during some international meetings (Fig. 6.2).

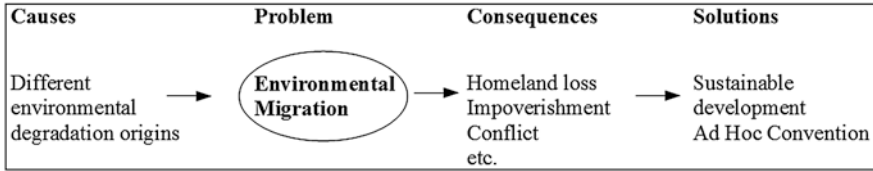


Fig. 6.2 Definitional cause—problem—consequence—solution scenario 1

What characterises this period is a wide perception of who should be considered as an ‘environmental migrant’. This maximalist view is mostly supported by the writings of environmental analysts and security specialists (Suhrke 1994, p. 477). The definition proposed by El-Hinnawi reflects indeed a multi-causal problem challenging human livelihood and human rights: ‘Environmental refugees are people who have been forced to leave their traditional habitat, temporarily or permanently, because of a marked environmental disruption that jeopardised their existence and/or seriously affected the quality of their lives. By ‘environmental disruption’ is meant any physical, chemical, and biological change in the ecosystem’ (as cited in Bates 2002, p. 466). The definition proposed by Myers (1993) goes in the same direction: ‘[P]eople who can no longer gain a secure livelihood in their erstwhile homeland because of drought, soil erosion, desertification, and other environmental problems’ (p. 752). Based on this large perception, Lonergan proposed in 1998 considering the main environmental causes of human displacement to be natural disasters (such as floods, volcanoes and earthquakes), cumulative environmental changes (such as deforestation, land degradation, erosion, climate change considered as natural processes aggravated by human activities), industrial accidents, development projects, (such as dams and irrigation projects), and degradation of the environment as a ‘weapon’.

The efforts to define environmental migration as an autonomous multi-causal problem generated two policy-oriented discourses: One that points to the necessity of promoting sustainable development policies and one that encourages the adoption of an ad hoc mechanism to assist environmental *refugees*.¹

The series of publications following the El-Hinnawi report coincide with the institutionalisation of the ‘sustainable development era’, introduced in 1987 by the Brundtland Commission’s report on environment and development and by the Earth Summit on Environment and Development held in Rio in 1992, as the new way of doing environmental policies. The concept of sustainable development appears to be a particularly relevant policy principle for coping with a problem like environmental migration situated at the intersection of different policy sectors (Vlassopoulos 2008, p. 53). Sustainable development signifies the adoption of policies that mutually satisfy the protection of the environment and human

¹ The term ‘refugee’ is frequently used here as means to claim the necessity of a protection regime equivalent to the one proposed by the 1951 Geneva Convention.

wellbeing. In that sense, Suhrke remarks that after the Brundtland report strategies of response to refugee emergencies increasingly focused attention on environmental root causes. For example, Mustafa Tolba, Executive Director of UNEP, announced in 1989 that sustainable development is the only alternative to avoid large scale environmental migration (cited in Bates 2002, p. 465). The 1990 Asian Development Bank report recommended strengthening the role of environmental expertise in the decision-making process in order to enhance both current and future potential to meet human needs, such as poverty and underdevelopment, which cause displacement (cited in Suhrke 1994, p. 494). Myers also considered in 1997 that sustainable development 'represents a sound way to preempt the environmental refugees issue in its full scope over the long term' (Myers 1997, p. 177).

To the extent that sustainable development could strengthen the position of environmentalists calling for stronger environmental policies, environmental migration appeared as suitable issue for claim-making: The greater the risk of migration linked to environmental degradation, the more obvious became the need for protecting the environment. However, the sustainable development debate 'moved strongly towards how to deliver sustainable development rather than how to protect the environment *per se*' (Mee 2005, p. 253). Indeed, the prevailing rationale was that environmental degradation would be combated if poverty were to be reduced, and to reduce poverty the countries in the periphery must achieve economic growth (Castro 2004, p. 197). This dominant perception of sustainability can explain the progressive disengagement of environmentalists and the capture of the environmental migration issue by the development and humanitarian discourse.

The 'humanitarianisation' of the problem generated a new demand for adopting an ad hoc mechanism to assist displaced population. The attention is focused here not on the (environmental) causes of the problem but on its (humanitarian) consequences. This cognitive shift was first observed during the Conference on 'Migration and Environment' organised by the International Organisation for Migration (IOM) and the Refugee Policy Group in 1992. The need for a special mechanism to assist environmental refugees was expressed but rejected as a policy option by the UNHCR, who feared weakening, by such a move, the 1951 Geneva Convention (Suhrke 1994, p. 490). Nevertheless, the idea of formulating a specific international mechanism for the recognition and assistance of environmental migrants slowly gained the support of different policy actors, in this case using primarily the term 'refugee' instead of 'migrant'. The nongovernmental organisation (NGO) Living Space for Environmental Refugees (LiSER) was created in order to promote the demand for official recognition of environmental 'refugees'. In 2004 LiSER proposed 'The Toledo initiative on environmental refugees and ecological restoration'. In 2003 The New Economic Foundation published a report on 'environment refugees' arguing for their recognition by the updating of the Geneva Convention or by instituting a new one (Conisbee and Simms 2003). In 2004 two European Green deputies proposed to the European parliament the adoption of a declaration recognising the status of 'ecological refugees'. In 2005, at the end of the Limoges conference on ecological refugees, the participants launched the '*Appel de Limoges*' for their recognition via an ad hoc international status

(Courmil 2008, p. 4). In 2006, the Belgian Senate adopted a resolution calling for the recognition of the status of environmental refugees. In 2008 the Parliamentary Assembly of the Council of Europe published a report on environmental migration which 'calls for a further investigation of existing gaps in law and protection mechanisms with a view to an eventual elaboration of a specific framework for the protection of environmental migrants, either in a separate international convention or as parts of relevant multilateral treaties' (Council of Europe 2008).

Although unconnected with one another, all these initiatives are accompanied by an alarmist discourse based on pessimistic predictions about the importance of the phenomenon. In 1988, Jacobson was estimating that there were already as many as 10 million environmental refugees. In 1989, M. Tolba, Executive Director of UNEP, was claiming that as many as 50 million people could become environmental refugees if the world did not act to support sustainable development. Myers in 1997 announced that 200 million people are expected to leave their homelands because of an environmental disruption.

The definition of environmental migration as an autonomous multi-causal problem has the advantage of covering all of the environmentally displaced and to claim recognition and protection for all of them. Yet it did not gain official recognition since, for the most part, international institutions and member states of the United Nations remained absent from this debate. For Suhrke (1994) the discourse on the expansive definition of environmental migrants nearly died because the maximalist environment-oriented scientific community failed to assemble a critical mass of social science specialists (p. 479). I consider that this community did not seek the support of the social sciences, because the migration issue was mostly serving the development discourse. Yet, if we look today at the interest of the social sciences in this issue, Suhrke's explanation does not seem to suffice. Other reasons must be advanced to explain this agenda denial (Cobb and Ross 1997).

Often the explanation of this denial is linked to the deliberate effort to avoid weakening the concept of 'refugee' status and the Geneva Convention. Another explanation is related to the uncertainty of the phenomenon. Many scholars remained sceptical and contested the scenarios predicting the displacement of millions of people in the years to come (Black 2001; Castles 2002). Further, the alarmist discourse that characterised this definitional effort worked rather as a 'push' than as a 'pull' factor for policy-makers. In a context in which western countries tend to restrict immigration flows, the claim to recognise a specific status for millions of environmental migrants produced a cognitive dissonance. These explanations do not, however, elucidate the silence of international agencies (excepting IOM) that would later take part in the debate by trying to frame the issue in a way that was adapted to their mandates. To argue that these institutions did not receive any explicit mandate from their member states to do so is to consider them as lacking any independence (Hall 2010, p. 12).

In fact, the way the problem is defined offers very low adaptability to the institutional structures in question. It is difficult indeed to envisage a common policy response for all the causal attributions included in this definition. Though they all reflect the same rationale of victimisation (people forced to flee their homelands),

each cause contains its own responsibility attribution. Man-made environmental changes attributed to economic activity involve the polluters’ responsibility who should compensate the victims. Environmental changes attributed to natural events do not engage anyone’s responsibility to protect the victims: The community must assist them. Environmental changes attributed to strategic operations from which the victims are not protected imply the state’s responsibility. Situated at the intersection of different policy sectors the problem is maladapted to the institutional context and prevents the allocation of authority to one institution, which is necessary for policy-making (Vlassopoulos 2010, p. 19).

If a problem does not find its way to the agenda-setting process, policy actors adapt their discourse and problem definition in order to overcome the obstacles and increase policy relevance. More than a rational premeditated manoeuvre, this shift operates through multiple interactions guiding the actors’ behaviour and strategy. It evolves through a process of inclusion and exclusion, which finally produces alternative definitions with different scenarios of victimisation and responsibility attribution and reallocation of authority for policy-making. In the case we study here, discourse will pass from environmental ‘migrants or refugees’ perceived as an autonomous problem to climate ‘migrants or refugees’ defined as a consequence of climate change. This evolution will put aside all other causes of environmental displacement.

6.4 From Environmental Migrants to Climate Migrants: From Problem to Consequence?

In 1990, the Intergovernmental Panel on Climate Change (IPCC) report announced that ‘[t]he gravest effects of climate change may be those on human migration’ (IPCC 1990, p. 20). This statement did not provide sufficient impetus to shift attention from environmental to climate migrants. Rather it was climate change itself, capturing global interest at the highest levels of the international agenda during 2000, which worked like a magnet attracting a range of issues that then began to be discussed as climate related. Climate change also began to draw the attention of the international institutions in charge of these issues as well as NGOs, giving them new possibilities for action, recognition and/or financing (Seybolt 2009, p. 1031). Migration is one of the topics that were integrated into the climate debate (Fig. 6.3).

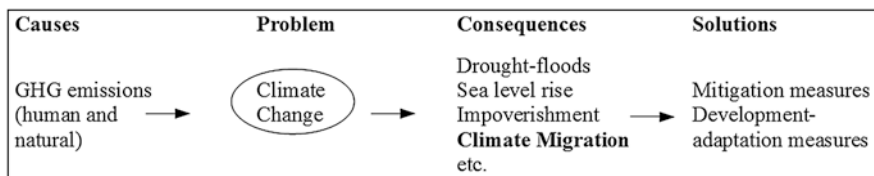


Fig. 6.3 Definitional cause—problem—consequence—solution scenario 2

The definition of a more restricted ‘climate migration’ problem brought about two developments. First, as was the case for environmental migration, the demand is formulated to adopt an ad hoc mechanism to assist population displaced—this time—by climate change. Second, the problem is for the first time placed on the international policy agenda by the active mobilisation of certain humanitarian Intergovernmental Organisations (IGOs) who will redefine climate migration as a consequence of climate change.

At the European Parliament in 2008 the Green European Free Alliance organised a conference on climate migration and proposed a declaration for the recognition of the status of climate migrant. Simultaneously, the Global Governance Project (Biermann and Boas 2007, p. 61) proposed establishing a specific international regime for the protection of climate migrants. This position is based on the alarmist discourse discussed earlier that has now become more ‘climate oriented’. For instance, Myers, in his 2005 paper entitled ‘Environmental refugees: An emergent security issue,’ specifies that ‘When global warming takes hold, there could be so many as 200 million people overtaken by disruptions of monsoon systems and other rainfall regimes, by droughts of unprecedented severity and duration, and by sea-level rise and coastal flooding’ (Myers 2005). In 2007, the Christian Aid report, *Human tide: The real migration crisis*, gives particular attention to climate migration whilst referring to about 250 million people to be displaced by climate change related phenomena.

As was the case for scenario 1, these initiatives consider climate migration as an autonomous problem, the importance of which is proved by the mass displacement expected as a result of climate change. Although this discourse is engaged, the association between climate change and migration will simultaneously give rise to the active mobilisation of humanitarian IGOs, particularly those concerned with population displacement. They will frame the issue on the policy agenda not as an independent policy problem but as a consequence of the problem of climate change. This second development will move the definition of climate migration from scenario 1 to scenario 2.

The active participation of humanitarian IGOs at the Copenhagen conference in 2009 was preceded by the publication of several reports which served as a legitimising means for different organisations to engage with new issues outside their traditional mandates. Amongst the most active international institutions since the 1990s, IOM is at the origin of many documents in which, without abandoning the extensive definition of environmental migrants, the accent is put more particularly on climate-induced migration. In 2008 a report on *Migration and Climate Change* is published in its collection of papers and in 2009 follow three publications: *Migration, environment and climate change: Assessing the evidence* (2009a); *Compendium of IOM’s activities in migration, climate change and the environment* (2009b); and *Climate change, environmental degradation and migration: Addressing vulnerabilities and harnessing opportunities* (2009c). Further, cooperation was established in 2008 (formalised in July 2009) inside the Inter-Agency Standing Committee framework (IASC) by the creation of a Taskforce on Climate Change. In 2010, a sub-group constituted by the IOM and the United Nations High Commissioner for Refugees (UNHCR) was created in order to ‘continue

to advocate for the inclusion of humanitarian concerns, including food security, hunger, nutrition, health, migration and displacement' during the climate change negotiations. The collaboration of these two institutions together with the United Nations University and the Norwegian Refugees Council permitted the organisation of a joint side event on migration and climate change during the Conference of Parties (COP) 15 in Copenhagen.

More surprisingly, the IOM in 2008 engages in collaborations with, amongst others, several environmental partners—such as UNEP, the Stockholm Environment Institute (SEI) or World Wildlife Fund (WWF)—through the creation of the Climate Change, Environment, and Migration Alliance (ccema), an informal network charged with bringing migration on to the environment, climate change and development agendas. Does this collaboration signify an effort to re-environmentalise the issue? Available information from UNEP, ccema and IOM official sites and documents do not confirm this hypothesis. UNEP's website refers to the existence of the ccema in only one document without further information about meetings, events or projects in progress. The ccema's official website has not been updated since 2009.² Only the IOM refers to some events linked to ccema where UNEP is not present (for example, the Cancun side event on 'Climate Change, Environment and Migration Alliance (ccema): Understanding impacts and finding solutions' was organised by the IOM alone). It is also interesting to note that UNEP has also not participated in the organisation of the side events on migration and climate change organised during the COP 14 and 15. As in the past, the 'humanitarisation' of the issue engenders the disengagement of environment-oriented actors.

Apart from the IOM initiatives, UNHCR is the second-most active institution on the subject. In addition to UNHCR's participation in the IASC sub-group with the IOM, the High Commissioner António Guterres, publicly recognises in a 2008 working paper the linkages between climate change, natural disasters and human displacement, viewing migration as a consequence of global warming: 'Whilst climate change has been the subject of intense debate and speculation within the scientific community, insufficient attention has been given to the humanitarian consequences it will generate. [...] [I]t is equally vital to [...] strengthen the responses to the humanitarian consequences' (Guterres 2008, p. 3).

If the recognition of an autonomous problem is to be accompanied by the adoption of an ad hoc status for climate refugees, what are the policy implications for the consideration of forced migration as a consequence of global warming? The entry of the migration issue into the climate change agenda did not take place in a vacuum. Climate change resonates with a more or less structured policy community with dominant definitional scenarios reflecting a specific balance of power between policy actors as well as a specific policy orientation.

² The latest event published is dated December 2009 (see <http://www.ccema-portal.org/>, last access October 2011).

During the 1990s, the UN Framework Convention for Climate Change defined climate change as an environmental degradation problem, and therefore encouraged industrialised countries to take environmental measures to mitigate their greenhouse gas emissions (GHG). Gradually the climate change debate evolved considerably. The initial environmental definition became weakened and other competing images entered the public debate, legitimising new policy actors in the field. Through more or less parallel discussion forums climate change has been alternatively defined as a ‘social vulnerability problem’ reflecting an anthropocentric approach of climate change and pointing more to adaptation-oriented measures than to mitigation as suggested in the UNFCCC and the Kyoto Protocol. Following on this redefinition, migration has been included in the climate discourse as one of the consequences of global warming to be considered within climate policy-making—together with impoverishment and security risk. In this context a large coalition of international humanitarian agencies begins now to consider sustainable development and adaptation as the most relevant responses to combat social vulnerability related to global warming and the development sector as the most appropriate to deal with it.

Boisson-de-Chazournes (2008) remarks that during the Second World Climate Conference, in 1990, it became clear that there was a divergence on how developed and developing countries viewed climate change (p. 1). For the former it was primarily a scientific and environmental issue, whilst the latter emphasised the implications for poverty and development of any future regime. Indeed the declarations of the Group of 77 call for efforts to address climate change not as an environmental issue but as a development issue: Climate policy must enhance and ensure sustainable development, promote (sustainable) economic growth for developing countries as the only way to eradicate poverty, hunger and disease and combat vulnerability to natural hazards. The discourse of developing countries worked as a window of opportunity for the implication of new institutions in the climate field. One of them is the United Nations Development Programme (UNDP) whose work, as Mee (2005) notes, had little environmental emphasis until the 1990s, ‘so little that it only received a single passing mention in the 1987 Brundtland report’ (p. 228). If sustainable development and adaptation are considered as the most suitable responses to combat climate-induced social vulnerability, the UNDP becomes a new UN legitimate partner to climate policy-making.

The UNDP’s 2006 Human Development Report reflects the new definition of the climate change problem in the international arena. The emphasis shifts from combating the causes to combating the consequences of global warming, from combating ecosystem equilibrium to combating social vulnerability (Vlassopoulos 2010, p. 21). The report criticises rich nations for not paying enough attention to the effects of climate change and considers that ‘International aid for adaptation ought to be a cornerstone of the multilateral framework for dealing with climate change’ (UNDP 2006, p. 16). This redefinition is reinforced by the conclusions of the fourth IPCC report stating that: ‘The world is already committed to further warming because of the inertia built into climate systems and the delay between mitigation and outcome’. Thus, adaptation appears for UNDP as the most relevant

policy strategy: 'For the first half of the 21st century there is no alternative to adaptation to climate change' and suggests putting 'climate change adaptation at the centre of the post-2012 Kyoto framework' (UNDP 2007, p. 13, 18).

The definition of climate change as a 'social vulnerability problem' requiring development–adaptation measures seems also relevant in order to deal with the security implications of global warming. Hence, new policy actors from the security sector presented themselves as qualified to intervene during the climate negotiations by defending the same policy orientation. The UNDP's report on human security was one of the first in 1994 to connect global warming to security by defining 'human security' as the need to shift attention from state centred to people centred security issues and presenting environmental change as one of the major stressor for human security. Like economic development, food availability, health conditions, political conditions, the environment is seen as a component of 'human security' (UNDP 1994, pp. 22–25). As Christie (2007) put it, in order to prevent vulnerability from becoming a threat to human security, the majority of measures that have been advocated are development measures, typically those that are associated with the international development agencies (p. 261).

In its 2007 special report 'Climate change: Thinking beyond Kyoto' the NATO Parliamentary Assembly also insists on the national and international security dimension of climate change. Migration is presented as a potential threat to be combated by the adoption of development-adaptation measures: 'Climate change will affect, and is already affecting, nearly all areas of our lives, including security and the geopolitical situation. It is expected to cause further redistribution of wealth and a subsequent migration of people'. Without rejecting the need for mitigation, the report recognises 'the need to increase focus on adaptation effort' (NATO Parliamentary Assembly 2007, p. 1, 12). Agricultural aid for developing countries, technology transfer and education are the principal policy means suggested by the authors.

More specifically, the question of migration appears through the development–adaptation discourse as a threat to be avoided and potentially a failure to adapt. The 2007–2008 Human Development Report argues that if development and adaptation fail, migration will become a danger for human development across the developing world: 'Losses of productivity linked to climate change will increase inequalities between rainfed and commercial producers, undermine livelihoods and add to pressures that are leading to forced migration' (UNDP 2008, p. 94). The position of the UNHCR goes in the same direction: 'To avoid people being compelled to migrate or become displaced, we must better understand and reinforce the resilience of communities both in terms of their physical security and their ability to sustain adequate livelihoods' (Guterres 2008, p. 9).

The definitional shift from environmental to climate migration is more precise, with greater institutional adaptability and policy relevance. Indeed, climate migration succeeded where environmental migration failed: To be set on the international policy agenda by the active engagement of UN and non-UN agencies and generate international public debate. This definitional shift produced two evolutions in comparison with the efforts to impose a large definition of 'environmental

migrants’ as an international policy issue. First, all other categories of environmental victims (from industrial accidents, dam construction, strategic deterioration of the environment, etc.) have almost disappeared from public debate. Second, climate migration is no longer appears on the international policy agenda as an autonomous problem. Instead, it is absorbed by the climate change problem increasingly perceived as a social vulnerability issue. In that context, climate migration is discussed as a humanitarian and security threat justifying the urgency for development–adaptation measures. However, the combination of a persistent alarmist discourse insisting on supposed large scale climate induced migratory flows (even if the term ‘refugee’ is used only infrequently) and the perception of migration as an a priori recognition of the inefficiency of adaptation measures blocked the passage from agenda setting to policy-making. First, the insistence on the risk of mass climate migration worked as a push rather a pull factor for public actors having to cope with a widespread political tendency to limit immigration flows. Second, recognising a ‘migration problem’ would mean accepting in advance the failure of adaptation efforts. A further attempt to define a policy-relevant issue is actually in progress principally supported by the IOM which does not adhere to the discourse presenting climate migration as a failure to adapt.

6.5 Migration as a Solution

When social vulnerability to climate change is discussed through a (sustainable) development and adaptation approach, migration is considered as a consequence and a threat to be prevented. Thus, the recognition of the need to adopt specific policy measures for assisting climate migrants is perceived as a failure of adaptation efforts. In opposition to this perception, IOM introduces a new definitional process presenting climate migration, not as a consequence, but as a solution to climate vulnerability (Warner 2010, p. 403). At the same time, the discourse becomes less alarming by putting the emphasis on the fact that climate migration is and will be principally internal and not international (Fig. 6.4).

Whilst at the 1996 Symposium the IOM perceived environmental migration as a problem—‘minimisation and amelioration of the problem of environmentally-induced population displacements’ (IOM et al. 1996, p. 11)—in its 2009 publication IOM firmly supports the definition of migration ‘as an adaptation strategy

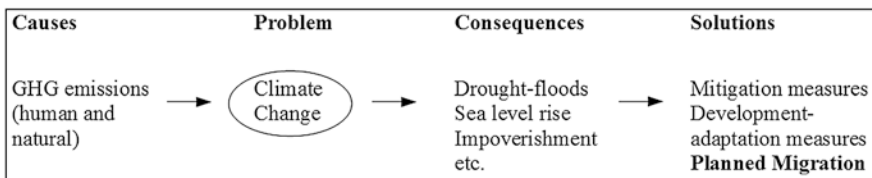


Fig. 6.4 Definitional cause—problem—consequence—solution scenario 3

[or] a possible way of enhancing adaptation to climate change' (IOM 2009a, p. 16, 26). In the same volume it is mentioned that: '[D]iscussions of migration usually see migration as the result of a failure to adapt to the Environment, rather than as a possible way of enhancing adaptation to climate change. Migration may itself be one of several adaptation strategies and a coping strategy' (IOM 2009a, p. 16). This position is in accordance with the way IOM describes its mission, as 'the leading intergovernmental organisation in the field of migration dedicated to promoting humane and orderly migration for the benefit of migrants' (IOM 2009b, p. 23). In this context, the development sector does not appear as the only legitimate authority to prevent climate-induced migration by the adoption of development-adaptation measures. The IOM, having already promoted temporary and circular labour migration programs as part of the Global Commission on International Migration, also becomes a legitimate actor in the climate adaptation policy community. Instead of proposing preventive measures to avoid migration, it proposes migration measures as a response to climate-induced vulnerability. In that sense, the IOM espouses the belief supported since the 1990s by the World Bank, NGOs and OECD member state governments that more circulation of labour is profitable both for native and hosting countries (Faist 2008, p. 2), by applying it to the climate–migration debate.

For the UNDP migration has always been a personal adaptation strategy for people seeking to ameliorate their conditions of living: '[I]n many cases, continuous change leads communities to develop their own adaptation strategies, of which migration—whether seasonal or permanent—may be only one component. Under these conditions movement typically takes the form of income diversification by the household, with some household members leaving and others staying behind' (UNDP 2009, p. 45). What is more specifically introduced through the debate on climate migration is the definition of migration as a policy solution (adaptation strategy): If migration is planned, it should not be considered as a problem.

The definition of migration as a policy option for combating the impacts of global warming is accompanied by a less alarmist discourse contesting the risk of an invasion of the north by climate migrants from the south. In 1996, Hugo affirmed that 'Historically, the vast bulk of migration caused by environmental change has occurred within national boundaries. Nevertheless, the international dimension of this relationship [...] is of increasing scale and significance' (Hugo 1996, p. 105). IOM refrains from emphasising an increased threat of international migration: 'Environmental migration may take place internally, regionally or internationally. Most empirical research, however, tends to suggest that internal migration, such as rural–urban migration, or movement across immediate borders between neighbouring countries, is likely to be predominant' (IOM, n.d). The UNHCR espouses only one part of the IOM's discourse, the one compatible with its mandate, particularly under the 'cluster approach', namely, coping with internally displaced persons: 'It is likely that most of the displacement provoked by climate change [...] could remain internal in nature' (Guterres 2008, p. 2). Indeed, the UNHCR has taken a leading role in overseeing the protection and shelter needs of IDPs as well as coordination and management of camps. Climate migration

may constitute another opportunity for additional recognition and authority. However, the UNHCR remains silent concerning the perception of migration as a solution to climate adaptation. An implicit competition is observable between the positions of these two institutions. The discourse on planned migration as a response to climate-induced social vulnerability legitimises the role that IOM expects to play whilst the discourse on climate-induced internal displacement legitimises the role of UNHCR.

The attenuation of the prevailing alarmist discourse coupled with the one on migration as a solution to climate change considerably strengthened the policy relevance of the issue. The presentation of climate migration as an internal (or south–south) displacement phenomenon makes the question more palatable for governments of developed countries, if climate migrants are not expected to invade the north. Simultaneously, the discourse on planned migration gives the impression of a controlled process with potential benefits for receiving countries. As a UN representative remarked, the introduction of a debate on migration since the COP 14 in Poznan coincides with the transmission of a more reassuring discourse: ‘[M]ember states have realised that there is no such risk of invasion. So they become open to discussion’ (personal interview—06/2010). The recent discourse can also be at the origin of the agreement on climate migration concluded in 2010 in Cancun, which could be seen as the first sign of an emerging policy-making process. The outcome of the Ad Hoc Working Group on long-term Cooperative Action under the Convention includes a paragraph inviting parties to undertake ‘Measures to enhance understanding, coordination and cooperation with regard to climate change induced displacement, migration and planned relocation, where appropriate, at national, regional and international levels’ (UNFCCC 2011, para. 14[f]). The above formulation seems to satisfy the positions of both the IOM and the UNHCR, today, the most active advocates of the issue amongst IGOs. Coordination and cooperation in case of climate-induced migration could fall under the jurisdiction of the UNHCR, whilst programs for planned relocation in climate vulnerable regions could correspond to the IOM’s policy mandate.

By integrating the migration issue into the climate policy-making process, this latest definitional shift can be considered as the most successful definitional scenario in terms of policy relevance. This is due to its wide acceptance amongst policy actors at the national and international levels. First, presenting migration as a solution implies that mobility is one of the possible ways to achieve personal wellbeing and development of the native as well as the host communities. As the 2009 Human Development Report on human mobility stresses, ‘enhanced mobility is only one component of a strategy for improving human development’ (UNDP 2009, p. 18). Put another way, planned migration, seen as a policy measure, is compatible with the ‘development–adaptation approach’ to climate change. Second, presenting migration as a solution avoids discussions of responsibility attribution. If (planned) migration is a solution, the question of who should pay for climate victims seems misplaced. Third, since the new discourse insists on the mainly internal character of displacement, most UN member states from developed countries seem to agree with the perspective of adding one more objective

to be financed through the adaptation funds: Helping governments establish reinstallation programs. If planned international migration is proposed, this will be possible only through bilateral agreements, thus controlled by receiving countries and classified as labour, or circular, migration. For less developed countries this perspective is a supplementary justification for the need to obtain new and additional adaptation financing. Fourth, for advocates of the recognition of a new legal status for climate migrants and the adoption of a new ad hoc Convention, this discourse does not satisfy their demands but can however be seen as a step forward: Although the policy orientation envisaged consists of acting locally, case by case, according to the degree of vulnerability, rather than globally by recognising a single climate victim, it nevertheless officially links for the first time the two policy issues, migration and climate change, in a UN document.

Nonetheless, the consideration of migration as a solution has three main impacts on the definition and protection of environmental victims. On the one hand, this definition refers only to a small category as the potentially protected population: If the term 'environmental migration' includes all cases of environmentally induced displacement, 'climate migration' concerns only the climate-induced migrants; further, 'planned migration' appears to apply only to some climatic circumstances, particularly in the early stages of slow onset environmental degradation. On the other hand, this definition risks dispersing the issue of environmental migrants into the global issue of 'human development' as defined by the 2009 Human Development Report: '[E]nhanced mobility is only one component of a strategy for improving human development' (UNDP 2009, p. 18). Further, if such is the case, climate migration should be discussed not only as a humanitarian issue but also, and probably primarily so, as an economic opportunity (McNamara 2007, p. 17). If the recent discourse on planned migration dominates the policy discourse, as the most 'successful' in terms of policy relevance, many questions can be raised: If migration is seen as a solution, can environmental migration continue to be debated as a problem? If the solution to climate stress consists of converting people to labour migrants, is there still a specific category of climate victims? Last and not least, can what is seen as a solution for international institutions also be experienced as a solution by those who are invited to leave their homes and families?

We cannot predict how the definitional process will evolve in the years to come but the very recent statement of the High Commissioner for Refugees at the Norwegian conference on 'Climate change and displacement', in June 2011, shows that the IOM's discourse on planned migration is far from becoming monopolistic. Although no public actor has yet espoused the claim for a specific policy regime for climate migrants, the head of the UNHCR, taking advantage of the Cancun agreement, declared that: 'I strongly believe that a [...] viable approach would be to at least develop a global guiding framework for situations of cross-border displacement resulting from climate change and natural disasters' (UN News Centre 2011). Whilst in 2008 the position of this agency has been that 'UNHCR is not seeking an extension of its mandate, but it is our duty to alert the international community to the protection gaps that are emerging' (Guterres 2008,

p. 9), in 2011, the discourse had evolved: ‘UNHCR stands ready to support states in the development of such a framework, which could take the form of temporary or interim protection arrangements’ (UN News Centre, 06/06/2011). Perhaps the time for allocation of authority between international institutions has come.

The definitional history of ‘environmental migration’ appears to be a continuous effort to attain policy relevance. Policy actors use diverse discursive strategies in order to frame the issue in accordance with their perceptions and with the constraints imposed by other actors. For Stone (1997), one strategy consists of reducing the scope of the problem to make it more manageable (p. 147). Indeed, the plural identities of victims have progressively diminished and attention is given only to climate migration. Another strategy consists of sliding between different definitional scenarios, each one having its own rationale of victimisation and responsibility attribution, legitimising different authorities and claiming specific policy measures.

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Chapter 7

Challenges and Pitfalls of Resettlement: Pacific Experiences

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Abstract Today the South Pacific presents a scenario of environmental and social developments induced by climate change that are destined to affect other regions of the world sooner or later. For this reason Pacific Island Countries are of particular interest within the discourse on climate change and its social effects. This chapter addresses climate change-induced migration in the South Pacific, with the focus on a prominent example of resettlement, namely the case of the Carterets Islands in the Autonomous Region of Bougainville (Papua New Guinea). Carterets Islanders are currently relocating to the main island of Bougainville, and the process is being planned and organised by a local non-governmental organisation, Tulele Peisa (which means ‘Sailing the waves on our own’ in the local language). Flowing from the presentation of the Carterets case, several core challenges connected with resettlement are identified: the land-people connection, attitudes of, and conflicts with, recipient communities, governance and funding. The chapter closes with some more general considerations, highlighting inter alia the need for long-term international planning. It becomes clear that communities in the South Pacific are not simply helpless victims of an overwhelming fate, but are bestowed with admirable resilience, ingenuity and capabilities upon which they draw in order to cope with the challenges of climate change-induced migration.

Keywords Carterets Islands/Bougainville • Resettlement • Sea-level rise • South Pacific • Tulele Peisa

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7.1 Introduction

In the centuries before Christ sea-faring Austronesians over time came to settle on the islands of the South Pacific. On occasion, they environmentally degraded an island to such an extent that it became uninhabitable. Then people moved on and resettled on another island. Currently Pacific atolls become uninhabitable due to climate change and its effects such as sea level rise and extreme weather events. The inhabitants of these atolls are forced to leave and resettle elsewhere. This poses severe challenges—and opportunities perhaps—not only to the directly affected people, but also to recipient communities and societies at large.

What is the difference between the two situations—two thousand years ago and today? First, in the historical case the issue was locally confined—an island here, an island there—and there was a direct link between cause and effect. The people who were forced to relocate were responsible for what caused the need for resettlement. In today's cases we are confronted with a global and ubiquitous problem: man-made climate change on a global scale which in various regions of the world causes sea level rise and other problems, and we are confronted with far more complex causal chains; the Pacific islanders who are affected by sea level rise do not contribute (much) to its causes, but they are the first who have to suffer and to relocate.

A second difference lies in the fact that in the historical case nobody in Europe or other parts of the world knew anything about what was happening in the South Pacific. In fact, we came to know about it only because of archaeological research conducted in the last century. About what is happening today in the South Pacific, however, one can be well informed everywhere on the globe. There are various websites on the Internet with detailed information about the effects of climate change in the Pacific, accessible from every place in the world. Film teams travel to remote Pacific islands and produce documentaries which can be watched everywhere else in the world (and, in fact, get shortlisted for the Oscar nominations in Hollywood), and environmental activists from the Pacific travel to Europe and North America to inform the public about the plight of their people. This is another decisive difference in today's situation compared to the historic case: not only is climate change a global phenomenon, but so also is the discourse about it. This of course frames the thinking and talking about climate change and migration—in the Pacific and elsewhere.

It is common global knowledge today that in the South Pacific climate change leads to sea level rise and an increased frequency and intensity of extreme weather events such as tropical cyclones and storm surges, but also rainfall decline and droughts. As a consequence, the South Pacific at present is the theatre of climate change—related environmental and social developments that will affect other regions of the world in the (not too distant) future. Hence the South Pacific island states have a kind of a 'canary in the coalmine' status (Jakobeit and Methmann 2007, p. 16), and this makes them particularly interesting in the context of the discourse on climate change and its social effects such as migration. Many South Pacific islands are particularly vulnerable because of their extreme exposure and their rather constrained options for adaptation. Many islands are of extremely low elevation and often also of rather limited area. The highest point of the Pacific island country of Kiribati is two metres, and the

average island width of Kiribati islands is less than 1,000 meters. Atoll countries are particularly vulnerable to sea level rise ‘because of their high ratio of coastline to land area, relative high population densities and low level of available resources for adaptive measures’ (Yamamoto and Esteban 2010, p. 2). Sea-level rise and associated submersion, storm surges, erosion and other coastal hazards will, according to the Fourth Assessment Report of the International Panel on Climate Change (IPCC), threaten ‘vital infrastructure, settlements and facilities that support the livelihood of island communities’ (quoted from Oxfam 2009, p. 14). Furthermore, climate change is ‘likely to heavily impact coral reefs, fisheries and other marine-based resources’ (IPCC, as cited in *ibid.*, p. 14). Rising temperatures will also increase the risk of vector-borne diseases such as malaria and dengue fever as well as diarrhoeal diseases, with significant ramifications for health sectors in Pacific Island Countries (PIC).

In other words: food security and water security as well as health are threatened (FAO 2008). People become more and more dependent on aid from outside, and options for adaptation (such as planting mangroves in order to reduce coastal erosion, building seawalls in order to contain storm surges, setting up rainwater tanks to improve fresh water supply) are limited and not always successful. Therefore, in some extreme cases people see resettlement as being the most appropriate (or perhaps the only) option for long-term adaptation.

In its first part this chapter focuses on such a case, namely the resettlement of Carterets Islanders to mainland Bougainville in Papua New Guinea. Drawing on this case, five core challenges and pitfalls of resettlement are discussed in the second part of the chapter. These are: the land-people connection, the relations between resettlers and recipient communities, conflicts due to resettlement, governance issues, and funding. The chapter concludes with some general observations and recommendations which build upon the Carterets case and the discussion of challenges and pitfalls. It will be argued that resettlement planning has to address not only the technical and material dimensions, but also the cultural, psychological and spiritual aspects, and not only the needs of the resettlers, but also of recipient communities. Furthermore, it will be posited that conflicts induced by relocation are a serious concern and that conflict impact assessments have to be an integral element of resettlement programmes. Finally, it will be argued that resettlement-related governance issues will have to be tackled by combining the forces of state and non-state actors from civil society and affected communities.

7.2 The Carterets Islanders Case

7.2.1 *Background*

The Carterets atoll comprises a handful of low-lying islands (Han, Huene, Jangain, Yesila, Yolasa, Piul), inhabited by approximately 3,500 people. The islands belong to the Autonomous Region of Bougainville (ARB), which is part of the independent state of Papua New Guinea (PNG).

With a maximum elevation of 1.5 metres above sea level, the islands are affected by sea level rise. One island has already completely disappeared; another island was cut in two by a king tide a few years ago. Since 1994, almost 50 % of the islands' surface was lost. The Carterets may be completely submerged in ten years' time. The people have great difficulties maintaining their subsistence economy which is based on fish, bananas, taro and other vegetables, grown in food gardens. Taro, the main staple food crop, can no longer grow due to salt water intrusion and salination of soil and water. Soils become more and more swampy, providing better breeding grounds for mosquitoes, and as a consequence, malaria becomes more frequent. Freshwater wells have been contaminated by saltwater, making freshwater more and more scarce. Food security is under immediate threat. People are becoming increasingly dependent on food aid shipped in from mainland Bougainville; these shipments, however, are irregular and unreliable. People have tried to adapt by building sea walls and planting mangroves, without sustainable success.¹

Given these conditions, the people on the Carterets have decided to resettle on the main island of Bougainville. Bougainville is around 80 km away to the southwest of the Carterets, a four hour ride by boat. Bougainville has an area of about 9,000 square kilometres (approximately the size of Cyprus), with around 200,000 inhabitants.

For almost ten years (1989–1998) Bougainville was the theatre of a large-scale internal war, the longest and bloodiest violent conflict in the South Pacific since the end of World War Two. It was mainly a war of secession between the security forces of the central government of PNG and the secessionist Bougainville Revolutionary Army. After a ceasefire in 1998 and a Peace Agreement in 2001, Bougainville has gone through post-conflict peace-building which has been rather successful. However, some unresolved issues remain, and the situation is still volatile in parts of the island. Land is scarce on Bougainville, conflicts over land are common.

Nevertheless, the majority of Carterets islanders intend to resettle on Bougainville. The Catholic Church provided some resettlement land in the relatively safe north of the island. In April 2009 the first settlers from the Carterets arrived on Bougainville, the heads of five families with around 100 family members. They were to pave the way for the others.

It soon became clear, however, that the land secured from the Catholic Church would not suffice. Financial support that was promised by the government for resettlement purposes has not been delivered yet. Carterets settlers were not welcomed with open arms by all of the locals. Already by July 2009 three families had left the resettlement site and returned to the Carterets, arguing that they could not live in peace in the new place. As things stand at the moment, it is not at all clear whether the planned resettlement of the majority of Carterets islanders before 2015 can actually be carried out.

¹ Other atolls in the Autonomous Region of Bougainville find themselves in a similar situation, namely Tasman, Mortlock and Nugeria, which have a total population of about 2,500.

7.2.2 Capabilities: *'Sailing the Waves on Our Own'*

People from the Carterets themselves took the initiative to develop a resettlement plan. After a series of community meetings at which the worsening situation on the atolls was discussed, the Carterets Council of Elders, the local governing body on the islands, in late 2006 decided to form an NGO to organise the resettlement. The organisation was named 'Tulele Peisa', which in the local language means 'sailing the waves on our own'. 'This name choice reflects the elders' desire to see Carteret islanders remain strong and self-reliant' as the organisation's Executive Director Ursula Rakova explains (Rakova 2009, p. 2). Tulele Peisa elaborated a detailed resettlement plan, the Carterets Integrated Relocation Programme (CIRP), which aims at the voluntary relocation of approximately 1,700 Carteret islanders to three locations on mainland Bougainville (Tinputz, Tearouki and Mabiri) over five to ten years.² The plan not only addresses issues such as constructing housing and infrastructure for the settlers, but also envisages the implementation of agricultural and income generation projects (mainly around cash cropping of coconuts and cocoa) and the development of education and health facilities as well as community development training programmes which will support the settlers in adjusting to their new home environment economically and socially (Tulele Peisa 2011).

The plan also addresses the needs and interests of the target communities (approximately 10,000 people) so as to 'ensure that these host communities will also benefit through upgrading of basic health and education facilities and training programs for income generation' (Tulele Peisa 2011, p. 5). This is to avoid preferential treatment of relocated newcomers which could cause resentment, frustration and animosities from the side of host communities. Accordingly, the plan envisages 'exchange programs involving chiefs, women and youth from host communities and the Carterets (...) for establishing relationships and understanding' (Rakova 2009, p. 2). Several such programmes have been actually carried through.

Resettlement was accompanied by custom ceremonies bidding farewell to people on the Carterets and welcoming them to host communities on Bougainville (including the exchange of shell money). Tulele Peisa also has sought to promote inter-marriages between Carterets islanders and members of host communities; this could create bonds and social cohesion and provide newcomers with access to much needed land. As both the Carterets islanders and the Bougainvilleans are Melanesians, they share a common cultural background which makes building relationships and mutual understanding relatively easy. Things will be more difficult for people from the other atolls in the ARB (Mortlocks, Tasman, Nuguria) as they are Polynesians who do not have kinship ties with people on mainland Bougainville.

² It is planned to resettle five families to Tinputz, 20 families to Tearouki, and 100 families to Mabiri. Implementation of the plan has started with the smallest resettlement site, Tinputz.

Currently work is underway in the Tinputz resettlement site: clearing of the relocation site, establishing food gardens, planting taro, building houses, organising meetings between members of the Carterets Relocation Task Force Committee and the elders, chiefs and church leaders of the host community, and negotiating with local landholders.

Securing more land for the people who are willing to resettle will be the most important and most difficult issue. As mentioned, land is already scarce on Bougainville, and traditional land tenure in the context of Bougainville societies does not easily lend itself to the accommodation of newcomers. Land on Bougainville, as in the South Pacific in general, is at the heart of local community life. Access to land depends on membership in a specific social kin-based group (lineage, clan); the group and the land are closely interwoven. Land provides not only livelihood and the most reliable security for the group, but it is also the source of its cultural and spiritual wellbeing.

Land belongs to the whole group (including the spirits of the dead and the unborn generations). There is no concept of individual ownership or of land as a commodity that can be bought and sold. There is a whole variety of primary, secondary and further land use rights, which complicates the notion of land ownership. Boundaries of certain areas of land are often not clearly defined. Given these uncertainties and the great importance of land it comes as no surprise that conflicts mostly revolved and still revolve today around land disputes.

The vast majority of land on Bougainville (95 %) is covered by this customary land tenure system. Only small portions are alienated land which at some stage in colonial times was bought or expropriated by outsiders, e.g. churches, white plantation owners or the state. It is no wonder that the settlers from the Carterets were relocated to land in the possession of the Catholic Church. This land—around 80 hectares—is by no means sufficient; according to the resettlement criteria developed by Tulele Peisa, some 1,500 hectares of land will be required to accommodate all the families who intend to resettle. It will be much more difficult to negotiate the acquisition of customary land between Carterets islanders and communities on Bougainville and to obtain clear legal title to land. Respective negotiations with landholders in resettlement sites were begun in 2007 and are continuing. Securing the funds for land purchase will be another critical issue.

Finally, it must be noted that there have already been conflicts between newcomers and host communities, and this has led to the return of some of the relocated families back to the Carterets, in other words, conflict-induced re-relocation.

7.2.3 The Cultural-Spiritual Dimension of Resettlement

As land is at the heart of the entire social, cultural and spiritual order, loss or scarcity of land does not only pose economic problems, but has far-reaching effects on the social structure, the spiritual life and the psychic conditions of the affected groups and their members. For Carterets islanders to have to leave their land is a

shocking prospect. They are afraid of losing their cultural heritage which is closely linked to the land. This is why there are still people who do not want to leave. Generational differences are at play, too. It is particularly the elderly who do not want to move, while members of the younger generation are more willing to leave. For the latter resettlement also opens new options, and they usually have more capabilities than the old; they also might think that it is more exciting to stay in a bigger place than on a tiny atoll. Pacific islanders have a tradition of sending their young people to other places (to raid other people's homes in the olden days, to earn cash in the modern age), but the decisive difference compared to today's situation is that the people always could come back, and they usually did come back. Resettlement due to sea level rise, storm surges, land loss and freshwater depletion, however, is irrevocable. One cannot return to an uninhabitable or sunken island.

Resettlement poses particular challenges to women. On the Carterets and in most parts of Bougainville communities are matrilineal, which means that land is transferred from mothers to daughters. The loss of land for the Carterets women is a traumatic experience as the chain of land transfer will be broken. On the other hand they realise that their land can no longer sustain the families. The women are torn between the desire to stay and the need to move if they want to secure a future for their children.

Tulele Peisa is trying to take these factors into account as far as possible; the resettlement plan envisages the establishment of a regular sea transport service for freight and passengers in order to maintain links between relocated people and those who will stay behind, and of a Conservation and Marine Management Area around the sinking Carterets so as to maintain the area as customary fishing ground and thus keep the links to the ancestral land (even if it might have disappeared from the earth's surface) (Tulele Peisa 2011, p. 6).

The fears and concerns of the Carterets islanders are a strong reminder that resettlement is not only a technical issue connected primarily to material problems, but also has a highly important cultural, psychological and even spiritual dimension. Tulele Peisa is taking this dimension into account by stating as one of its objectives to 'assist Carterets people to overcome fear, anxiety and trauma associated with the need to leave their homeland' (Tulele Peisa 2011, p. 8).

7.2.4 External Support (or the Lack of it)

The plight of the Carterets islanders has drawn considerable international attention. The islanders were presented as being at 'the frontline of global climate change' and dubbed the world's first 'environmental refugees', and their relocation was presented as 'one of the first organised resettlement movements of forced climate change migrants anywhere in the world' (Displacement Solutions 2008, p. 2). More than a dozen film crews, news networks and freelance media teams have visited the Carterets over the last few years and have spread the

Carterets message to the outside world. In fact, so many media people have visited that they have become a burden and locals are now tired of having to accommodate them. Representatives of Tulele Peisa have been on speaking tours to Australia, North America and Europe.³ So far all this international public attention has not translated into any substantial support or benefit for the Carteret islanders. The current resettlement program which is conducted by Tulele Peisa is dependent on the resources and ingenuity of the Carteret islanders themselves, with only modest support from donors and international civil society.

Support from the side of the state of Papua New Guinea (PNG) and the Autonomous Bougainville Government (ABG) so far has been very modest. State institutions acknowledge the problem and the need for action, but words so far have not been followed by deeds. The ABG has endorsed the Carterets Integrated Relocation Program, and in October 2007 the PNG government allocated 2 million Kina (US\$800,000) for an official 'Carterets Relocation Program'. But somehow this money disappeared somewhere in the jungle of the PNG state bureaucracy, and has not yet been utilised for resettlement purposes. Some people from state institutions say that the money is still there, 'parked' somewhere and ready to be used later. Tulele Peisa estimates that some 14 million Kina will be required to resettle all of those who wish to relocate (Displacement Solutions 2008, p. 4).

Of utmost importance, nevertheless, is the fact that people from the Carterets have not waited for the state and others to come to their assistance, but have taken their fate into their own hands and in doing so have shown tremendous capability and ingenuity. The people have agency of their own. Local agency, however, should not be used as an excuse for the passivity of state institutions in PNG and of those who are responsible for the plight of the islanders at the international level in the first place.

7.3 Challenges and Pitfalls of Resettlement

Five major challenges and pitfalls of resettlement must be highlighted, based on the empirical evidence given so far. There may be some implications and insights here that are thought-provoking and helpful in more general terms, beyond the specifics of the Pacific situation.

³ Tulele Peisa is actively involved in international civil society activities regarding climate change and resettlement. In particular, it is part of efforts to build an alliance of vulnerable Pacific communities impacted by climate change, and it is determined to document its own experiences so that other communities around the world might profit from the lessons learned in the Carterets case. It presents itself as a 'community led model for relocation of climate affected communities elsewhere' (Tulele Peisa 2011, p. 5), and climate affected communities can indeed be found elsewhere in the Pacific as well. Relocations are taking place in the small island countries of Vanuatu, Solomon Islands, Kiribati, Tuvalu, Marshall Islands, the Federated States of Micronesia and Palau.

7.3.1 *The Land-People Connection*

Resettlement implies moving from one area of land to another. But land is scarce, not only on Bougainville, but all over the South Pacific. Finding and acquiring appropriate resettlement land is a major challenge; it will be difficult to find land, and it will be costly to purchase it. The problem will rise in magnitude in the future, given the rise in numbers of people who will have to relocate. Numbers in the Carterets case are small, and if difficulties are already considerable here, one can imagine what they will be like in the future. Given the internationally recognised principle of voluntary resettlement that settlers must not be worse off after resettlement than in their regions of origin, it will be an enormous challenge to find solutions for this problem. Just letting people move individually to the squatter settlements, the slums and the favelas of the (mega) cities of this world is no solution; it would be devastating for the people in question, and it would be devastating for the environment.

Resettlement poses not only technical, legal and economic challenges, nor is it merely a technical exercise. It has a variety of political, social, cultural and spiritual aspects to it. I have emphasised the importance of ‘land’ to the Carterets islanders, with the meaning of ‘land’ being very different from ‘land’ in the western sense as understood by most academics and policy-makers who deal with these issues. Carterets islanders view the land and the people as one—the people belong to the land as much as the land belongs to the people. There is no clear-cut boundary between nature/environment and people/society. The land is the home of the spirits of the ancestors and of the unborn generations. Land has an other-worldly dimension, it connects people to the unseen world (of spirits, gods, God). This holistic notion of land and the intimate relatedness of people and land is by no means unique to the Carterets islanders. It can be found everywhere in the South Pacific, and it can be found in many of the rural regions of the Global South where most of the people live who will have to relocate due to climate change. These people will harbour sentiments regarding land similar to those expressed by the Carteret islanders. Chief Paul Mika from Han Island in the Carterets explains: ‘The hardest thing will be to lose our sacred places, our tambu places’ (quoted from Pacific Institute of Public Policy 2009, p. 2). Abandoning their land and thus their ancestors is a traumatic experience for Carterets Islanders—and for Melanesians in general. An inhabitant of Babaga island in the Solomon Islands says: ‘They talk about us moving. But we are tied to this land. Will we take our cemeteries with us? For we are nothing without our land and our ancestors’ (quoted from Oxfam 2009, p. 36). If the Carterets or other islands will disappear in the sea, this does not only mean loss of land, but destruction of entire societies and cultures. What one researcher describes for the Marshall Islands also holds true for any other place in the South Pacific, namely that ‘the entire culture revolves around vital connections to land and family, and it is difficult for outsiders to comprehend what it means from a Marshallese perspective to see the graves of your ancestors and traditional leaders succumb to the seas’ (Barker 2008, p. 2).

An obvious pitfall of resettlement then is to conceptualise it without taking into account the ‘soft’—cultural, psychological, spiritual—dimensions which are a decisive factor for the wellbeing and perhaps even the survival of people (at least as members of a culturally distinctive group). In other words, communities can be destroyed not only by ignoring the plight of people and letting them drown on their home islands, but also by culturally insensitive resettlement.

7.3.2 The Relations Between Communities of Origin and Recipient Communities

The ‘land’ challenge is closely linked to a second challenge, namely the relations between settlers and host communities. Resettlement affects not only those people who have to leave their homes, but also those who have to accommodate them in their midst. There are no empty spaces left on earth. The Carterets islanders’ case demonstrates how immensely difficult it is to find sufficient and appropriate land for people who are willing to relocate. Settlers in each and any case will find that people already live in the areas they are moving to. Organised voluntary resettlement therefore will have to focus on establishing and maintaining peaceful and productive relations between settlers and host communities. As has been shown, Tulele Peisa has put a great deal of reflection and effort into this component, trying to establish sustainable bonds between newcomers and recipient communities, and developing inclusive programs which are of benefit to both settlers and hosts. Particular attention has to be paid to equity issues so as to avoid situations in which newcomers are better (or worse) off than the members of host communities, as this can easily spark resentments and conflicts. For example, Tulele Peisa is very anxious to make sure that settlers do not end up with bigger and better houses than their Bougainvillean neighbours.

An obvious pitfall of resettlement is to conceptualise the process with an exclusive focus on the settlers. Resettlement has to take into account the needs and interests of recipient communities and the relationship between them and newly arriving settlers.

7.3.3 Conflict

If settler-recipient relations are not managed properly, a third challenge of resettlement will gain prominence: conflict due to climate change-induced migration. As noted earlier, disputes over land have led to the re-relocation of Carterets islanders back home to their islands from mainland Bougainville. Conflicts over land, water and other natural resources can escalate under conditions of scarcity and (perceptions of) inequity.

A community leader from Tuvalu describes the problem as follows: ‘Right now we have land issues for people living at the edges of the island. As the land on

the coast is eaten away, people want to relocate saying “We’re losing our land: we need to move a bit in”. Other families reply “This is our land, this is where it stops”. So this is creating disputes amongst the communities in Tuvalu. Land in Tuvalu is communal land, so it’s not one person arguing with another, it becomes a wider dispute with family versus family’ (Annie Homasi, quoted from Oxfam 2009, p. 33).

Similar stories of conflicts between people moving from the coast to higher ground and the landowners there can be heard from Palau, Vanuatu or Solomon Islands. In Kiribati water scarcity has led to conflicts over water between neighbouring communities which felt forced to encroach on each other’s land (Foreign Affairs and Trade References Committee 2010, p. 102). Of particular concern is the situation in the Solomon Islands which, like Bougainville, experienced an internal violent conflict not long ago. The island and province of Malaita was a conflict hotspot. Currently some outer islands of Malaita are becoming uninhabitable due to sea-level rise, and people have to be relocated to mainland Malaita, which is already overpopulated and where land is extremely scarce.

So far there are only small conflicts at a low level of intensity, affecting only small groups of people. In referring to conflicts induced by climate change, one has to be aware that it is primarily this type of localised conflict which is the problem, and not conflict at a larger international scale. For the people who are directly affected, however, these small conflicts can have devastating consequences, and conflict escalation cannot be ruled out, particularly in a fragile post-conflict environment such as in Bougainville or Solomon Islands, or in situations that are already conflict-prone anyway. In those situations environmentally induced migration can trigger conflict escalation in the resettlement areas, particularly between newcomers and locals—over scarce natural resources, employment opportunities, ethno-religious and cultural differences etc.⁴ It must be taken into account that in the future ever more and larger groups of people will be affected, and this will lead to increased potential for conflict and conflict escalation. Hence it is for good reason that the German Advisory Council on Global Change (WBGU) includes environmentally induced migration in the spectre of ‘conflict constellations’ caused by climate change (WBGU 2007, p. 3) and that International Alert identifies migration as a key conflict-relevant risk of climate change (Smith and Vivekananda 2007, pp. 21–22). In fact, migration is ‘one of the most plausible links from climate change to conflict’ (Gleditsch et al. 2007, p. 4).

Having said that environmentally induced migration will lead primarily to local conflicts at the sub-national level does not mean one can neglect the international security dimension altogether. Not only can internal conflicts—once they have reached a certain level of violence—make the intervention of external actors

⁴ The causal chain in this case is: climate change leads to environmental degradation (such as sea-level rise and/or water scarcity) leads to migration leads to conflict in the in-migration area (migration as a cause of conflict). Another causal chain involving conflict and migration would be: climate change leads to environmental degradation leads to conflict (over water and/or land) leads to migration (conflict as a cause of migration) (Reuveny 2007, p. 660).

necessary (for peacekeeping and peacebuilding), environmentally induced transnational migration can also become a more direct security issue for other countries. This is why climate change and its effects are often presented these days as an issue of national security. It would be more appropriate, however, to frame them as matters of human security. The concept of human security transcends the state-centric approach of conventional security thinking; it does not focus on the national security of states, but on the security of people and individuals. As early as 1994 the UNDP report which laid the basis for the human security approach mentioned the environment as one of seven dimensions of human security (UNDP 1994). PIC pursue this human security approach, and they are particularly active in raising awareness about the links between climate change and security. They achieved a major success in June 2009 when the United Nations General Assembly adopted a resolution on ‘Climate change and its possible security implications’. This resolution had been introduced by the group of Pacific Small Island Developing States (PSIDS) and was supported by 101 states. Based on the resolution, the UN Secretary General presented a comprehensive report on the topic (United Nations General Assembly, 11 September 2009).

7.3.4 Governance

The fact that environmentally induced migration is prone to conflict and even violent conflict escalation can be explained in part by the political and institutional setting in which migration takes place. In other words, a fourth challenge of resettlement is good (enough) governance, or the lack thereof. Whether conflicts escalate or not depends on the stability and the quality of the state and societal framework and the capacities and legitimacy of governance institutions.

In the case of the Carterets the most obvious evidence of the importance of this governance aspect is the issue of the relocation fund. Why have the two million Kina allocated to the resettlement of the Carterets islanders by the PNG government not been used? The fact that this money has not (yet?) been put to its designated use is a clear indication of weaknesses in governance. Fragile states with limited institutional capacities have many more difficulties dealing with climate change and its social effects than states with stable institutions. Lack of capacities and consequent lack of effectiveness in dealing with those effects diminishes the legitimacy and trustworthiness of state institutions in the eyes of the people on the ground; lack of legitimacy in turn makes it more difficult for state institutions to implement adaptive measures—and this again increases the potential for conflict. In other words: various vicious circles ensue.

In such a situation non-state actors can and do play important roles, as the example of Tulele Peisa demonstrates. The interesting point about Tulele Peisa is that it is not just an NGO or civil society organisation in the western understanding of the term, but is closely linked to non-state actors who do not neatly fit into the western ‘civil society’ category. Tulele Peisa was set up at the request of the local Council

of Elders, that is, traditional authorities from the customary sphere of societal life. Such traditional authorities—chiefs and elders, tribal leaders, religious authorities, healers, wise men and women etc.—are of major importance for the organisation of everyday life in the weak states of the South Pacific and in so-called fragile states in the Global South in general. They are in charge of the governance of communities, natural resources and the environment; they often follow customary law (and not the written law of the state); they regulate resource use and solve disputes according to local custom. These types of non-state customary actors have to be taken into account when it comes to the management of the effects of climate change, including resettlement measures. Resilience of communities and adaptive capacity very much rest with customary actors and institutions. Efforts geared at improving adaptive capacity therefore should focus not only on state institutions, but also on local customary non-state (as well as more formal civil society) institutions. Their potential must not be left untapped. Engaging their capabilities, however, requires respect for their ways of operating and their worldviews, and this means acknowledging the cultural and spiritual dimension of climate change and resettlement and the significance of local knowledge. Dan Smith and Janani Vivekananda point to the dangers of cultural insensitivity: ‘To ordinary people it will feel like outside experts coming and telling them how things are, how they should live and what they should do. The likelihood is that they will ignore this advice or, if necessary, fight it. A different way of working is possible, grounded in a peace-building approach. This emphasises the importance of local knowledge and seeks the active participation of local communities in working out how best to adapt to climate change’ (Smith and Vivekananda 2007, p. 29). Accordingly there is the need ‘to bring hard science and local knowledge together’, acknowledging ‘that local knowledge alone is not enough, because climate change throws up unprecedented problems, but nor is the best hard science enough by itself, because adaptation needs to be locally grounded and culturally appropriate’ (Smith and Vivekananda 2007, p. 32).

What is needed then is the collaborative effort of non-state customary as well as civil society institutions and state institutions. Good management of migration induced by climate change will depend on such collaboration. In the case of the Carterets, the actors from the customary sphere and from civil society are willing and able to play their part, while state institutions are lagging behind. It can be assumed that the Carterets case is no exception in this regard. It would be a mistake, however, to relieve the state of its responsibilities. As the Carterets case demonstrates, civil society and customary actors cannot carry the burden alone.

To summarise this point: pitfalls with regard to the governance issue may mean either leaving resettlement merely to the initiative of the affected people and their capacities for self-organisation, thus unburdening the state from its responsibilities or, in the other extreme, calling on the institutions of the state alone and waiting for the state to fix the problem. State institutions and affected communities, including civil society organisations and social networks from the sphere of communal customary life, will have to join forces, and international donors will have to lend meaningful support for state and non-state civil society and customary institutions and their collaboration.

7.3.5 Funding

Referring to the responsibilities of international donors for building adaptive capacity leads to the fifth challenge which is the most obvious one: money, or the lack of it. Adaptation costs are high in PIC and large sums are needed to boost their adaptive capacities. Given the magnitude of the issues involved and the activities required to be undertaken, the financial resources of the PIC alone are not sufficient. Thus far, donor commitment has been lagging well behind the needs. Australia, for example, has allocated AUD\$150 million for adaptation measures in PIC, and none of this money is explicitly designated for resettlement programs. What is needed is a funding mechanism tailored to ‘supporting governments, local communities, and support agencies to protect people within their own territory. The governance challenge of protecting and resettling climate refugees is thus essentially about international assistance and funding for the domestic support and resettlement programs of affected countries that have requested such support’ (Biermann and Boas 2010, p. 76). Even though most resettlement will take place domestically, international assistance will be needed for this in-country resettlement. PIC cannot carry the burden alone. It is not enough to deal with the issue as a humanitarian problem requiring crisis responses whenever disasters occur. Instead, it is necessary to understand the issue of climate-induced migration as a ‘development issue that requires large-scale, long-term planned resettlement programs for groups of affected people, mostly within their country’ (Biermann and Boas 2008, p. 11). We are still very far away from that concept.

In sum, the following should be noted: in order to address the challenges and to avoid the pitfalls, any resettlement endeavour has to be conceptualised holistically, dealing with not only the technical, legal or economic aspects of resettlement, but also the cultural and spiritual, focusing not only on the communities which have to resettle, but also the recipient communities, drawing on the capabilities not only of state institutions, but also including non-state civil society and non-state local customary actors and institutions. Resettlement has to be carried out in a conflict-sensitive and a culturally sensitive manner. It has to be—and it can be—based on the resilience and capabilities of the people on the ground, but these people need external support, not least in the form of financial assistance. It is the obligation of those who bear the brunt of the responsibility for man-made climate change—namely, the developed nations of the OECD world—to provide this support. The people in the South Pacific hardly contribute anything to global climate change (there are no cars and there is no electricity on the Carterets), but they are left with all its problems, including losing their entire homelands.

7.4 Conclusions and Implications for Resettlement Planning

For many people in the South Pacific region migration might be the only workable adaptation strategy in the future. They are confronted with such severe and even irreversible forms of climate change-induced environmental degradation that

permanent resettlement becomes unavoidable. Environmental degradation, however, will be gradual, for the most part (although the frequency of extreme weather events and disasters might increase). This means that it will be difficult for them to argue that they are ‘forced’ to migrate because of climate change. On the other hand, it makes relatively long-term planning possible.

The Carterets islanders case illustrates that it is difficult to make a clear distinction between ‘forced’ and ‘voluntary’ instances of migration related to climate change and its effects. Tulele Peisa stresses the point that it organises ‘voluntary’ resettlement. Nevertheless, people feel ‘forced’ off their homeland. They would not leave if the atolls were not to become uninhabitable. The distinction between ‘forced’ and ‘voluntary’ migration might leave people like the Carterets islanders trapped in a legally uncertain conundrum: ‘Particularly for those considered to have moved due to gradual environmental degradation, there may be operational and normative protection gaps, internally and internationally, because they risk being considered economic or voluntary migrants’ (Kolmannskog 2008, p. 39; see also Warner et al. 2009, p. v). Currently, there is ‘a lack of criteria to determine where to draw the line between voluntary movement and forced displacement’ (Representative of the Secretary-General 2008, p. 4), and it can be questioned whether it would be analytically helpful and morally adequate to draw such a line (Biermann and Boas 2010, p. 65).⁵ Instead of bickering about the relation between and the mix of (economically induced) voluntary migration on the one hand and (environmentally induced) forced migration on the other, the chances for long-term planned resettlement should be taken now so that people have the opportunity to relocate voluntarily in a well organised manner sooner rather than being forced into a hasty, disorganised move later. To make this option a reality is exactly what Tulele Peisa is trying to do.

Long-term planning is a must—and it is possible. ‘When it comes to sea-level rise in particular, there is no need to wait for extreme weather events to strike and islands and coastal regions to be flooded. All areas that cannot be protected through increased coastal defences for practical or economic reasons need to be included early in long-term resettlement and reintegration programs that make the process acceptable for the affected people’ (Biermann and Boas 2010, p. 83).

In order to make processes ‘acceptable for the affected people’, community participation in the planning process has to be secured, providing for ‘the use and integration of traditional knowledge and the communication of science in ways that can be understood and used by Pacific Island policy-makers and their people’ (Sem 2006, p. 181). Of particular importance is that state institutions and international donors work closely together with customary local networks and traditional authorities in planning, decision-making and implementation of resettlement programs.

Resettlement will be mostly an internal affair within countries affected by the consequences of climate change. National adaptation plans will have to include

⁵ The Representative himself tries to develop such criteria based on the terms permissibility, possibility and reasonableness (Representative of the Secretary General 2008, p. 7).

resettlement programmes. Planning in particular will have to address the problems of land acquisition for resettlement purposes. 'States should begin now to review public land holdings and to select possible long-term resettlement sites that will be removed from the land market through land set-aside programmes' (Displacement Solutions 2009, p. 27). For climate change-induced migration will not be of a temporary nature, but will require permanent resettlement.

Although the main focus has to be on resettlement within countries, international relocation has to be taken into account as well. Many PIC, for example, are so small that resettlement in-country is not feasible because there is not enough safe space. Moreover, in extreme cases, entire island countries will become uninhabitable and even completely submerged. In these extreme cases of total submersion, the relocation of (the population of) whole nation states will be necessary. Thus for 'citizens of sinking island states permanent solutions on the territory of other states must be found' (Representative of the Secretary-General 2008, p. 7). Apart from resettlement issues this raises a host of difficult political and legal questions: can these countries maintain their sovereignty and statehood, given that one key qualification of statehood under international law is a defined territory? Can they retain something like a 'deterritorialised' statehood with some form of a 'government-in-exile'? Can they continue to claim an Exclusive Economic Zone even after their islands have been totally submerged? Will other states be willing—or obliged—to recognise such 'deterritorialised' states (Rayfuse 2009) and their governments and accommodate their populations and government institutions? Will the people of those submerged island states maintain their original citizenship or will they become stateless persons? Answers to these questions will have immediate repercussions on the forms of resettlement.⁶

The developed countries in the Pacific region, that is Australia and New Zealand, must begin working now with PIC to plan for displacement that is taking place already or that is likely to be caused by climate change in the future.⁷ A meaningful increase in adaptation and relocation funding for PIC, in addition to already existing aid commitments, should be allocated in particular to basic resilience programs at the community level, including in-country resettlement programs such as Tulele Peisa's. Furthermore, migrant worker schemes such as those already in place in New Zealand and Australia should be expanded and explicitly include members of communities particularly vulnerable to climate change. For an interim period such temporary and circular migration schemes can be of use for the home communities and support their resilience and adaptive capacities, particularly when combined with 'measures to facilitate and strengthen the benefits of migrant remittances' (Warner et al. 2009, p. v).

In the long run, however, permanent immigration from PIC affected by climate change has to be faced and dealt with as 'climate refugees must be seen

⁶ Some of these issues are discussed by Yamamoto and Esteban (2010), and Rayfuse (2009).

⁷ Conservative estimates estimate that up to 100,000 climate-displaced people from the South Pacific between now and 2030 will seek to immigrate to Australia (Bhathal 2008, p. 5).

and treated as permanent immigrants to the regions or countries that accept them' (Biermann and Boas 2008, p. 12, 2010, p. 75). Immigration policies have to be developed which support Pacific island communities that are forced to relocate due to the effects of climate change. The short-term perspective of mere emergency responses and disaster relief has to be overcome. What is really needed are long-term relocation programmes.

As the example of the Carterets islanders and Tulele Peisa demonstrates, communities in PIC are bestowed with admirable resilience, ingenuity and capabilities. They have over generations proven their ability to adapt to challenges coming from the outside world. Carteret islanders are not only extremely vulnerable, but they are also highly capable (as members of closely knit social networks). It is worth drawing attention to what Tulele Peisa calls its 'guiding philosophy', namely 'to encourage self-sufficiency and independence through all steps of the relocation process so that Carterets people and host communities do not develop a dependency or cargo mentality but take initiative and action to improve the quality of their personal and community life' (Tulele Peisa 2011, p. 8). In other words: local agency is at the heart of Tulele Peisa's approach. 'Climate refugees' such as the Carterets people are not just helpless victims of an overwhelming fate, and they are not doomed to become the objects of policies and plans and strategies and measures of others, but they have the capabilities—and the will—to take things into their own hands.

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Chapter 8

Climate Change and Planned Relocation: Risks and a Proposal for Safeguards

Jeanette Schade

Abstract Natural disasters and slow onset degradation due to climate and environmental change often cause sudden displacement and uncontrolled autonomous mass migration. Planned relocation is increasingly discussed as a policy response to prevent those perceived threats. Based on the analysis of three Environmental Change and Forced Migration Scenarios (EACH-FOR) case studies and existing literature on relocations in the context of development planning this contribution elaborates on the risks and pitfalls of planned relocation for the livelihoods of those subject to resettlement. Subsequently the question is raised as to how people can be protected from the shortfalls of relocation. Human rights-based approaches are recommended and discussed.

Keywords Human rights • Planned relocation • Livelihood risks • Viet Nam • Mozambique • Inner Mongolia

8.1 Introduction

Natural disasters and slow onset degradation due to climate and environmental change often cause sudden displacement and may perpetuate massive uncontrolled autonomous migration away from destroyed and degraded homesteads. Both threats have been identified in all Intergovernmental Panel on Climate Change (IPCC) reports as a major challenge of climate change and as a consequence of inaction in mitigation and adaptation efforts. In 2006 the Stern review on *The economics of climate change* accepted the seemingly unavoidable and remarked that ‘in some cases the only effective adaptation response will be to migrate to higher land or safer areas with greater access to food and water’ and requested the respective United Nations (UN) agencies and the International Organisation for

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Migration (IOM) to ‘take on expanded roles for resettlement¹ [...] given the permanent nature of such migration in response to climate change’, thus preventing unorganised mass movements (Stern 2006, p. 566). In 2007 Frank Biermann and Ingrid Boas made planned relocation the corner stone of their proposal for a climate refugee regime (Biermann and Boas 2007). In 2009 the UN special rapporteur on the right to adequate housing, Raquel Rolnik, submitted her report on climate change and housing to the Human Rights Council (HRC), which equally elaborates on climate change-related relocation (HRC 2009b, paras. 23, 33, 55–57, 75). In 2010 the idea of planned relocation finally found its way into United Nations Framework Convention on Climate Change (UNFCCC) negotiations in Cancun. Thus, the Ad Hoc Working Group on Long-term Cooperative Action under the Convention (AWG-LCA) encouraged member states in its concluding document to undertake:

Measures to enhance understanding, coordination and cooperation with regard to climate change induced displacement, migration and planned relocation, where appropriate, at national, regional and international levels (UNFCCC 2011, para. 14[f]).

Planned relocation, however, inherits its own threats. The idea of removing people from ‘high risk zones’ to places that do not face those risks, includes consideration of the availability of essential natural resources, the stability of the environmental conditions and the reliability of ecosystem services. In its most technical mode it can take the form of searching for environmentally healthy locations with the help of geographic information systems as carried out, for example, for the settlements of Syunik marz (Armenia) ‘to move people from areas which have bad conditions to the areas which have better ecological conditions’ (Muradyan 2011, p. 4). It potentially reduces the risk or vulnerability analysis to the dimension of natural capital, and hopes to solve the problem by changing this particular condition, for instance proneness to flooding or land slides. Such an approach—at least in its simplistic version—is bound to fail, because moving people from A to B involves change not only in particular environmental conditions but also in all other conditions which determine the livelihoods of those subject to relocation. Though global warming might challenge the current living conditions of an affected population, relocation as a response measure will do so as well. It will also introduce major changes that affect people’s livelihoods, such as entitled access to natural resources, value of skills, labour demand, and so on. Those changes often lands people into desperate situations, which raises the question what will be worse for them—climate change or relocation.

¹ Stern uses the terms ‘resettlement’, ‘planned relocation’ and ‘relocation’ in a synonymous way in the meaning of a policy response of authorities in the context of environmental and climate change. They are used in the same way in this chapter. It should be noted, however, that the term ‘resettlement’ has, as the term ‘refugee’, a defined legal meaning under the UN Refugee Convention, which is the ‘selection and transfer of refugees from a State in which they have sought protection to a third State which has agreed to admit them—as refugees—with permanent residence status’ (UNHCR 2004, p. I/2). In this chapter this latter meaning is never used.

Though there are indeed some cases, for instance low lying islands suffering inundation from sea-level rise, where relocation is inevitable, it seems naïve to promote the idea of planned relocation without discussing and preparing against the great risks to human wellbeing. On the basis of three EACH-FOR case studies that focus on environment-related relocation this chapter elaborates on the shortfalls of those experiences with regard to the livelihoods of the resettlers, the institutional challenges, and climate change and environment-related aspects. The question is raised as to how the identified pitfalls can be avoided and the wellbeing of those subject to relocation be protected. The chapter then discusses the advantages of existing human rights-based approaches to planned relocation as well as the challenges in realising them.

8.2 Experiences with Environment-Related Relocation

All three examples of environment-related relocation are government-organised programmes. They face many of the problems which are already known from resettlement measures attached to large-scale infrastructure projects, so-called development-based evictions (cf. Bennett and McDowell 2012; Cernea and McDowell 2000; Cernea 1997; McDowell 1996). Those comprise a number of risks to the viability of livelihoods of the resettlers, which are frequently related to institutional challenges. The uncertainties regarding future climatic and environmental change additionally complicate the task of relocation in the context of climatic and environmental threats to lives and livelihoods. After presenting the three cases of Mozambique, Inner Mongolia (China), and Viet Nam, the challenges will be summarised. Planned relocation is thereby regarded to have been unsuccessful if people experience a significant deterioration in their living conditions and human agency, if there is a high degree of return migration from the resettlement sites, or if the target population refuses to move to the new sites at all. Moreover, it is regarded to be ineffective in its environmental dimension if the environmental justification of relocation turns out to be wrong or if it leads to grave environmental degradation.

8.2.1 *The Case of the Zambezi Relocations in Mozambique*

Mozambique frequently suffers extreme weather events caused by El Niño (droughts in the interior due to precipitation below normal) and La Niña (floods mainly along the coastal region due to precipitation above normal) (Ministry for the Coordination of Environmental Affairs [MICOA] 2007, p. 10, 15, 19). Central Mozambique thus has a great share in all kinds of related disasters that affect Mozambique on the national scale (44 % of floods, 40 % of cyclones, 44 % of droughts; Emergency Events Database [EM-DAT] 2011a, b). The Zambezi River, where the evaluations

of resettlement measures were carried out, runs through Central Mozambique and is one of its nine large international river basins, whose flooding behaviour depends on precipitation over Mozambique, but also on torrential rains in countries situated upstream and their related water discharges from dams.

During the first decade of the new millennium the Zambezi suffered three major floods, the worst one in 2001 with 113 people killed, 220,000 displaced, and 554,000 affected. In April 2001 the Government of Mozambique thus announced the resettlement of 39,000 families within Tete province (Panafrikan News Agency 2001). But the resettlements were not well accepted by the supposed beneficiaries (Stal 2009, p. 21). The 2007 flood then affected 108,000 people, and caused 110,000 displaced and 50,000 evacuees (Stal 2009, p. 5). The subsequently approved *Estratégia de Reassentamento e Reconstrução* of April 2007 planned to resettle 30,000 families in the provinces of Tete, Zambézia, Manica and Sofala (ECHON Consultants 2008, p. 11). In 2007, indeed, a total of 52 so-called resettlement centres (in contrast to temporary accommodation centres) had been set up (Stal 2011, p. 137). The programme was extended after the 2008 flood with its 80,000 displaced to relocate about an additional 29,000 families, bringing the total to about 98,000 families.

The following brief summary of those governmental efforts is based on three assessments of the resettlement measures. These comprise the field study conducted by Stal (2009), which covered a total of 13 resettlement centres located in the districts of Chinde (Zambézia Province), Caia (Sofala Province), and Mutarara (Tete Province); an evaluation of the Mutarara case by Oxfam (2008); and an evaluation of relocation measures in Marromeu (Sofala Province) by ECHON Consultants (2008) on behalf of Oxfam. Chinde and Marromeu districts border on the Indian Ocean, while the others lie upstream. The relocation efforts along the Zambezi River thereby form part of a nation-wide effort to relocate people from flood prone areas, comprising all provinces that had been identified as high risk zones in Mozambique's National Adaptation Programme for Action (NAPA) of 2007 (compare MICOA 2007, p. 22; ECHON Consultants 2008, p. 13). Official criteria for all three phases of the relocation scheme included safety from floods (elevations high enough to escape the flood levels of 2001 and 2007), proximity to fertile land and existing health services, schools and markets (Stal 2011, p. 136).

During all three iterations of the relocation scheme, however, the resettlement centres suffered from high return migration or from deprivation of the resettlers respectively. One of the main reasons for the failure of the 2001 relocations, it was assumed, was that the provision of land alone had not been a strong enough incentive for people to stay (Stal 2011, p. 138). Thus, the new programmes offered additional incentives in the form of modern housing and service infrastructure such as schools, sanitation units and access to clean water. The houses were built out of burned bricks instead of traditional building materials such as reed, straw, branches and bamboo, and beneficiaries participated in the construction of the houses (Stal 2009, p. 22f). Though to a lesser extent than previously, for a variety of reasons these settlements were also not well accepted.

Generally, the implementation of the promised infrastructure lagged behind. By the end of 2008 only 16 (all in Zambezia Province) of about 90 planned schools

and none of the planned health centres had been realised (ECHON Consultants 2008, p. 13). Performance with regard to wells was much better (134 of 148), but at least for the Mutarara case it was confirmed that many of them soon dried up and became useless (Oxfam 2008, p. 33). Severe aridity due to lack of access to water is also reported by Stal (2009, p. 21) to have been a problem.

Despite objectives to the contrary, resettlement areas were mainly characterised by arid and semi-arid soils, and there was insufficient precipitation or water for irrigation for farming. Moreover, the distances between the new habitats and the former plots (machambas) in the low-lying fertile areas were often too great to commute on a daily basis. In Mutarara distances of more than 30 km were found, and 10–15 km was common. In 55 % of the cases the distance between settlements and machambas was more than one hour (one way). Only 16 % were located less than 30 min away from their plots, and had thus the possibility to continue their livelihoods as before (Oxfam 2008, p. 60).

There was also rarely an alternative source of income to agriculture available. As a consequence of this lack of livelihood opportunities people often remained dependent on governmental and international aid (Stal 2009, p. 27). Some migrated to nearby cities to find labour, often without success, and returned afterward. In many other households the young adults returned to work on the machambas and only came back on a circular basis. The old and the children stayed behind, which perpetuates family fragmentation.

As the livelihoods of the resettlers became disrupted, without convincing alternatives return migration was a major phenomenon. The main declared reason for leaving the new settlements thereby have been the Machamba (62.3 %), the second most important was the drying-up of wells (10.4 %), and the third was the attachment of people to their land (9.1 %) (Oxfam 2008, p. 33). These figures only reflect the Mutarara situation, but similar arguments are raised for the other districts (Stal 2009, p. 25).

Land conflicts and the question of land tenure were other reasons for return migration (Stal 2009, p. 23). Conflicts arose because the newly designated plots were not firmly marked or documented, so that some of the resettled households expanded at others' expense or did not respect the customary land tenure of the original residents (ECHON Consultants 2008, p. 25). Finally, the question of land tenure cast clouds over the initiative as a whole. There were rumours among resettlers of Mutarara district that it was not natural disasters or climate change that caused the resettlement programmes, but agricultural investment for agrofuel plantations (Oxfam 2008, p. 11).

Two of the evaluations explicitly claim that many of these problems have arisen because of the government's top-down approach—a failure to consult with administrative sub-levels as well as with the affected population. Neither was included properly in planning or decision-making (ECHON Consultants 2008, p. 23; Oxfam 2008, p. 8). Civil society organisations were also barely consulted. Local knowledge about needs of the resettlers and conditions of the old and new settlement sites was therefore dismissed and the plans became insensitive to local contexts.

The design of the resettlement schemes of 2007 and 2008 also displayed little environmental sustainability. The digging of clay for the bricks left back holes

that became basins for brackish water and thus breeding sites for mosquitoes and other vectors of diseases. Moreover, the bricks were burned with firewood taken from the sparse forests of the resettlement sites (Stal 2009, p. 24), which perpetuated the degradation of the already arid environment. The drying of wells also indicates the lack of environmental planning. Above all, a climate change assessment for Mozambique, which was carried out after the resettlement programmes had already been initiated, arrived at the conclusion that evaporation will increase considerably in Mozambique (Instituto Nacional de Gestão de Calamidades [INGC] 2009). The Zambezi river valley is therefore expected to suffer a decline in soil moisture and fertility. A reduction of 15 % of Zambezi flows is predicted due to upstream rainfall decreases in Zimbabwe and Zambia and, accordingly, an increase in salt water intrusion into the river. The overall Central region is said to be most likely to be hit by droughts. In other words, the resettling of the population to locations more distant from the river, at semi-arid areas at higher latitudes, might have been the wrong decision even with regard to future risks of flooding.

8.2.2 The Case of Relocation from the Degrading Environment in Inner Mongolia

Relocation programmes in Inner Mongolia (China) were launched for a different type of water stress, namely water scarcity. China is well known for the large-scale evictions it takes as a loss for the construction of dams and water reservoirs for hydro power plants, but evictions for the purpose of environmental recovery and the establishment of natural reserves constitute the second largest group of people being relocated. The so-called ‘environmental resettlement’ undertaken in 2006 already evicted more than 700,000 persons (Rogers and Wang 2006, p. 44).

China’s policy of relocation from degrading areas in combination with poverty alleviation programmes is related to and in line with the World Bank’s ‘resettlement with development’ framework (Rogers and Wang 2006, p. 42). Inner Mongolia, which experiences declining precipitation, ongoing desertification and severe sand storms, suffered major droughts in 1989, 2001 and 2005 (Zhang 2009, p. 8f). About 60 % of its rangeland is heavily degraded. The dominant narrative amongst officials is that degradation is mainly caused by overgrazing, and changing the livelihoods of pastoralists is, accordingly, the challenge that lies ahead—despite the fact that the livestock population has already been reduced considerably by natural disasters, emergency selling, rural–urban migration and strict stocking rate regulations (Zhang 2009, p. 10, 23). Inner Mongolia is thus one of the main target areas of resettlement programmes for environmental recovery. Most of the resettlements are of large-scale character and form part of a broader process of intended urbanisation. They are embedded into the (rural) development strategy for the western provinces, adopted in 2000, to close the development gap between the coastal and inland regions of China. There is, however, some evidence that actions in Inner Mongolia to prevent desertification and sand storms were also

meant to improve the air quality of Beijing, in particular with regard to Beijing's 'Green Olympics' that took place in 2008 (Li et al. 2004).

In Xilingol prefecture nearly 13,000 households and more than 56,500 people had been resettled, of which the majority (9,227 households and 41,081 persons) were moved because of ecological reasons (Zhang 2009, p. 3). The EACH-FOR study investigated in more detail the relocations of pastoralists to the milk cow village of Qiha that was carried out in 2001 and the city of Erenhot in 2006. Both locations have much better communication and transport facilities and Erenhot has also much better social infrastructure than the remote villages where the pastoralists came from. The way of organising these two resettlements was similar. Pastoralist households enter—on voluntary basis ideally—into a contract with the government to accept a year round grazing ban on their rangeland for several years (typically five). Those who moved to the designated areas were provided with several social amenities and livelihood support. Nevertheless results have been mixed. In total only about 35 % of the target population resettled (Zhang 2009, p. 6).

In Qiha each household got a house and a shed, subsidised loans to purchase milk cows, and free silage for more than one year to feed the cows. However, since 2004 many households moved back because they could not sustain the milk cow business due to dropping milk prices. Of the initial 158 households only 94 stayed in Qiha, of which finally only 39 renewed their grazing ban contract after five years. In Erenhot city pastoralists were expected to enter new forms of livelihood. They were provided with housing, professional training, job seeking assistance, support to start their own businesses, exemption from school fees for their children and other subsidies. Of the planned 196 households only 30 moved into the designated resettlement districts of Erenhot. Another 96 households moved into small apartments in other parts of Erenhot, the main reason being presumably the lower costs and thus the greater gain out of the governmental subsidy for shelter.

The high rate of return migration in both cases appears to have been caused by resettlers' dissatisfaction with their new life. Instead of improving their income and living standard people could not find enough employment opportunities, or markets (milk prices) were failing. They thus became dependent on government subsidies paid according to the amount of land under the grazing ban. Some of the poorer pastoralists used the resettlement programme as a short-term solution to their economic problems, but facing insufficient income opportunities they turned back home as soon as the grazing grounds improved again, or maintained activities at the place of origin as a second pillar of their livelihood. Another reason for return migration seems to be an increase in meat prices, which made the former livelihood attractive again (Rogers and Wang 2006; Zhang 2009, p. 13, 19, 22–24). With respect to the environmental dimension, the success of the projects was equally limited. Those moving did not necessarily sell all their animals, but contracted them to relatives and friends. Moreover, the land under the grazing ban contract was—in the absence of tenants and fences—often used as grazing ground by neighbouring families (Zhang 2009, p. 23). The objective to help the regeneration of the environment by reducing the livestock population was thus undermined.

8.2.3 The Case of Relocations at the Mekong Delta in Viet Nam

This third case is illustrative of the particular problems of housing schemes. In 2002 the government of Viet Nam decided to undertake major 'residential cluster/dyke construction' in the Mekong Delta as part of its disaster management (Nguyen and Trung 2007, p. 16). Locations called 'residential clusters' were provided for resettlement of people prone to river bank collapse. This relocation policy forms part of a broader programme, 'Living with Floods', that addresses a number of environmental challenges, but also the 'stabilisation' of nomadic households and floating fishing villages, the construction of dams, roads and industrial parks, and even national defence objectives (Dun 2009, p. 11). The relocation component of the policy also fits into Viet Nam's new climate change strategy, in which 'withdrawal' figures as a major strategy to deal with the expected rising flood levels in the delta due to sea level rise (Ministry of Natural Resources and Environment [MONRE] 2010, p. 16, 62–65, 71). In An Giang province, considered in the EACH-FOR study on Viet Nam, a total of 19,690 households are supposed to be relocated by 2020 to the residential clusters, which are said to be in 1–2 km distance from former homesteads (Dun 2009, p. 15). Priority was placed on households facing the threat of river bank erosion (Partnerships for Disaster Reduction-South East Asia 2004, p. 2).

Those river banks are inhabited mainly by very marginalised and impoverished segments of the population. The government programme, however, calls for considerable investments by those people. The settlement scheme offers five-year interest-free loans to acquire plots and rebuild proper houses, but lacking financial and reliable assets was a main challenge for the target groups. Often landless, their main source of income was day-to-day jobs offered in the wealthier neighbourhoods and by nearby landowners. To move away to the residential clusters meant risking the loss of those job opportunities and relevant social networks, and at the same time being obliged to pay debt services (Dun 2009, p. 16). Moreover, from the interviews with the supposed beneficiaries it became apparent that the side-by-side style of plot demarcation does not fit with their traditional rural way of living. Despite the semi-urban character of resettlement clusters, access to crucial social infrastructure such as water treatment facilities, health services, and schools is said to be lacking. Thus, despite the everyday threat of landslides, many decided to stay.

8.3 The Inherent Challenges of Relocation Measures

The livelihood challenges traced in the EACH-FOR studies mirror to a large extent the livelihood risks identified by Cernea for development-based evictions, namely landlessness, joblessness, homelessness, marginalisation, food insecurity, morbidity and mortality, and social disarticulation (Cernea 1997, pp. 1572–1576). They are frequently related to a number of institutional failures such as the lack

of participatory processes, discrimination, mismanagement and corruption, lack of adequate compensation, use of force and political abuse. The risks associated with climate change and environment-related resettlements can thus be understood as both livelihood challenges and institutional challenges, with additional risks posed by environmental challenges. Supported by insights from other studies these challenges are elaborated in the subsequent sections.

8.3.1 Livelihood Challenges

Land loss, which is a common result of relocation, was a consequence of resettlement in all three case studies. It affects in particular rural populations where the land is also the source of livelihood. Land loss can take various forms: above all, a drop in the share of households that hold land, but also a decrease in the size of the landholdings, and a decrease in the quality of soil. For Mozambique it is confirmed that people subject to relocation suffered a decreasing quality of soil as plots at the destinations were arid and semi-arid in contrast to the fertile soils in the river valley. Moreover, the relocated frequently faced insecurity of tenure, when plots were not demarcated properly,² leading to quarrels and conflicts with neighbours over who is entitled to use and inhabit a piece of land. From the Viet Nam study it can be concluded that land was equally a matter of concern. The semi-urban character of the residential clusters compared to the dispersed way of rural living along the fragile but fertile river banks implies a loss of accessible land in terms of size as well as of quality. To acquire a plot resulted to be too costly compared to the—mainly informal but cost-free—homesteads along the river. The land issue thus turned out in both cases to be a major reason why people left the new settlements again or decided not to move there in the first place. In the case of Inner Mongolia the—temporary—deprivation of land for livelihood use was actually the major objective of the ‘environmental resettlement’.

A feature of land loss that did not show up in the case studies but which is known to be of major concern is the loss of communal land such as loss of common grazing grounds, forest lands and water bodies, which provide for additional fodder and watering places, wild fruit, hunting and fishing grounds, medicinal plants, firewood and construction material. To lose access to such land hits the community as a whole and particularly those who are very poor and have few assets of their own. In their case such land provides significant shares of household income and thus protection from further impoverishment (Kibreab 2000, p. 313).

² ‘Security of tenure’ means being entitled to use a defined piece of land or space and not to be evicted from that land easily. This might mean to own that land by statutory title or deed, to use the land on a contractual basis, or to be entitled to the use of land by respected customary law. ‘Insecurity of tenure’ means that even established use and inhabitation of land is not protected and can be ended easily by a third party.

The pressure on community land can, however, also be a matter of concern in the host communities. This challenge did show up in the case of Mozambique, where encroachment of newcomers onto local community land fuelled conflicts. The reasons for their behaviour might have been disrespect for the host communities or equally insufficient size of the assigned plots.

If access to land is lost it increases the number of persons becoming dependent on alternatives to agricultural income. Even though many relocation programmes are designed in a way that creates short-term employment by engaging the target groups in construction work (as in Mozambique), this type of job creation has little sustainability, because it terminates as soon as the project measure comes to an end. In Mozambique some resettlers thus even became dependent on food aid. The case of Inner Mongolia showed, moreover, that even if a government makes efforts to support the establishment of new livelihoods this might not necessarily result in the expected outcomes. In Erenhot interviewees complained about the lack of jobs and the inadequacy of the skills they have. In Qiha obviously only about a quarter of the resettled households (39 of 158) could successfully establish a new livelihood and thus prolonged their grazing ban contract with the government. Both problems were related to the conditions of the labour and milk markets, respectively.

The question of land and income is closely linked to concerns for food security and, related to it, access to water. If the allocated land is arid and of low quality, then it is difficult to resume food production for consumption and sale. If there is no secure and sufficient access to water, as was often the case in Mozambique, the poor quality of the land cannot be compensated for by irrigation. If people are thus deprived of their means of subsistence and income, and have no alternative job opportunities, they face high risks of becoming food aid dependent. In Mozambique this threat hit in particular those households that had been relocated at a distance far from their former livelihoods. In the case of Viet Nam the fear of losing job opportunities at the current homestead even appeared to be a major obstacle to the relocation programme as a whole, despite the (presumed but not verified) relative proximity of the new to the old places of living. In the case of failed livelihood reconstruction in Inner Mongolia the question arises whether the incentive system of subsidies for the grazing ban, the silage and housing could work as an adequate long-term substitute for sustainable livelihoods if those cannot be integrated into commodity and labour markets respectively. The high return migration rates indicate that such was not the case.

The question of land is equally linked to the challenge of homelessness. The latter often occurs despite the provision of housing schemes for the relocated. As was the case in Viet Nam, relocation schemes are often combined with loan schemes for the purchase of plots or for the construction of a house. Though such loans are often provided on favourable conditions, it is often the case that not all households which have to be relocated are provided equally with such loans, or that not all of them—as in Viet Nam—are able to take out a loan, because they cannot comply with the ensuing obligations no matter how favourable the conditions might be. Such schemes are particularly problematic if relocation is coerced and households do not have the choice to refuse such loans. Complaints about loss

of income due to coerced housing purchases have also been found in other relocation experiences in Inner Mongolia (Rogers and Wang 2006, p. 58). If households therefore refuse to undertake relocation they face the risk of being forced one day into ‘temporary shelters’ if governments want to vacate a certain area (Cernea 1997, p. 1573). This might happen for developmental or for environmental reasons, a distinction which is not always clear-cut as the respective overarching resettlement programmes of the Vietnamese and Chinese government indicate.

Another major threat is the loss of human capital. In the case of Erenhot formerly useful skills were rendered useless and even newly acquired human capital could not be put to good use. Thus, neither old nor new forms of livelihood activities could be resumed. The lack of proper investment into the new settlements by the authorities can also contribute to the loss of human capital. The authorities in Mozambique, for instance, lagged considerably behind in the construction of schools and health centres, implying long-term consequences for human capital. Schooling is interrupted and children lose their access to education; likewise the often enhanced need for medical attention in relocation situations is difficult to meet. The lack of health services contributes to increased morbidity and mortality typical for relocation processes (Cernea 1997, p. 1574).

In addition to the described losses of natural, economic and human capital, the resettled communities may face the loss of social capital and the threat of social disarticulation. In the case of Mozambique, for instance, the seasonal migration to distant machambas might perpetuate family fragmentation. The importance of this aspect might be equally illustrated by the case of Viet Nam. Here the fear of losing access to social networks—and thus access to jobs—prevented many of the targeted households from participating in the measure at all. In case of forced displacements the threat is even greater that interpersonal ties, kinship relations and patterns of social organisation will become dismantled, because organisers often do not take into account that social entities should be moved as a unit (Cernea 1997, p. 1575).

8.3.2 Institutional and Procedural Challenges

One of the major threats arising from the role of institutions in relocation processes is the use of force by the authorities. Use of force often entails unnecessary destruction of possessions, sexual harassment of women, violence against minority groups, disruption of families and communities, all of which lead to physical and psychological injuries. It is often explicitly or implicitly endorsed by the authorities with the aim of hastening the resettlement process (Cernea 1997, p. 1573). Fortunately, in none of the above case studies was the use of force an issue, but ‘involuntary resettlement’—in the sense that government rendered life in places of origin impossible—was a feature experienced in ‘ecological resettlement’ within Inner Mongolia (Rogers and Wang 2006, p. 48).

Related to the risks of landlessness, joblessness and homelessness is the problem of inadequate compensation for land, equipment and investments that cannot be

moved or that are rendered useless for income and for shelter. The question of compensation was not directly addressed in the above case studies. An answer can be found, however, in the method of the applied land allocation and housing schemes. In the case of Mozambique and Viet Nam the option for improved housing on the one hand did not correspond with adequate compensation of the abandoned land on the other. Another common problem is that even when compensation was integrated more broadly into relocation procedures it was usually based on the assessed value of the loss rather than on the replacement value, posing further hardship on the evicted to re-establish their livelihoods (Cernea 1997, p. 1573). Finally, in the case of community land usually none or only very weak provisions for compensation exist, and above all not for secondary user rights (Wily 2008, p. 47).

Discriminatory practices by responsible institutions, particularly against women, indigenous minorities and other vulnerable groups, are another major challenge. This can be a cross-cutting issue regarding access to compensation or exposure to violent encroachments. Or it can simply take the form of discourses that shape policies to the disadvantage of certain groups. In Inner Mongolia the dominant narrative amongst officials that degradation is mainly caused by overgrazing, despite the fact that livestock numbers have considerably decreased, perpetuated policies that, it could be argued, discriminate against pastoralist livelihoods (Zhang 2009, p. 19, 23). The case of the Zambezi relocations raises the question whether improved cross-border water management and construction of small dams would have been the more sustainable option.

Discrimination against the poor and marginalised is, however, not only a problem of (rapidly) developing countries. African-American residents on the banks of the Mississippi River in New Orleans faced similar problems during and after Hurricane Katrina when it came to being served properly by their local and national governments. Most claim that the speed of the evacuation efforts was lower compared to that for other groups and perceived this as an act of racism (Gemenne 2010, p. 32).³ Moreover, whilst their settlements were not fully rebuilt in the reconstruction phase, for the stated reason that those areas were then supposed to serve as floodplain in case of future flood events, the areas where their white middle-class neighbours resided experienced improved protection. The end result was increased urban stratification (Elliott and Pais 2006). The likelihood that authorities will prefer relocation to more expensive in situ adaptation options such as flood protection or a comprehensive water management system is particularly high in the case of socially vulnerable groups that have no voice to insist on in situ alternatives. Relocation thus might turn out to be a kind of 'second-class adaptation' for marginalised segments of a population. Finally, financial corruption and mismanagement regarding funding for relocation, for instance for compensation, land purchase or other necessary investments, is also often linked to discriminatory practices (Kibreab 2000) and is another institutional problem that can curtail successful relocation (cf. Boege in this volume).

³ Authorities claim that this was due to lack of preparation and coordination (Gemenne 2010, p. 32), but there might be a close connection between those two positions.

The major institutional weakness of all cases studied was a lack of consultation of local communities and stakeholders due to the use of top-down approaches. The lack of consultation has been identified explicitly as a major reason why relocation schemes were not tailored appropriately to the needs of the relocated population in the case of Mozambique (ECHON Consultants 2008, p. 23; Oxfam 2008, p. 8). In Mozambique even administrative sub-levels were not involved in the planning and locally engaged nongovernmental organisations (NGO) had not been consulted, though of the three case studies Mozambique is probably the country with the most active NGO sector.

In addition to the manifold pitfalls that often result from poor and careless planning and implementation there exists the threat of political abuse of relocation measures. Alleged concern for vulnerable groups or the environment that legitimise eviction processes might be a cover for other motives. Thus, the engagement in combating sand storms in Inner Mongolia seems to have been linked, at least partially, to the interest in the 'Green Olympics'. Relocations from river banks in Viet Nam might just as easily be carried out for the purpose of vacating water ways or for some national security concerns. Climate change or disaster management as a 'public interest' might even be abused to legitimise resettlements for political calculations favouring a particular ethnic or economic group. Rumours that the evacuation of the Zambezi valley might serve the purpose of large-scale investment into agrofuel plantations, and not of flood protection, would be such a case if the rumours turned out to be true. Resettlements can even be misused to manipulate power relations in constituencies as was done by Siad Barre, once President of the Somali Democratic Republic (1969–1991), to broaden his power base (Nannini 1994).

8.3.3 Climate Change and Environment Related Challenges of Relocation

It is well known that relocation often entails negative repercussions for the environment of the destination. In Mozambique the construction of the resettlement camps led to further degradation of the arid environment, because the sparse local woods had been used for brick burning. In the case of Inner Mongolia, where environmental regeneration had even been the main objective for the relocation measure, the success of environmental recovery at the places of origin can be assumed to have been limited, because grazing areas were not fenced and were being used by other pastoralists. Such consequences could be avoided by proper environmental impact assessments, better planning of the environmental components and their reconciliation with livelihood needs. In the case of Mozambique a combined social and environmental impact assessment would have revealed in advance that water resources at the new sites were insufficient to meet the demand for water to secure food production. The particular challenge with regard to planned relocation in the context of climate change, however, concerns the

uncertainties of projections and the differences we might face between current weather anomalies and those in 30 years and more. Thus, relocations from disaster prone areas are usually a response to current disasters. The Zambezi relocations of 2001, 2007 and 2008, for instance, were carried out in response to the severe and frequent floodings of the past decade and proved to be unsustainable with regard to projections which have been carried out since. Such projections as well as proper hydrological assessments require, however, scientific-technological knowledge and collaboration with local knowledge.

In sum, the identified threats to livelihoods, the possible institutional pitfalls and the uncertainties regarding climate and environmental change show that there are obviously many risks involved in planned relocation as an adaptation to climate change. With regard to climate policies it should additionally be mentioned that relocation under the UNFCCC will also be at stake in many programmes of mitigation and in situ adaptation. The latter often entail development-like types of measures such as dam construction and energy generation from renewable energy resources. In addition, re- and afforestation to extend carbon sinks or to protect catchment areas will often involve forced relocation (see e.g., McDowell 2011; Schade 2012).

8.4 Human Rights as Safeguards to Protect Target Groups of Relocation

Experts concerned with development-related relocations already in the second half of the 1990s developed frameworks for organising relocation in a manner more beneficial to those resettled. Their analysis and suggestions are based on livelihood research as a methodological approach, which emphasises the micro perspective. Michael Cernea's Impoverishment Risks and Reconstruction Model thereby converts the identified livelihood risks into objectives of resettlement planning. This means that relocation should be combined with job creation, planning for appropriate housing, improved social infrastructure, and so on, to convert risks into opportunities. Genuine participatory planning and involvement of resettlers are emphasised as a crucial instrument to achieve sustainable outcomes as well as accompanying economic programmes to re-establish livelihoods (Cernea 1997, p. 1080). Today this approach is brought forward again with respect to the relocation challenges in the context of climate change, enriched with reference to the Guiding Principles on Internal Displacement (GPID), which were developed at the turn of the millennium (Sherbinin et al. 2011).

In all of the discussed cases human rights-based approaches such as the GPID can, in my opinion, provide added value in the protection of those who are subject to relocation. The GPID deals with the human challenges of displacement, and subsequent resettlement or repatriation, in the context of war and natural disasters. It was developed by the Representative of the then-Secretary General on Internally Displaced Persons (IDP), Francis Deng, on behalf of the United Nations

(UN) Human Rights Commission (HRC) and the UN General Assembly (UNGA) (Organisation for the Coordination of Humanitarian Affairs [OCHA] 2001). The UN's Inter-Agency Standing Committee (IASC) subsequently encouraged its members—UN agencies, IOM, Red Cross and Red Crescent Societies, and other humanitarian NGOs—to promote their application in the field. Due to its endorsement by high ranking UN bodies it enjoys great legitimacy. Taking the GPID as a foundation, the successor to Deng, Walter Kälin, drafted the IASC Operational Guidelines on Human Rights and Natural Disasters, which were endorsed and published by the IASC in 2006 (IASC 2006). Both guidelines are, however, designed more for disaster response and less for precautionary planned relocation.

In contrast, in 2007 the then-Special Rapporteur on the Right to Adequate Housing, Miloon Kothari, brought out the Basic Principles and Guidelines on Development-based Evictions and Displacement (hereafter 'Kothari Guidelines'; HRC 2007), which address the particular challenge of development-related resettlements. They thus consider aspects that are of special relevance to the type of non-emergency resettlement at stake in cases of preventive relocation as adaptation to climate change or as an environmental protection measure. They are, moreover, particularly applicable to relocations in the context of mitigation and in situ adaptation measures under the UNFCCC, which can be regarded as a sub-type of development projects. The Kothari Guidelines were, however, published as an annex to the rapporteur's annual report (Golay et al. 2012, p. 304). In comparison to the guidelines endorsed by the UNGA, the HRC, or the IASC, the Kothari Guidelines thus enjoy less official legitimacy and recognition by state parties. The impact of UN special procedures, to which the work of special rapporteurs belongs, nevertheless should not be underestimated.

In 2009 the now-acting rapporteur on the right to housing, Raquel Rolnik, in her report on climate change and housing, set out a number of recommendations on relocation as an adaptation measure that build upon the established guidelines noted above and on the work of her predecessor (HRC 2009b, paras. 55–61). All of those guidelines are voluntary in nature, but are based on binding international human rights and humanitarian law. The following will elaborate on the utility of rights-based guidelines to function as safeguards to protect potential resttlers against the identified livelihood risks and to tackle institutional shortcomings. Subsequently the prospects of justiciability of human rights such guidelines are based on will be discussed.

8.4.1 Human Rights as International Law Framework and Operational Guidance

Human rights are covered in binding international law which defines the rights of individuals and special groups as well as the respective state obligations to respect, protect and fulfil those rights. The normative focus of human rights on the individual level and certain vulnerable groups such as women and indigenous people is appropriate to the livelihood perspective taken by relocation experts and is argued

for in this chapter. The two main human rights treaties, the International Covenant on Economic, Social and Cultural Rights (ICESCR) and the International Covenant on Civil and Political Rights (ICCPR), refer to substantive needs such as access to food and water as well as to procedural needs such as genuine participation, and thus have great potential to function as safeguards against the livelihood risks and institutional challenges identified in this and other chapters in this volume. The interpretation of human rights by human rights treaty bodies, moreover, delivers important operational guidance with respect to how human rights, their fulfilment or violation respectively, can be disaggregated and thus monitored and implemented.

The above mentioned rights-based guidelines share the goal of protecting the rights and livelihoods of vulnerable groups. All of them highlight the differential nature of the impacts of relocation, defeat discriminatory practices, are gender sensitive, set out criteria for compensation and remedies, and are—with regard to relocation—sequenced into three phases: before, during, and after an eviction. Apart from substantive rights to adequate food, water, shelter, and so on, all of them also strongly highlight the importance of participation and procedural rights in carrying out resettlements, including access to legal remedies. To enable the provision of basic assets and participation within the human rights frame turns those needs into legal entitlements (cf. Schade in this volume). Such legal entitlements become most effective, however, if they are enshrined in national law.

8.4.2 Economic and Social Rights as Safeguards to Livelihood Risks

Protecting people's livelihoods and life chances is related to securing the satisfaction of their basic needs for certain resources, goods and services. The rights to such substantive matters had been sidelined for a long period because they were said to be difficult to define and operationalise in a manner consistent with the great variety of existing national welfare regimes. Within the realm of substantive ESC-rights, however, the '4A' scheme developed by the first special rapporteur on the right to education revolutionised the interpretative work of the Committee on ESC-rights (CESCR), which subsequently applied the scheme in its general comments (GC) amongst others to the right to education (1999), the right to food (1999), and the right to water (2003) (Golay et al. 2012, p. 314, n. 14). The '4A' is the short name for availability, accessibility, acceptability and adaptability. In the case of the right to food this is interpreted as *availability* of food by means of subsistence or functioning market systems, economic and physical *accessibility*, and consumer and cultural *acceptability*. Adaptability, which in the context of education means the qualitative enhancement of educational systems, is converted into the—qualitative—requirement for food *safety* (CESCR 1999, GC no. 12). The clarification of the meaning of rights thereby enables the monitoring of those rights, and supports the official recognition of derived rights such as the right to water and sanitation by the UNGA and the HRC (Golay et al. 2012, p. 300, 302).

The distinctions among the various dimensions—the ‘4A’—of substantive human rights supports the livelihood perspective. ESC-rights thus become an applicable tool to assess the dimensions of availability and accessibility that are so crucial to livelihood research and moreover, enriches it with cultural dimensions. Indeed, the above guidelines all take into account ESC-rights such as the right to food, water, health and housing. As shown in Fig. 8.1 the application of the ‘4A’ scheme is, for example, ideally applied by the IASC Operational Guidelines (IASC 2006, para. B.2.1.) to the provision of essential goods and services during an emergency situation, and is also contained in the definition of adequate housing in the Kothari Guidelines (HRC 2007, para. 55; see italics). The definition also expresses the interrelatedness of ESC-rights and resists a narrow interpretation of housing as providing four walls and a roof. The right to housing cannot be fulfilled without fulfilling the right to food, to water, and to health, or without security of tenure. By linking adequate housing to the maintenance of livelihoods it entails important entitlements that protect against the livelihood risks of landlessness, joblessness, marginalisation and certainly homelessness.

The added value of the Kothari Guidelines within the realm of ESC-rights for the purpose of relocation is that they emphasise in particular the right to security of tenure as a general condition to avoid evictions and to enable the re-establishment of livelihoods in case of relocations (paras. 25, 55), and that they detail at

<p><u>The ‘4A’ scheme for the provision of basic goods and services in emergency situations in the IASC Operational Guidelines</u></p> <p>During and after the emergency phase of the disaster, adequate food, water and sanitation, shelter, clothing, and essential health services should be provided to persons affected by natural disasters who are in need of these goods and services. Provision of goods and services should be without any discrimination of any kind as to race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth, age, disability or other status. Adequacy of these goods and services means that they are (i) available, (ii) accessible, (iii) acceptable, and (iv) adaptable: (i) Availability means that these goods and services are made available to the affected population in sufficient quantity and quality; (ii) Accessibility requires that these goods and services (a) are granted without discrimination to all in need, (b) are within safe reach and can be physically accessed by everyone, including vulnerable and marginalized groups, and (c) are known to the beneficiaries; (iii) Acceptability refers to the need to provide goods and services that are culturally appropriate and sensitive to gender and age; (iv) Adaptability requires that these goods and services be provided in ways flexible enough to adapt to the change of needs in the different phases of emergency relief, reconstruction and, in the case of displaced persons, return. During the immediate emergency phase, food, water and sanitation, shelter, clothing, and health services are considered adequate if they ensure survival to all in need of them. (IASC 2011, para. B.1.2)</p> <p><u>Criteria of adequate housing for relocation purposes in the Kothari Guidelines</u></p> <p>‘(a) security of tenure; (b) services, materials, facilities and infrastructure such as potable water, energy for cooking, heating and lighting, sanitation and washing facilities, means of food storage, refuse disposal, site drainage and emergency services, and access to natural and common resources, where appropriate; (c) <i>affordable</i> housing; (d) habitable housing providing inhabitants with adequate space, protection from cold, damp, heat, rain, wind or other threats to health, structural hazards and disease vectors, and ensuring the physical safety of occupants; (e) <i>accessibility</i> for disadvantaged groups; (f) access to employment options, health-care services, schools, childcare centres and other social facilities whether in urban or rural areas, and (g) <i>culturally appropriate</i> housing.’ (HRC 2007, para. 55).</p>

Fig. 8.1 The ‘4A’ scheme applied in the IASC and Kothari Guidelines

length the matter of appropriate compensation (paras. 60–63).⁴ They thus provide a basis on which to assess what has been lost and what is needed to re-establish livelihoods successfully, and indicate the state has a duty with regard to support and compensation. Additionally they emphasise that relocation sites should be as close as possible to the livelihoods of people (para. 43) to avoid unnecessary disruptions. The guidelines moreover claim that the ‘right to resettle’ is containing two meanings: The ‘right to resettlement’ if they become evicted or displaced, and a right to assisted return if return results to be possible or if new settlements are not consistent with international human rights standards (paras. 16, 23, 64–67).

Had such guidelines been seriously applied in the cases of the EACH-FOR studies they could have worked as safeguards for the protection of livelihoods. In the case of Mozambique the problem of distances to former or new sources of livelihoods, access to and availability of food, land and water, security of tenure, and so on, would have been anticipated and, ideally, avoided. Particularly relevant in this regard is the objective of resettling people close to their livelihoods to avoid disruptions from the beginning and to compensate for the lack of mobility that poor people often face. Similar arguments can be made with regard to Viet Nam, where the potential loss of access to income opportunities curtailed the whole scheme and where the criterion of affordability of housing was not considered properly. A significant point regarding climate change-related relocation is the right to assisted return. If the reasons given for relocation turn out not (or no longer) to be justified or to be to the disadvantage of the people, as was the case in Mozambique, it would be the responsibility of the government to support people in returning to their old machambas, for instance, by integrating into the planning in situ solutions for flood protection. The right to return might also be applicable if resettlements have been undertaken on false premises, for example, if it indeed were to turn out that protection from floods was only a means to vacate the valley for agricultural investment.

8.4.3 Procedural Rights as Safeguards Against Institutional Failure

In the realm of procedural rights CP-rights support the participatory dimension of deciding and planning resettlements. It is in particular the formula of the ‘free, prior and informed consent’ (FPIC) based on CP-rights and emphasised in the UN Declaration on the Rights of Indigenous Peoples (2006), that sets out the leading normative claim that the target population has to be substantially involved in deciding, planning, and implementing decisions that significantly affect the basis of their livelihoods. Such an approach for relocation as adaptation emphasises the human

⁴ Beyond considering the GPID they explicitly base themselves on existing Basic Principles and Guidelines on the Right to Remedy and Reparation for Victims of Gross Violations of International Human Rights Law and Serious Violations of Humanitarian Law and the Principles on Housing and Property Restitution for Refugees and Displaced Persons (HRC 2007, p. 15).

agency of those to be resettled. Further, all guidelines demand access to independent legal advice, complaint mechanisms and legal processes, which is equally important to resettlements as a consequence of mitigation measures and in situ adaptation. CP-rights thus particularly highlight the role of formal institutions in enabling participation and human agency, if necessary also against the intentions of authorities.

The GPID and IASC guidelines, as they have been conceptualised for disaster response and situations of displacement, thereby take the challenge of temporary or permanent relocation as a matter of urgency and place a certain emphasis on proper procedure to that aim. In this matter as well FPIC is, however, required to decide properly whether return or permanent relocation is the best solution, and would have been essential to the case of Mozambique. In contrast the Kothari Guidelines, designed for investment-based evictions, consider duly the phase prior to eviction to avoid life disrupting and unnecessary relocations from the outset. Thus, they clearly define how ‘exceptional circumstances’ that permit evictions have to be ‘fully justified’ (paras. 21, 40, 41); call for an “eviction-impact” assessment’ prior to the relocation and the assessment of alternatives (paras. 32, 33, 38); and provide detail on the procedures of planning including the right of those subject to relocation to propose and discuss their own alternatives to proposed relocation sites as well as to relocation as such (paras. 37, 38; Housing and Land Rights Network and Habitat International Coalition 2010, p. 8). These provisions, above all, protect against relocation as adaptation that is unnecessary or not the best option to sustain the livelihoods of the affected. They help to avoid relocation as a ‘second class’ adaptation or to serve hidden agendas. These would have been particularly relevant to the conditions of the EACH-FOR case studies of Viet Nam and Inner Mongolia where no urgency and thus no obstacles to long-term planning existed.

The EACH-FOR studies did not address the question of participation systematically. From the descriptions of the relocation schemes in Viet Nam and Inner Mongolia, and from the Oxfam evaluation in Mozambique, it can nevertheless be deduced that top-down approaches were the norm. All cases would indeed have profited from greater participation and consultation. Proper prior consultation of the target groups could have revealed in advance the obstacles in question and probably prevented the low rates of acceptance of the resettlement schemes. In the case of Mozambique, the resettlement centres located at great distances from livelihoods and social services would likely have been rejected already during the planning phase; in the case of Viet Nam it could have revealed that the attached loan scheme might not have been tailored appropriately to the level of poverty of the targeted groups, that the available plot size might have been too small to attract people who partly depend on subsistence farming and access to other natural resources, and that the residential clusters should be closer to existing livelihoods. In the case of Inner Mongolia it might have helped to challenge the problem analysis that legitimised the resettlements, namely, that overstocking causes desertification and thus that de-stocking and ending this form of livelihood is the only solution.

Having all the decisive information at hand, however, is a challenge for consultation and planning processes. In the case of Mozambique, for example, it might have been the possibility of functioning wells that drew people to accept certain locations initially. A proper hydrological assessment, however, would have

revealed that the wells would not work sustainably. In the case of Inner Mongolia an economic assessment might have shown in advance either that dairy farming is not a sustainable alternative, or what would be needed to make it one. The request for proper prior assessment by the Kothari Guidelines is of particular relevance with regard to climate change. Had the climate change projections for Mozambique been at hand in advance, the whole approach might have been questioned and much of the disruption to the livelihoods of the resettlers prevented.

8.4.4 Challenges of Human Rights Enforcement

Non-compliance with basic human rights standards, as for example in the case of the quality of some resettlement centres in Mozambique, and even more so the matter of giving false reasons to justify relocation, raises the question of enforcement of human rights. Disputes rage over whether international human rights are or should be enforceable legal rights. Legal experts on national law at times deny enforceability, and there are many objections of a political-philosophical nature (cf. Westra 2009, pp. 54–69; Sen 2005, 2012). Indeed, the application of all the above-mentioned guidelines in national laws and policies of UN member states is voluntary. There is, however, also an added value of human rights as legal and enforceable entitlements. Though the guidelines themselves are voluntary, the human rights they are based on are not since both covenants have been ratified by virtually all member states. Thus, individuals whose human rights have been violated and their advocates have the right to address the courts in these matters. If international human rights treaties are not implemented into national laws and constitutions, or if the national judicial system is too ineffective and/or corrupt, they can access regional human rights courts, which exist for Europe, Africa, and Latin America. If lawsuits are filed in courts, judges then often use general comments and existing human rights guidelines to inform their judgments (Golay et al. 2012, p. 306f). To undertake the effort of recourse to courts, however, is often a lengthy process and not always successful. In 2005 a group of Inuits issued a case against the United States of America (US), claiming that the US does too little to reduce its greenhouse gas emissions and thus impairs the group's livelihoods. The Inter-American Human Rights Commission dismissed the case for procedural reasons, in particular because the US is not a party to the American Convention on Human Rights (Westra 2009, p. 141). The Office of the High Commissioner for Human Rights (OHCHR) regarded the Inuit case, moreover, as problematic because in the case of global warming it is difficult if not impossible to attribute changes in the environment that threaten the enjoyment of human rights to particular emitters (countries or industries) (HRC 2009a, note 3).⁵

⁵ The case had, nevertheless, positive impacts on the public discourse because, following the recommendations of the commission, a hearing on the international level on human rights and climate change was initiated, and subsequently the OHCHR report (HRC 2009a) on the topic and a HRC resolution were produced (Hunter 2009, p. 336, 343).

The prospects for successful litigation are much better in the case of climate policies, including planned relocation, where duties and responsibilities are much more easily identified. The three following examples of successful litigation in environmental and livelihood matters in favour of minority groups support that perspective.

The African Human Rights Commission found in favour of the Edois Community against the Government of Kenya, which had evicted the former to establish a natural reserve. The Edois could go back and had to be compensated for the act of eviction. '[T]he Commission found that this eviction, with minimal compensation, violated the Edois' right as an indigenous people to property, health, culture, religion, and natural resources' (Human Rights Watch 2010).

The European Court of Human Rights (ECHR) in the case *Budayeva and others versus Russia* judged that Russia has to compensate the survivors of heavy mudslides that affected the town of Tyrnauz for the loss of property and of the lives of relatives because the government has a responsibility to protect people from foreseeable environmental disasters. It based its sentence on the right to life, property and privacy (ECHR 2008; HRC 2009b, p. 16). Protection in this case could have included appropriate resettlement measures.

The Federal High Court of Nigeria decided in favour of Nigerian citizens who filed a case against Shell for practicing gas flaring, which pollutes the air considerably. The court based its decision on the rights to life and dignity (Orellana et al. 2010, p. 18).

Legal enforcement depends, however, on institutional preconditions and individual or group capacities to engage in such processes. And though regional human rights courts are an important instrument for controlling unwilling political and judicial national systems, as in the Kenyan case, the implementation of international human rights into national policies and law is crucial if they are to be effective. Including robust complaint mechanisms against human rights abuses as a rule in relocation measure would be the most effective way to guarantee implementation of such rights. The Inuit case, however, indicates the difficulties of human rights jurisprudence if national governments do not become members of regional human rights bodies.

In sum, it is obvious that jurisprudence on international human rights is a difficult path. This does not change the character of international human rights as part of the law of nations nor their normative value, however. Human rights-based approaches to planned relocation should therefore become international policy if relocation turns out to become a major response measure to climate change.

8.5 Conclusions

This chapter showed that planned relocation in the context of climate change policies can seriously threaten the livelihoods and wellbeing of those subject to relocation and in some cases might have equally or even more severe consequences for those involved than climate change itself. Effective regulation of such policy is therefore needed. Human rights-based approaches offer effective guidance to

protect against the livelihood risks and institutional weaknesses of relocation by putting focus on the micro-level of substantive and procedural needs of particular vulnerable groups. The unwillingness of national governments to apply human rights-based guidelines voluntarily should be compensated by integrating those guidelines into climate policy mechanisms. The GPID and the IASC Operational Guidelines are in widespread use amongst humanitarian organisations already, and the Kothari Guidelines are being employed by the national offices of the OHCHR (Golay et al. 2012, p. 316, footnote 49). Further official recognition of the latter should be reconsidered, in particular with regard to its strong procedural elements to avoid relocation and their emphasis on protecting and enabling the re-construction of livelihoods if relocation turns out to be the best option. In this regard it is a positive development that the successor to Kothari in her report on climate change included the idea that resettlement sites should be close to current income-opportunities of the resettlers (HRC 2009a, b, para. 58) and that the new edition of the IASC Operational Guidelines also strongly recommends prior assessments of shelter zones (IASC 2011, para. A. 1.7).

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Chapter 9

Disasters, Displacement and Protection: Challenges, Shortcomings and Ways Forward

Megan Bradley and Roberta Cohen

Abstract Natural disasters have become a primary cause of forced migration, and the effects of climate change are expected to intensify such disasters and accelerate displacement rates in upcoming decades. Yet the conceptual, normative and organisational frameworks underpinning human rights protection for environmentally displaced persons remain underdeveloped. This chapter examines the need for human rights protection for environmental migrants; the challenges to providing this protection; and potential responses. While most persons uprooted by environmental disasters will remain within their own countries, entitled to the protections set out in the Guiding Principles on Internal Displacement, there is a need for greater clarity regarding the status and protection requirements of those displaced by ‘slow onset’ disasters. But the largest protection gap pertains to environmentally displaced persons who cross international borders. Strengthening protection for those displaced by the effects of climate change must include clarifying and expanding normative and organisational frameworks; crafting comprehensive national protection policies; raising awareness of human rights protection; and pioneering more effective approaches for dealing with states that fail to protect their citizens.

Keywords Climate change • Displacement • Human rights • Natural disasters

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9.1 Introduction

The tragedy of the 2004 Indian Ocean tsunami brought to light critical gaps in the assistance and protection systems for those displaced by environmental disasters. These gaps should be a major concern for governments and policy-makers around the world now that natural disasters have become a leading cause of forced displacement and given that climate change is expected to intensify such disasters and the forced migration they produce. Over the course of the past 20 years, nine out of ten natural disasters have been linked to climate change, with the number of recorded disasters doubling from an estimated 200 to more than 400 per year. Since 2001, an estimated 200 million people have been directly affected by natural disasters each year (Holmes 2008, p. 4; International Federation of the Red Cross (IFRC) 2002). The United Nations and the Internal Displacement Monitoring Centre (IDMC 2011) report that in 2008 alone, 36 million people were displaced by ‘sudden onset’ disasters (floods, hurricanes, earthquakes, landslides, cyclones); in 2010, the figure rose to more than 40 million. Most of the disasters were climate related (OCHA and IDMC 2009, p. 9). Millions more were forcibly uprooted by ‘slow onset’ disasters such as rising sea levels, desertification, drought, deforestation, land degradation and extreme temperatures.

Most of those displaced by sudden or slow onset disasters will remain within the borders of their own countries, but considerable numbers may also cross international borders, particularly if rising sea levels render small island states uninhabitable. With regard to those displaced inside their countries, migration because of slow onset disasters has often been assumed to be voluntary. However, increasingly in the context of climate change, some of these migrants are viewed as having been compelled to leave their homes. In such instances, they may have a claim to the protection and assistance provisions laid out for internally displaced persons (IDPs, those *forcibly* uprooted by conflict or disasters who remain within their countries). At the same time, distinctions between IDPs displaced by natural disasters and those displaced by conflicts can become increasingly blurred (International Alert 2009; Burke et al. 2009; Ferris 2008; United Nations High Commissioner for Refugees 2009a). In the case of those compelled to cross borders for environmental reasons, an entirely new terminology of rights and responsibilities may be needed since most of those migrants cannot be characterised as refugees under the 1951 Convention Relating to the Status of Refugees. The increasing prevalence of environmental disasters therefore poses complex new challenges for current conceptual, legal and organisational arrangements for addressing displacement. They also raise pressing human rights protection concerns but to date these have received inadequate attention. As Walter Kälin, the former Representative of the UN Secretary-General on the Human Rights of Internally Displaced Persons (RSG) and Jan Egeland, the former UN Under-Secretary-General for Humanitarian Affairs, have rightly observed, the international response to environmental disasters has become ‘swifter and more sophisticated’ in delivering life-saving aid, but has given ‘little attention...to the rights of these displaced people’ (Egeland and Kälin 2011, p. 5). To date, responses

have concentrated on prevention and mitigation strategies; rescue and relief delivery systems; and ‘build back better’ initiatives. Less attention has been paid to identifying survivors’ human rights concerns and ensuring effective protection. This oversight is troubling as recent disasters have revealed serious protection problems, including inequitable access to aid; discriminatory evacuation plans; widespread incidents of sexual and gender-based violence; the exploitation of children separated from their families; the neglect of elderly and disabled survivors; the forced relocation of survivors to economically marginalised, unsafe areas; and unequal provision of restitution, compensation and other forms of redress and assistance.

This chapter examines human rights and protection concerns raised by disaster-induced displacement. It identifies obstacles to effective protection, gaps in current protection strategies and recommends ways forward.¹ In this discussion, the terms ‘environmental displacement’ and ‘disaster-induced displacement’ will be used interchangeably to refer to both internal and international migration resulting from sudden as well as slow onset disasters.²

9.2 Human Rights Protection in Disaster Contexts

As former RSG Kälin (2005a, p. 11) has argued, ‘it is no less important in the context of natural disasters than it is in cases of displacement by conflict to examine and address situations of displacement through a “protection lens”’. Several frameworks inform the application of a protection lens to disaster survivors, including the UN Guiding Principles on Internal Displacement (hereafter ‘Guiding Principles’), the IDP policy of the Inter-Agency Standing Committee (IASC) and the IASC Operational Guidelines on Human Rights and Natural Disasters.

The Guiding Principles explicitly recognise natural disasters as a cause of internal displacement. Based on international humanitarian and human rights law and refugee law by analogy, the Guiding Principles describe IDPs as

[...] persons or groups of persons who have been forced or obliged to flee or to leave their homes or places of habitual residence, in particular as a result of or in order to avoid the effects of armed conflict, situations of generalized violence, violations of human rights or *natural or human-made disasters*, and who have not crossed an internationally recognized State border (Commission on Human Rights (1998), para. 1 [emphasis added]).

The Guiding Principles underscore that IDPs have the same rights as other individuals in their states, and stress that their governments are responsible for protecting and assisting them, in cooperation with international organisations. Recognised by 192 governments as an ‘important international framework for the

¹ See Schade in this volume for discussion of the protection challenges associated with crafting durable solutions for those displaced by the effects of climate change.

² For a more detailed discussion of the arguments advanced in this chapter, see Cohen and Bradley (2010).

protection of IDPs', the Principles map out protection responsibilities at all phases of displacement (United Nations General Assembly 2005; Kälin 2005b, p. 27).

The Guiding Principles underpin the IASC's IDP Protection Policy, which was adopted in 1999 by the major human rights, humanitarian and development actors. This document defines protection as 'all activities aimed at obtaining full respect for the rights of the individual in accordance with the letter and the spirit of the relevant bodies of law' (IASC 2000, p. 4). Under this definition, protection encompasses ensuring IDPs' physical safety and access to life-saving assistance, as well as their fundamental civil, political, economic, social and cultural rights.

Building on these frameworks, the former RSG developed Operational Guidelines on Human Rights and Natural Disasters (hereafter 'Operational Guidelines'), which were adopted by the IASC. The Operational Guidelines apply to all people affected by disasters within their own state, including IDPs, and address four key areas of responsibility. First, the Operational Guidelines focus on the protection of life and physical security, integrity and dignity. This involves protection activities including evacuations, relocations, family reunifications, camp security and demining. Second, the Operational Guidelines address the protection of rights pertaining to basic needs, including non-discriminatory access to humanitarian aid, goods and services. Third, the framework concentrates on the protection of economic, social and cultural rights such as housing, education, employment, property restitution and compensation. Last, the Operational Guidelines tackle the protection of civil and political rights, including mobility, freedom of expression and voting rights. By placing human rights protection at the centre of disaster response, the Operational Guidelines help ensure that humanitarian efforts integrate 'all the basic needs of the victims' (IASC 2011, p. 3).

Those compelled to cross borders due to natural disasters may also have complex protection concerns. Yet this population is not covered by the Guiding Principles or the IASC Operational Guidelines. Indeed, there is currently no specific normative framework to address and clarify their needs and rights.

9.3 Obstacles to Human Rights Protection

The protection of those uprooted by natural disasters raises a wide range of intertwined conceptual, legal, practical and organisational challenges. Rather than listing them in order of importance, the following section explores these obstacles as challenges that must be addressed in an integrated manner by researchers, policy-makers and practitioners.

9.3.1 Lack of Definitional and Conceptual Clarity

Although the UN Human Rights Council (2007, para. 6 g) and the UN General Assembly (2009) reinforced the Guiding Principles' assertion that those forcibly displaced within their states by natural disasters are indeed IDPs, some experts

and governments consider only those who flee conflict to be IDPs. When the Guiding Principles were drafted in the 1990s, the recognition of natural disasters as a cause of internal displacement was a point of debate, as some contended that only those uprooted by violence and persecution should be considered IDPs, so that the concept would mirror legal definitions of refugees. However, the majority favoured including those displaced by environmental disasters because of the discrimination, neglect and abuse often experienced by these individuals.

Most international organisations and NGOs today recognise those forcibly displaced by natural disasters as IDPs, although some governments do not (laws on IDPs in Colombia and Armenia, for example, pertain only to those uprooted by conflict), and conceptual confusion persists about those uprooted by slow onset disasters and whether they should be considered forced migrants entitled to international protection. While motivations for migration are typically complex and intersecting, individuals moving primarily for economic reasons have not been counted as IDPs because the coercive nature of their migration has not been clear. Kälin suggests that individuals leaving environmentally degraded areas in search of improved economic opportunities cannot be considered forcibly displaced ‘in the strict sense of the word’; however, ‘if the areas become uninhabitable because of complete desertification or sinking coastal zones, then population movements amount to forced displacement’ (Kälin 2008).

There is far less definitional clarity regarding the status of individuals affected by natural disasters who cross international borders. For some, leaving their countries may be the only escape route, while others may hope to access better aid and protection abroad, or may be abroad when a disaster strikes, making it impossible for them to return. Diverse terms have been used to refer to this group, including ‘ecological migrants’ and ‘environmental refugees.’ Essam El-Hinnawi of the United Nations Environmental Programme put forward a popular definition of ‘environmental refugees’ as:

[...] people who have been forced to leave their traditional habitat, temporarily or permanently, because of a marked environmental disruption (natural and/or triggered by people) that jeopardized their existence and/or seriously affected the quality of their life (El-Hinnawi 1985, p. 4).

But this term has been challenged as ‘poorly defined and legally meaningless,’ and has been opposed by the Office of the United Nations High Commissioner for Refugees (UNHCR) in its capacity as the guardian of international refugee law (Kibreab 1997, p. 21). As UNHCR points out, the term is not in harmony with the 1951 Convention Relating to the Status of Refugees, which defines a refugee as a person who,

[...] owing to well-founded fear of persecution for reasons of race, religion, nationality, membership of a particular social group or political opinion, is outside the country of his nationality and is unable or, owing to such fear, is unwilling to avail himself of the protection of that country (Article 1A 2, as modified by the 1967 Protocol).

Although environmental disasters are not generally grounds for refugee status under the 1951 Convention, in some cases those displaced by disasters may qualify

as refugees. For instance, when disaster-displaced citizens are intentionally and discriminatorily prevented from accessing aid, or when governments purposefully employ environmental destruction as a means of persecution (e.g. Iraq's destruction of the Marsh Arabs' habitat), the uprooted may be recognised as refugees under the 1951 Convention (Stavropoulou 2008, p. 12; UNHCR 2009b, pp. 7–9).

Regional instruments including the 1969 Organisation for African Unity (OAU) Convention Governing the Specific Aspects of Refugee Problems in Africa and the 1984 Cartagena Declaration on Refugees may provide a measure of protection to environmental migrants displaced across borders under their broader refugee definitions. According to these agreements, refugees may be displaced by 'events seriously disturbing public order,' such as, arguably, natural disasters (OAU 1969, Article 1.2; Colloquium on the International Protection of Refugees in Central America (1984), Mexico and Panama, Section III.3). However, the report of the International Conference on Central American Refugees addressing the interpretation of the Cartagena Declaration specifies that natural disasters are not considered 'events disturbing the public order', and those who developed these agreements do not interpret them as extending to disasters (Lopez 2007, pp. 390–391). Moreover, the UNHCR, the International Organisation for Migration (IOM) and other members of the IASC maintain that the term 'environmental refugee' lacks firm grounding in international law, and risks generating confusion and undercutting traditional refugee protection (Cohen and Bradley 2010, p. 107).

A lack of definitional clarity also persists regarding the citizens of small island states that will be submerged by rising seas. The ambiguity pertains to whether these individuals will be legally recognised as 'stateless persons', given that under international law 'statelessness means to be without nationality, not without state' (Kälin 2008). If other countries do not formally withdraw recognition of submerged island states, these countries may still exist as legal entities, rendering former residents *de facto* stateless. Yet if the islanders are to access the admittedly weak protections international law provides for the stateless, they must be able to show *de jure* statelessness (Batchelor 1998, p. 171; Goris et al. 2009, p. 4). The eventual status of these islanders remains uncertain, as the inundation of island states represents an unforeseen dilemma for international law.

9.3.2 *Gaps in Legal Protection*

Lack of definitional clarity and limited legal protection for the environmentally displaced are intertwined challenges. Some of the most pressing legal concerns, which will be addressed in this section, pertain to the status and protection needs of those uprooted by slow onset disasters; the predicament of environmentally displaced persons who cross international borders; and the fate of the citizens of small island states expected to be inundated by rising sea levels.

IDPs uprooted by sudden onset disasters are effectively covered by international human rights law, as set forth in the Guiding Principles. As noted above,

however, whether those on the move due to slow onset disasters are IDPs in need of tailored protection and assistance as specified in the Guiding Principles is an open question. The African Union (2009) Convention for the Protection and Assistance of Internally Displaced Persons in Africa (hereafter Kampala Convention) legally requires signatories to ‘protect and assist persons who have been internally displaced due to natural or human-made disasters, including climate change’ (which suggests slow onset disasters), but it does not clearly indicate whether this provision pertains to those uprooted by such disasters. Indeed, there is currently no alternative normative framework tailored to the needs of those on the move due to slow onset disasters, and ‘there are no criteria for establishing at what point voluntary movements become forced, which would bring some of those displaced by slow onset disasters under the IDP umbrella’ (Cohen and Bradley 2010, p. 108; Kälin 2008).

Even in cases of rapid onset disasters, efforts to ensure that IDPs benefit from adequate legal protection have been hindered by lack of awareness of the Guiding Principles. For example, when Typhoon Durian hit the Philippines, Oxfam reported that the authorities ‘had no awareness of minimum standards of assistance or of the obligations to, and rights of, displaced communities’, leading to ‘discrimination and abrupt relocations’ (McHattie 2008, pp. 30–31). Legal protection may also be limited by state reservations about the Guiding Principles as a relevant standard for disaster victims. For instance, the US government recognises the Guiding Principles as a ‘useful tool and framework for dealing with IDPs’ overseas who are uprooted by conflict, but did not use them to inform its response to Hurricane Katrina (USAID 2004, p. 6). This was reportedly due to concerns that a rights-based response could expose the government to lawsuits for inadequate protection of those rights.³

Environmentally displaced persons who cross international borders face a particularly concerning ‘legal and operational limbo’ (Kälin 2008). Although these individuals are entitled to the protection of international human rights law, they lack a clear right to remain in the states where they sought shelter. Typically, they cannot claim protection as refugees under international law, and their predicament is not addressed in the IASC Operational Guidelines. Given this protection gap, a few European states have revised their asylum laws to cover those who flee disasters, including those related to climate change. Finland and Sweden, for example, may accept individuals uprooted by environmental changes under their national asylum laws (Martin 2009). Elsewhere, states have delayed deportations or offered temporary protection to those who have fled across an international border. For instance, the United Kingdom, Switzerland and Canada temporarily halted deportations to countries directly affected by the 2004 tsunami, while the US has applied legislation to provide temporary protection to individuals already in the US ‘who are temporarily unable to safely return to their home country because of ongoing armed conflict, and environmental disaster, or other extraordinary and

³ Interview with Advocates for Environmental Human Rights staff member.

temporary conditions' (Martin 2009, p. 374). Under the US system, the government of the disaster-afflicted country must ask for temporary protection status for its citizens, which is extended on a discretionary basis.

From a rights-based perspective, temporary protection models are limited due to their ad hoc, discretionary nature and their irrelevance in cases where return is not a feasible long-term option (UNHCR 2009b, p. 6; Kälin 2008). This is a particularly serious concern for the citizens of small island states expected to be submerged as sea levels rise. International law on statelessness offers only minimal protections and, as aforementioned, it is uncertain whether these individuals will be formally acknowledged as stateless. These islanders risk falling through a 'genuine normative gap in international law' because even if they are acknowledged as *de jure* stateless, under international law no state has a clear legal obligation to grant them a new citizenship (Goris et al. 2009, p. 6; Gibney 2009, p. 50; Lee 1998, p. 138; Batchelor 1998, p. 156).

Because inundations will likely be permanent, temporary protection is not an adequate response to islanders' predicament. In some cases, labour migration programs have been explored as an alternative. Already some citizens of island states such as Tuvalu have been resettled to New Zealand through its Pacific Access Category labour migration program. While heralded as an excellent example of international cooperation, this program is not a concerted response to islanders' protection needs. Rather, participants in the initiative must be 18–45 year old English speakers with an employment offer, no criminal record and a clean bill of health. Consequently, it cannot respond to the protection needs of those who may be particularly vulnerable to abuse, such as children, the elderly and persons with disabilities (Gemenne 2006, pp. 9–18; Boana et al. 2008, p. 29; Loughry and McAdam 2008, p. 51; Lopez 2007, p. 372; Jacobs 2005, pp. 103–107). Taken as a whole, it is evident that ad hoc responses such as temporary protection and labour migration programs cannot replace effective legal protection for those who may flee across international borders for environmental reasons.

9.3.3 *Gaps in Organisational Arrangements*

Just as there are gaps in the legal and normative frameworks for responding to displacement linked to climate change, there are also significant gaps in current organisational arrangements at the national, regional and international levels for protecting environmental migrants' human rights. This section considers some of the factors that have undermined effective organisational arrangements for responding to the needs and rights of those displaced by disasters, including inadequate integration of a human rights approach, and lack of clarity regarding how international organisations will share responsibility for ensuring the protection of those uprooted by environmental factors.

In many countries, human rights have not been integrated into national disaster response policies, laws and implementation mechanisms (Brookings-Bern 2009a, b). This can result in discriminatory access to evacuation assistance, emergency aid and reconstruction support. The consequences can be life threatening. This was

evident in Burma at the time of Cyclone Nargis (see below) and in China during the Sichuan earthquake (Yardley 2008; Cohen 2008; Drew 2009). In the US, the Federal Emergency Management Agency initially failed to arrange for transportation for imprisoned and hospitalised individuals as well as poor people without access to vehicles in its Gulf Coast evacuation and rescue plans during Hurricane Katrina (McKinney 2006; Snyder 2008).

Regional organisations have also been inconsistent in integrating human rights into their responses to natural disasters. While the entry into force of the groundbreaking Kampala Convention will ideally strengthen rights-based responses to displacement on the part of African states and the African Union, the Parliamentary Assembly of the Council of Europe is encouraging its member states to take on a similarly 'pioneering role' in standard setting and improving the 'protection of people compelled to leave their homes mainly or exclusively for environmental reasons'.⁴ Other regional organisations such as the Association of South East Asian Nations (ASEAN), although faced with large-scale disasters such as Cyclone Nargis, have not yet adopted a systematic rights-based approach.

International organisations concerned with natural disasters have recently started to pay greater attention to human rights concerns in their responses. The former RSG was instrumental in raising the profile of these issues by adding the rights of those displaced by disasters to his mandate activities in 2004. However, this problem will continue to require considerable attention by Kälén's successor, the UN Rapporteur on the Human Rights of Internally Displaced Persons, Dr. Chaloka Beyani, working alongside key organisations such as UNHCR. In September 2009, UNHCR announced that it would be willing to take on a key role in filling the current 'protection gap' for those displaced by environmental disasters, building on the lead role it assumed in 2005 for the protection of IDPs in conflict situations (Guterres 2009). Still, donor and other state support for this shift has been lacking since UNHCR is not fully able to execute its responsibilities toward 'conflict IDPs'.⁵ Yet UN organisations like UNICEF and the Office of the High Commissioner for Human Rights (OHCHR) have not been adequate to the task so UNHCR may have to assume more of the protection 'lead' (Cohen and Bradley 2010, p. 115). If it does, it will not necessarily have a major field presence in every disaster scenario (Guterres 2009). Instead, it will oversee the coordination of protection in cooperation with other actors; advocate on behalf of the displaced; and craft protection strategies, including documentation and registration programs, responses to sexual and gender-based violence, and early warning and preparedness initiatives. Given UNHCR's current limitations in terms of financial resources, staff and training, it will need to work closely with other agencies to implement these activities (UNHCR 2009a, p. 11).⁶

⁴ See Council of Europe Recommendation 1862, para. 3.

⁵ Interview with UN staff member, 5 April 2010.

⁶ Interview with Claudine Haenni Dale, Interim UN Focal Point for Protection in Natural Disasters, 5 December 2009. See also NGO Statement on US IDP Policy, signed by 22 organisations, 19 December 2008.

Significantly, while UNHCR may be poised to assume a greater protection role for IDPs uprooted by environmental factors, it has been hesitant to engage with the problem of those who flee across borders due to disasters.⁷ Given its mandate to protect and assist stateless persons, UNHCR has acknowledged that it may be obliged to engage with those expected to be displaced from small island states, but admits it is not yet ready to execute this responsibility effectively (UNHCR 2009a, p. 7; IASC 2008, p. 3). Ensuring a predictable and effective protection response to cross-border displacement will require clarifying the role of international organisations including UNHCR. However, an appropriate institutional response will ultimately depend on states strengthening and systematising the protection they offer to those who are compelled to seek refuge outside their countries. International organisations will have an important role to play in persuading potential states of asylum to accept those in need of shelter, and encouraging states of origin to advocate for their displaced citizens and, where possible, enable their safe and dignified return.

While members of the IASC Informal Working Group on Migration, Displacement and Climate Change have promised to ‘launch a dialogue among [UN] Member States on how to fill existing legal, operational and capacity gaps associated with climate change and human mobility, and to allocate sufficient additional funding to this issue’, some advocates contend that effective action will require the negotiation of a binding international agreement or at least a set of guidelines on the status of those who cross borders (IASC 2008, p. 1; Refugees International 2009; Boana et al. 2008, p. 26). Even in the absence of such an international framework, IOM has indicated that it stands ready to become increasingly involved with this issue. IOM has a long history of involvement in research on environmental displacement and field responses to natural disasters, and currently serves as the global cluster lead for coordination and camp management in natural disaster scenarios (IOM 2007, para. 6, 2009a, p. 6). It is therefore well placed to work with states to strengthen responses to environmental migration. Historically, however, IOM has devoted little attention to human rights protection in its post-disaster work. For example, although IOM acknowledges the importance of ‘adequate assistance and protection for people on the move’, in an overview of 17 IOM initiatives on environmental disasters, protection is mentioned in only three project descriptions, and then merely in passing (IOM 2009a, p. 7, 2009b). In order for IOM and other actors to strengthen organisational responses to environmental migration, they must consistently connect identification of vulnerabilities with explicit acknowledgement of migrants’ human rights and protection needs. Recently, to its credit, IOM has begun to expand its training in migration law to include human rights protection in disasters.

⁷ UNHCR is ready and mandated to respond to those fleeing *both* environmental disasters and conflict or persecution, as in the case of Ethiopians flowing into Sudan in 1984–1985.

9.3.4 Lack of Consultation and Attention to Specific Needs

Effective responses to displacement due to the effects of climate change require not only well coordinated organisational arrangements, but also ongoing consultation with survivors. Assistance and protection efforts have often been compromised by a ‘top down’ approach in which one-off cursory meetings with displaced communities are substituted for the thorough integration of displaced persons in the recovery planning process. Inadequate consultation can result in unsustainable reconstruction programs and a lack of attention to the specific needs of particular groups that may be especially vulnerable to exploitation, such as single women, female heads of households, elderly people, separated children, disabled and sick people, poor people and marginalised groups including indigenous people.

Although various international standards highlight the protection concerns of vulnerable groups, their needs are often overlooked, exacerbating patterns of inequality and discriminatory treatment. This is particularly evident in the case of women. The Women’s Environment and Development Organisation (WEDO 2008, p. 56) has underlined that climate change ‘is not gender neutral’. In natural disasters such as extreme hurricanes and floods, more women ‘tend to die or suffer injury than men because they are not warned, cannot swim, or cannot leave the house alone’, while slow onset disasters such as deforestation and drought often result in increases to women’s domestic workloads, leaving less time for education and work outside the home (WEDO 2008, p. 56). Since discrimination against women is often culturally and legally entrenched, it can be particularly difficult to challenge these patterns in the context of disaster response. The result may be that only men receive relief packages, and have access to restitution and compensation processes.

The relationship of the displaced to host communities is another area of concern. Long term relocation can generate competition over access to scarce resources and employment opportunities. In the Maldives, for examples, violence was reported in areas where those displaced by rising sea levels were resettled (Brookings-Bern 2009a, p. 12; see also Boege’s Chap. 7 in this volume for a discussion of resettlement from the Carteret Islands). When consultation processes and assistance initiatives fail to include both the displaced and host community members, they are generally unable to defuse tensions and ensure equitable protection of human rights.

9.3.5 State Prevention and Protection Failures

In many cases, governments’ failure to prevent and mitigate disasters, or protect their citizens, can be attributable to negligence and incapacity. While deeply troubling, such problems may be remedied through international cooperation, policy reviews and accountability mechanisms such as court cases. In some states, however, such remedies are non-existent or ineffective. This represents a major

challenge for the international community, particularly when governments deliberately neglect disaster victims' needs and rights.

Burma's reaction to Cyclone Nargis in 2008 is a case in point. The Burmese junta not only failed to warn its citizens of the impending disaster, but impeded the delivery of international relief and delayed access by international aid workers (particularly those from outside Asia) for nearly a month. Only under pressure from the UN Secretary-General, ASEAN and a range of Western and Asian governments did General Than Shwe accede to cooperation with the international community. The government's prevarication undoubtedly increased the number of people who suffered and died.

Faced with the junta's initial intransigence, many proponents of the responsibility to protect (R2P) concept argued that it should be applied to Burma. The 2005 UN World Summit Outcome document (paras. 138–139) outlines an international responsibility to take 'collective action' in response to governments that are unable or unwilling to halt crimes against humanity, war crimes, ethnic cleansing and genocide. 'Collective action' under the R2P framework may include, but is certainly not limited to, military interventions to halt or prevent atrocities. Various advocates contended that the Burmese government's 'reckless indifference' to its own citizens represented a crime against humanity meriting a response under R2P, aimed at ensuring that civilians could access essential humanitarian assistance (Evans 2008; Axworthy and Rock 2008; Wong 2009). However, China and other states ruled out any application of the R2P concept through the Security Council, while UN Secretary-General Ban Ki-moon was similarly opposed to evoking R2P in response to natural disasters:

Extending the principle to cover other calamities, such as HIV/AIDS, climate change, or response to national disasters, would undermine the 2005 consensus and stretch the concept beyond recognition for operational utility (Ban 2008).

Humanitarian agencies also objected to the application of R2P, favouring negotiation with the Burmese authorities as a more direct route to gaining access (World Federalist Movement Institute for Global Policy 2009). Although R2P was not formally invoked in response to Cyclone Nargis, it arguably had a significant effect nonetheless: reportedly, the mere instigation of debates on R2P made the Burmese government more cooperative with the international community, in part by prompting ASEAN to pressure the junta to accept international humanitarian assistance (Haacke 2009, p. 169).

Beyond the potential (albeit limited) relevance of the R2P concept, Burma's resistance to the presence of foreign aid workers underscored an additional concern for disaster response—whether it is legitimate for states to reject assistance simply on political grounds. Countries such as China and India, which have far greater capacity to provide relief, have at times refused international aid during disasters, even though external assistance might have saved more lives in the disasters. International standards such as the Guiding Principles and the Kampala Convention underscore the unacceptability of arbitrary rejections of assistance when lives are at stake. This is especially the case when governments are incapable of providing the necessary aid and protection. Failure to implement standards has raised serious concerns that remain to be addressed (Richard 2006, p. 42; Cohen 2008).

9.4 Ways Forward

The following recommendations are offered with a view to addressing the gaps in current protection frameworks for environmentally displaced persons, focusing in particular on policy challenges. Meeting these challenges will require coordinated action amongst different actors, including local communities, NGOs, governments and international organisations. The obstacles to effective protection for the environmentally displaced are intertwined and multifaceted so the responses to the problem must encompass a broad range of national, regional and international efforts. The following suggestions collectively represent a coordinated strategy to improve protection for those uprooted by disasters.

9.4.1 Increased Awareness of the Importance of Human Rights Protection

Understanding of the protection dimensions of displacement linked to climate change has been growing, but there is a need for ongoing training and awareness-raising to ensure that local and national authorities take proactive steps to prevent and mitigate disasters and protect those exposed to displacement.

Court challenges have and may continue to play an important role in underscoring the need to recognise environmentally displaced persons' human rights, and take preventive measures as well as steps to protect persons during and after disasters. For instance, the European Court of Human Rights found the Russian government negligent in failing to prevent mudslides in the Northern Caucasus. Russia was found to have abrogated its duty to 'safeguard' lives and ordered to pay compensation to surviving relatives (Kälin and Dale 2008, pp. 38–39). In the US, lawsuits have also been introduced charging the government with 'monumental negligence' in failing to take adequate preventive measures in relation to Hurricane Katrina (Robertson 2009, p. 20). Such legal processes, as well as the political fall-out encountered by governments who have responded inadequately to disasters, may persuade states to think twice before eschewing rights-based responses to displacement. The Kampala Convention [art. 12 (3)] provides that governments 'are liable to make reparations' to IDPs when they refrain from protecting and assisting them in natural disasters.

9.4.2 Improve Definitional Clarity

In light of the persistent misperception that the term 'IDP' pertains only to those displaced by conflict, it should be stressed that those forcibly uprooted by disasters associated with climate change are in fact IDPs entitled to the protections set out in the Guiding Principles, the IASC Operational Guidelines and relevant regional frameworks such as the Kampala Convention. In the case of IDPs, more precise

criteria would be helpful to determine when movement in connection with slow onset disasters may be considered forced, thereby making national and international IDP protection necessary. In developing such criteria, international legal experts will have to consider how to expand the concept of forced migrants so as to include those who have no choice but to leave their homes because of slow onset environmental factors and those who can no longer return to their homes because of a deteriorating environment even though their initial movement was voluntary.

In the case of those who cross borders in response to environmental disasters, far more than criteria will be needed. States and legal bodies need to clarify their interpretation of international norms on refugees and stateless persons, and begin to negotiate new guidelines or agreements to ensure that those who are compelled to cross international borders can access adequate protection in a predictable and equitable manner.

9.4.3 Stronger Protection Frameworks

While there is no need for new international laws or standards on the rights of those internally displaced by the effects of climate change, greater dissemination and application of the Guiding Principles and IASC Operational Guidelines are required.⁸ In contrast, there are troubling gaps in the protection frameworks for those who cross borders, which could be filled in several different ways. First, various advocates and scholars have promoted a ‘hard law approach’ of expanding the 1951 Refugee Convention to incorporate the environmentally displaced (Boana et al. 2008, p. 25). While UNHCR (2009a, p. 3) has recognised that ‘new legal frameworks may need to be negotiated’ in response to cross-border environmental displacement, it has objected to this option because of widespread state resistance to expanding asylum rights, and the significant risk that re-opening the 1951 Convention relating to the Status of Refugees could result in an erosion of refugee rights. Given these concerns, some have advocated the negotiation of a new, binding treaty (Lopez 2007, pp. 365, 402–408). This will prove challenging, however, given the difficulties already encountered in persuading states to address migration and human rights in international climate change negotiations. After concerted lobbying, the 2010 Cancun Agreements finally included language referencing migration, inviting the parties to the UN Framework Convention on Climate Change to undertake ‘Measures to enhance understanding, coordination and cooperation with regard to climate change induced displacement, migration and planned relocation, where appropriate, at national, regional and international levels’ (Conference of the Parties to the United Nations Framework Convention on Climate Change 2010, Article 14f). While this is an important foundation for negotiation, the difficulty in achieving this basic recognition suggests that a hard law approach would be a long term challenge.

⁸ The integration of these standards into domestic laws is a particularly effective means of bolstering legal protection for IDPs uprooted by the effects of climate change. See Brookings-Bern (2008b).

A timelier and more politically viable alternative might be to take a ‘soft law approach’, building on the example of the Guiding Principles on Internal Displacement. This would involve convening a team of legal experts to draft a set of guidelines for responding to cross-border environmental displacement, based on international human rights law, humanitarian law and refugee law by analogy. Proponents would then circulate and strategically build support for the guidelines (Boana et al. 2008, p. 26; Zetter 2008). Although this approach was highly effective for IDPs, it might be limited in this case. The Guiding Principles restated and clarified existing law in setting forth the rights of IDPs, whereas responding to the needs of those who cross international borders due to natural disasters may require the creation of *new* law and involve new rights and responsibilities. As UNHCR (2009b, p. 5) has pointed out, the ‘crux of the issue will be whether persons have a need for international protection; and if so, on what grounds this need may be turned into an entitlement’. While a soft law approach following the example of the Guiding Principles could suggest directions for the development of a normative framework, in order for any new entitlements to be effective they would have to be drafted and adopted by states.

The question at the heart of efforts to promote greater protection for this population is whether the prohibition on *refoulement* should cover those who have fled their countries due to environmental disasters. This is reflected in Kälín’s observation that the

point of departure should not be the subjective motives of individuals or communities for their decision to move, but [...] whether in light of the prevailing circumstances and the particular vulnerabilities of the persons concerned it would be inappropriate to require them to go back to their original homes. (Kälín 2008).

Kälín suggests that decision-making on return should take three key elements into consideration: the permissibility, factual possibility and reasonableness of return. Impermissible returns are those that involve collective expulsions, or forcing people back to conditions in which ‘life or limb is at risk’ (Kälín 2008). Returns may be factually impossible due to the inundation of island states, or overriding technical problems such as lack of drinking water or the destruction of roads. Repatriation would be deemed unreasonable if there was no prospect of durable return or resettlement within the displaced person’s state of origin. Equally, returns would be unreasonable if assistance and protection were non-existent or inadequate in light of international standards. If return is not permissible, possible and reasonable, displaced persons who have sought shelter across an international border should be provided temporary protection, or permanent resettlement if required (Kälín 2008).

The challenge is to revamp temporary protection regimes so that they serve as a reliable, rights-based response to environmental displacement. Unfortunately, current temporary protection models do not provide a strong starting point for this transformation because they are almost totally discretionary and limited to those who were already abroad when disasters struck their home countries (Lopez 2007, pp. 392–399; McAdam 2005). However, significant insights may be gleaned from the experiences of states like Finland and Sweden that have provided asylum to those displaced by disasters linked to climate change.

9.4.4 Tackling Statelessness

Protecting the rights and wellbeing of the citizens of small island states expected to be inundated by rising sea levels will require clarifying their legal status, in addition to proactively negotiating international resettlement plans. This process should be based on islanders' active participation, and should be informed by analysis of the lessons learned through past large-scale resettlement efforts.⁹ Potential solutions should be explored creatively and open-mindedly, recognising that while some islanders may wish to disperse into resettlement countries, others may want to preserve their communities, a possibility that may be accommodated through relocation to similar but more ecologically secure territories where they may be provided relative autonomy. Options of this nature are already being investigated by the Maldives (Kelman 2008, pp 20–21; Loughry and McAdam 2008, p. 51).

9.4.5 Integrating Human Rights Protection into Natural Disaster Policies

In recent years, many states have drafted national policies on disasters, often in the context of the 2005 Hyogo Framework for Action. Human rights protection needs to be systematically integrated into such national policy frameworks, which should broadly address all aspects of the state's response to natural disasters, including prevention and early warning systems; risk reduction initiatives; evacuation plans; emergency assistance; and community reconstruction.¹⁰ Further, these policies must address the concerns of all disaster-affected populations, including IDPs and host communities, and should ensure non-discriminatory access to essential supplies and services, as well as protection from violence and other human rights violations. National policies should guard against forcible returns or relocations to unstable or insecure areas, and should support access to livelihoods, property restitution, compensation, and political participation, including voting rights.

National policy frameworks must ensure that the special needs of potentially vulnerable groups are recognised and addressed as a priority concern. This includes ensuring that children are educated in advance on what to do in disaster situations, and that emergency shelters are constructed with survivors' security needs in mind (Kapila et al. 2005, p. 55). Traditionally marginalised groups should be included in the development and implementation of relief and reconstruction programs, particularly as this has been demonstrated to improve both the efficacy of such initiatives, and the wellbeing of the participants (WEDO 2008). Indeed, equitable and in-depth consultation with affected populations is a critical plank of

⁹ See Boege's [Chap. 7](#) in this volume.

¹⁰ The *IASC Framework on Durable Solutions for Internally Displaced Persons* should inform national recovery policies (IASC 2010).

successful national policy frameworks and recovery processes. Through increased consultation with displaced and host populations, governments and international organisations can maximise the efficacy of relief and protection interventions, building on survivors' own capacities (Brookings-Bern 2008a).

In order to ensure accountability, particular government offices should be assigned responsibility for implementing and monitoring such national policy frameworks. These actors must ensure that national disaster policies are appropriately disseminated, and that sufficient resources are allocated for policy implementation.

9.4.6 Increased Human Rights Training and Monitoring

From international organisations and NGOs to military forces, corporations, government authorities and community leaders, the wide range of actors involved in disaster prevention and response would benefit from increased training in human rights protection in disaster scenarios. The value of such tailored training was made clear in the response to Typhoon Durian in the Philippines. While government authorities were initially concerned that human rights training for IDPs would 'incite' the displaced to voice 'unmeetable demands', a large-scale training program resulted in improved aid distribution; enhanced communications among stakeholders; and policy revisions that made the government's efforts more attuned to IDPs' rights and needs (McHattie 2008, p. 30). Government officials recognised that without the training program, 'they would have been faced with significant unrest amongst evacuees' (McHattie 2008, p. 31). Improved training is essential to effective monitoring of compliance with human rights standards before, during and after disasters.

National human rights commissions can serve as leaders in monitoring the efficacy of protection measures. For example, India's national human rights commission has spearheaded investigations of human rights violations following disasters in Gujarat and Orissa. However, national human rights commissions, particularly in developing countries, need greater resources and training in order to fully engage in monitoring and advancing displaced persons' claims.

9.4.7 More Effective Organisational Arrangements

At the regional and international levels, more effective organisational arrangements for addressing the protection needs of those displaced by disasters should be undertaken in order to achieve more predictable and coordinated responses.

At the regional level, organisations should be expected to expand their role to include a stronger focus on advancing human rights in disaster response. At the international level, the UN must identify a clear lead agency responsible for

ensuring predictable and comprehensive attention to protection in disasters. As the agency most appropriate to fill this role, UNHCR will have to enhance its capacity in this area; increase its protection presence in the field; and secure increased donor support for these activities.

Since protection concerns are cross-cutting in disaster scenarios, UNHCR's partners will also need to strengthen their abilities to contribute to the task of ensuring adequate human rights protection. For example OHCHR should expand its contributions by ramping up training programs for local authorities and displaced populations, and by deploying more human rights monitors. UNICEF should consider expanding its protection role beyond children. Development actors such as the World Bank and UNDP also have a critical role to play in the transition from emergency relief to recovery and reintegration, and could enhance their contributions by more concertedly integrating a protection lens in their programming. As potential protection coordinator, UNHCR would also have to strengthen its relationship with non-UN actors such as NGOs, and especially IOM. Clearer divisions of labour and collaboration arrangements will need to be reached so that these organisations reinforce each other's efforts on behalf of those displaced internally and across borders.

Ensuring a predictable and comprehensive institutional response for persons who cross borders represents a more serious challenge, particularly as UNHCR has been somewhat hesitant to assume a leadership role here. However, as the former Deputy UN High Commissioner for Refugees has argued, in cases of 'forced displacement precipitated directly or indirectly by climate change', UNHCR has 'to be ready to assume our share of this responsibility' (Johnstone 2008, p. 47). This will entail UNHCR engaging in dialogue with governments and other key stakeholders, including through the Nansen Initiative, with a view to developing a comprehensive protection response for this population. UNHCR and IOM should cooperatively promote the drafting of international guidelines that can serve as the foundation for the effective and reliable protection of environmentally displaced persons who seek shelter outside their states.

9.4.8 The Humanitarian Aid Imperative

In recent years, protection and assistance efforts have in some instances been compromised by governments' refusal to accept assistance from other countries. Too often, these refusals are motivated by political considerations that have little bearing on victims' needs, rights and wellbeing. While states are primarily responsible for assisting their displaced citizens, the Guiding Principles underscore that humanitarian agencies have 'the right to offer their services', and that offers of help 'shall not be regarded as an unfriendly act or an interference in a State's internal affairs' (Principle 25). Consent to provide life-saving assistance is not to be 'arbitrarily withheld', particularly when authorities are unwilling or unable to provide such aid themselves (Principle 25).

Governments of states devastated by natural disasters should therefore be expected to accept reasonable offers of help from other states if they cannot themselves provide for their citizens' critical needs. There 'should be an overall international understanding that acceptance of aid from certain countries, but not others, on political grounds that are unreasonable when populations are at risk, contravenes international obligations to the victims of disasters' (Cohen and Bradley 2010, p. 141). When governments deliberately prevent victims from accessing assistance and generate massive suffering tantamount to a crime against humanity, greater flexibility in the interpretation and application of R2P may be needed so that the international community may, where appropriate, respond to this abuse through the pursuit of 'carefully calibrated collective action' (Cohen and Bradley 2010, p. 141).

9.5 Conclusion

As the effects of climate change force greater numbers from their homes, the need to question and revise established international categories, norms and organisational arrangements for responding to forced migration is becoming increasingly clear. Although states will retain primary responsibility for protecting the displaced, international organisations, regional bodies, NGOs and host communities will all have significant roles to play. Successful execution of these roles will require a willingness to adapt to changing realities, while preserving a principled commitment to human rights protection. At present, critical gaps are evident in international protection frameworks, particularly in terms of those displaced by slow onset disasters and those who seek refuge across international borders. New organisational arrangements and normative frameworks may be needed to address these gaps, and ensure that the rights and wellbeing of those uprooted by the effects of climate change are upheld.

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Part IV

Conclusion

Chapter 10

Entitlements, Capabilities and Human Rights

Jeanette Schade

Abstract It was the intention of the conference organisers to capture the potential of human agency involved in environmentally induced migration as well as its limits. They therefore chose to try to move conceptually from vulnerabilities to capabilities by embedding environmental migration within the broader frame of the capabilities approach pioneered by Amartya Sen. Capabilities, according to Sen, are not the things that people may be able to do—their ‘functionings’—but their capacity to choose and to live a life they value. The conclusion reconsiders the previous chapters in light of their contributions to the question of vulnerability versus capability and then discusses Sen’s approach in more detail, in particular with respect to its relationship with the realm of human rights that figures so predominantly amongst the contributions of part II.

Keywords Amartya Sen • Capability • Entitlements • Human rights • Migration

10.1 Introduction

This chapter elaborates on Amartya Sen’s entitlement and capability approach and its contribution to overcoming the lopsided emphasis on neo-Malthusian thinking about the natural resource base and its limited capacities to sustain human society. This thinking dominated the approaches of international organisations to combat famines through most of the 1980s and Sen contributed considerably to challenging it. This perspective, however, still influences the climate change and climate migrant debate. Without negating the challenges of climate change, recalling the achievements of Sen’s approach re-embeds the discussions about vulnerability and environmental

The author thanks her co-editor for the lively and fruitful discussions.

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migration at the micro level and re-introduces an agency-oriented perspective that considers the interrelationship between human agency and social institutions. After having shed light on the role of migration within Sen's entitlement and capability frames as well as the subsequent sustainable livelihood approach to development, the contributions to this volume view climate related migration through the lens of the entitlement and capability perspective. Some of the chapters emphasise the role of human rights in protecting the needs and entitlements of those who are most vulnerable to climate change and to its policy responses. Therefore, the concluding chapter turns finally to a discussion in greater detail of the relationship between Sen's work and internationally recognised human rights. Though Sen's theorising had considerable impact on the interpretation of the right to food, the relationship turns out to be ambivalent and characterised by the primacy of democratic and procedural rights over substantive social and economic rights and by a reservation to impose allegedly international values and law over smaller political communities, which is typical of the communitarian perspective. It is shown, however, that his thinking is not entirely consistent.

10.2 From Food Output to the Right to Food and from Vulnerability to Capability

Discussions of climate change are—due to the nature of anthropogenic global warming—largely dominated by the vantage point of population and environment studies (P&E), whose foundations were laid down by Malthus. In his *Essay on the principle of population* (1798) he developed the argument that exponential population growth will, in the long run, exceed the presumably linear growth of food production, which will be a major cause of famines. His legacy to the twentieth century, so-called neo-Malthusianism (the Club of Rome in particular), extended this argument to other forms of resource consumption and the suffering that the mismatch between the increasing human population and its declining natural resource base will cause.¹ Though in the scientific realm P&E studies have diversified and even include critical strands such as political ecology, the neo-Malthusian paradigm still dominates public and political discourses—at least in the western sphere. A recent example is the debate on the increasing consumption of meat and milk in China and India. The main message is that our resource base will break down, because we are too many and consume too much. The call to ensure the survival of humankind is often accompanied by a proclivity to technical solutions. This is most clearly expressed in the Club of Rome's IPAT-formula, which defines 'environmental impact' as a function of 'population', 'affluence' and 'technology' (see Sherbinin et al. 2007, p. 348). Technological progress is thus regarded as a decisive means to exploit natural resources in a more effective and sustainable manner.

¹ For an overview of P&E approaches see Sherbinin et al. (2007). For an overview of the 'degradation narratives' of neo-Malthusianism see Hartmann (2010).

This line of thinking has been playing a major role in tackling the problem of, for example, famine already since the 1970s. Leading development organisations such as the World Bank and the Food and Agriculture Organisation (FAO) at this time reduced the challenge of combating hunger to a deficit in food availability, to which the logical solution was an increase in food production per capita by means of modernising agriculture (Norse 1976; Sinha 1976; FAO 1979).² The World Bank, moreover, promoted trade-based strategies to achieve national food security, that is, purchasing food on the world market by producing and selling cash crops with better terms of trade (Bals et al. 2008, p. 42f). The social unit of food production and consumption thus expands from the national to the global scale. Moreover, this type of market paradigm also complements the technical approach in guiding other resource management policies.

The climate change discourse has both the survival rhetoric and the technical solutions approach in common with the neo-Malthusian paradigm of P&E studies. It has a clear focus on how society's resource consumption fuels the production of climate unfriendly greenhouse gas (GHG) emissions and on its consequences for the atmosphere and climate conditions. For policy advice, the early Intergovernmental Panel on Climate Change (IPCC) reports accordingly focus on limiting GHG emissions by developing more energy-efficient technology and by shifting toward a greater share of renewable energy resources. Both contribute to reducing fossil fuel consumption per capita and to adjusting the economic foundations of our society to the appealing—and widely criticised—idea of a so-called 'green economy'. Such a shift is intended to be driven by market mechanisms that will give incentives to market stakeholders to reduce CO₂ emissions and/or to extend carbon sinks. Thus, the United Nations Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol have been tailored mainly around mitigation and carbon counting mechanisms to avoid unmanageable climate change (Hunter 2009, p. 340).

P&E studies also contribute their frames of reference to the meaning of vulnerability and of adaptation. It is ultimately human vulnerability, for example to famines, which results from the claimed mismatch between the consumption needs of a population and its natural resource base. Thus vulnerability to environmental conditions can be said to be understood as a resource shortage. Translated into the context of global warming and increased climatic variability it can be understood as dependency on ecosystem services which become increasingly unreliable for human use. The definition of vulnerability in both the third and fourth IPCC report of Working Group II (vulnerability and adaptation) mirror this thinking³:

Vulnerability is the degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate change and

² Hartmann (2010, pp. 196f). For further sources see McNerney (1976); Sinha (1976); Norse (1976). An example of a political document in line with this thinking is FAO (1979).

³ For further discussion on conceptions of social vulnerability to hazards see also Villagrán de León (2006).

variation to which a system is *exposed*, its *sensitivity*, and its *adaptive capacity* (IPCC 2007, p. 883; IPCC 2001, p. 288; emphasis added).

In IPCC reporting the ‘human system’ is thus only one system alongside the atmospheric, the climate and the natural systems that are considered to fall under such a definition of vulnerability. Taking again the example of famines, a human system exposed to drought suffers from reduced availability of food. Humans are very sensitive to such conditions, because without food they starve. Coping and adaptation strategies along neo-Malthusian thinking may include food storages from overproduction of former years or from less affected or unaffected regions of food production to bridge the food gap, or—as climatic conditions may change persistently—the introduction of drought resistant crops and other (bio-engineering) innovations to secure agricultural output. Kenya might serve as an example that such conviction of belief in technical solutions is well entrenched in the climate adaptation debate. In its national climate change strategy the Kenyan government calls for biotechnology to tackle national food insecurity and in July 2011 enacted a law that permits the production of genetically modified food in Kenya (Ministry of Environment and Mineral Resources 2010; DeCapua 2011).

Such approaches are of concern to social scientists, practitioners and activists engaged in bottom-up development, and it is useful to recall the arguments against the above mentioned food security strategy of the 1970s and early 1980s. It was in the context of that debate that Amartya Sen developed his entitlement approach, which broadened the analysis of famines to go beyond the lopsided focus on food shortage and food availability. Based on empirical cases he showed that famines and chronic hunger had increased in many parts of the world even though food output per capita had also increased (Sen 1982). This finding discredited the neo-Malthusian approach to famines, according to which food output per head (at local, national, regional, global scales) is a reliable indicator of food security and increasing it the adequate solution to the problem (Sen 1986, p. 6). It is to Amartya Sen’s credit that he pointed out that food insecurity is not just a matter of food quantity, but of ‘entitlements to food’ that are predominantly regulated and restricted by societal institutions. Thus the complex social underpinnings of emergency-like situations as well as of the solutions to them came into focus.

Accordingly, Sen pleaded for the study of ‘the causal mechanisms leading to famine and the precise form it takes’ (Sen 1986, p. 10), which can look very different from case to case. As an economist he proposed to do so by analysing production and exchange patterns. His so-called ‘entitlement approach’ concentrates on the ‘set of different alternative commodity bundles’ a person can acquire by legal means to satisfy his/her need for food. Entitlements encompass ‘endowments’ (entitlements that are owned) and ‘exchange entitlements’ that are achieved by means of trade and production (including wage labour). A person is threatened by misery if there are unfavourable changes in his/her entitlements (e.g., loss of land or labour power) or in his/her ‘entitlement exchange mapping’, that is, the exchange value of entitlements (e.g., declining wages and selling prices, or increasing food prices). Determinants of entitlements such as natural hazards,

inflation, recession-induced unemployment or war, etc. do, however, affect different sections of a population very differently (Sen 1986, pp. 9–10). Accordingly he claimed that the circumstances of different occupational groups, and the ways they are deprived of their entitlements, have to be disaggregated (Sen 1986, p. 20). Moreover, he called for long-term policies, which are ‘geared to enhancing, securing, and guaranteeing entitlements’ (Sen 1986, p. 28).

Sen’s analysis of famines is characterised by an economic perspective that regards entitlements as ‘the commodities over which she [a person] can establish her ownership and command’ (Sen 1999, p. 162). ‘Entitlements’, in a legal sense, seem thus to be reduced to property rights, the right to sell one’s own labour, and the right to exchange goods and services, features that are characteristic of a ‘private ownership market economy’. This interpretation is confirmed by his earlier writing on *Poverty and famine* (1981), where Sen offered his typology of four entitlements, all of which are expressed in terms of ‘ownership’ (Sen 1981, p. 2): (1) trade-based entitlements that allow the selling of goods that one legally owns; (2) production-based entitlements that allow one to own (and then sell) what one has produced by using one’s own resources, or resources hired from willing parties; (3) self-labour-based entitlements that ensure that everyone owns his or her own labour power (as opposed to slavery) and can offer it to others; and finally (4) inheritance and transfer entitlements which allow one to own what has freely been given to him or her by another who legitimately owns it, possibly as an act of charity or inheritance. Such categorisation leaves no doubt that Sen’s entitlement approach to famines is about economic entitlements and that his preferred societal system of reference is the market economy.

Sen’s work on entitlements to food must, moreover, be seen in relation to his capability approach, on which he started to work shortly after (Sen, 1984a [1982], 1984b, 1985). His work on capabilities is rooted in his search for alternative measures of living standards. As with the neo-Malthusian idea of food security he regarded the existing measures of living standards, gross domestic product and income, as thoroughly inadequate to measure wellbeing and development (Sen 1984a, [1982], pp. 74–79). Again he diverged from the dominant macro and aggregated approaches of his time to emphasise the importance of the micro level and of agency [Overseas Development Institute (ODI) 2001, p. 1]. Already in 1982 he called his approach ‘that of freedom’ which finally culminated in his book *Development as freedom* (1999), where human agency gains centre stage. Freedom was ‘interpreted in its “positive” sense (to be free to *do this* or *be that*) rather than in its “negative” form (not to be interfered with)’ (Sen 1984a, [1982], p. 85). His point of departure was to re-define development as ‘a process of expanding the real freedom people enjoy’ (Sen 1999, p. 3) and to understand freedom as ‘the expansion of the “capabilities” of persons to lead the kind of lives they value—and have reason to value’ (Sen 1999, p. 18). Living conditions are thus directly reflected in the bundle of functionings a person has achieved, such as being well fed, educated and so on. In contrast, capability is what a person *can do* or *can achieve*, that is, ‘the opportunities you have regarding the life you may lead’ (Sen 1986, p. 36). In other words, capability is the bundle of potential functionings someone is able to choose from and to

realise. It 'refers to the alternative combinations of functionings that are feasible for her [a person] to achieve. Capability is thus a kind of freedom: the substantive freedom to achieve alternative functioning combinations' (Sen 1999, p. 75).

To stay with the example of hunger: in the case of religiously motivated fasting or a hunger strike, 'to be hungry' is a chosen function and expression of capability; in the case of starvation and chronic hunger it is an expression of unfreedom, because those affected can hardly, if at all, exercise any choice about this living condition. The example also shows that realised functionings do not in all cases depend on the disposal of commodities and other assets; they can just as well imply the choice to abstain from certain goods. However, in most cases the availability and use of certain commodities is a precondition for effectively realising functionings and exercising choice. Though a high degree of capability is not equal to a high degree of access to commodities, the two are nevertheless strongly related in many cases. Availability of and access to commodities and other assets are nevertheless highly conditioned by formal and informal institutions. Sen thus gives particular importance to political participation and to democratic procedures.

What people can positively achieve is influenced by economic opportunities, political liberties, social powers, and the enabling conditions of good health, basic education, and the encouragement and cultivation of initiatives. The institutional arrangements for these opportunities are also influenced by the exercise of people's freedoms, through the liberty to participate in social choice and in the making of public decisions that impel the progress of these opportunities (Sen 1999, p. 5).

Types of 'instrumental freedoms' include (1) political freedom, (2) economic facilities, (3) social opportunities, (4) transparency guarantees and (5) protective security (Sen 1999, p. 38). 'Political freedom' explicitly includes 'civil rights' and all the varieties of political freedoms that are usually associated with political rights and are the *sine qua non* conditions of democracy. 'Economic facilities' entail 'opportunities to [...] utilize economic resources for the purpose of consumption, or production, or exchange' and thus correspond to the term 'entitlement' in his reflections on famines, which he now refers to as 'economic entitlements' (Sen 1999, p. 39). 'Social opportunities' refer to the 'arrangements' a society offers to enhance, for example, education and health care. 'Transparency guarantees', which include the 'right to disclosure', he regards as fundamental to support relations of trust within a society and to combat corruption. 'Protective security' calls for arrangements within a society to support those who suffer hardship due to economic crisis or natural disasters, etc. Sen views those freedoms as mutually reinforcing and considers social opportunities in particular to be essential, not only to improve morbidity or literacy rates, etc., but also to enable more effective participation in economic and political life.

The reason Sen regards those freedoms to be 'instrumental' is presumably that all of them serve to enhance 'capability', that is, 'substantial freedom' (Sen 1999, p. 75). That the first of those instrumental freedoms, in his view, nevertheless enjoys a privileged status becomes clear from his elaboration of the 'pre-eminence of political freedoms and democracy' (Sen 1999, p. 147f), which are of both instrumental and intrinsic value.

Sen's theorising revolutionised the conceptualisation of food security and of development. With respect to food security it unmasked the shortcomings of the neo-Malthusian approach taken by the FAO and the World Bank to solving the problem of famine simply by increasing food output. In line with Sen's distinction between the availability of food and its accessibility according to a person's entitlements, the FAO at least adjusted its food security policy to embrace the access dimension and even included the question of food preferences, which can be said to reflect the matter of choice in the capability approach (FAO 1996, p. 1). This approach finally informed the interpretation of the right to food, part of the International Covenant on Economic, Social and Cultural Rights (ICESCR) by the respective treaty committee (CESCR 1999, General Comment no. 12) and the adoption by the FAO member states of voluntary guidelines on realising the right to food (FAO 2004).

10.3 Sen's Impact on Thinking About Development, Social Vulnerability and Migration

Beyond the policy debate on food security Sen's work on entitlements and capabilities inspired the entire discipline of livelihood research and the development of the sustainable livelihood approach (SLA) as a useful tool for analysis and planning in development cooperation (Beall 2005, p. 1; de Haan and Zoomers 2005, p. 31). Livelihood research has its roots as well in the search for more actor-oriented approaches in development studies as an alternative to structuralist and other macro economic approaches. In contrast to Sen, whose emphasis on freedom logically embraces the individual as the unit of analysis, livelihood research focuses on the household because of its important role in organising livelihood strategies in the case of the poor. This makes sense, because households are one of the most important social formations in the accumulation of assets and help to overcome the restrictions individual members would face to achieve comparable assets. Moreover, household-based livelihood research allows for the investigation of typical strategies of sub-groups of a population (de Haan and Zoomers 2005, p. 28f).

The SLA developed in the 1990s puts more emphasis on the issue of capability, not only on availability of assets and their strategic use. Two of its main pioneers, Chambers and Conway, defined 'livelihood' as 'comprising the capabilities, assets (including both material and social resources) and activities required for a means of living' and 'sustainable livelihood' as a livelihood that 'can cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets, while not undermining the natural resource base' (Chambers and Conway 1991, p. 6). They refer directly to Sen's work on capability and wellbeing during the 1980s by emphasising the value of capabilities as an end and as a means of livelihood. Chambers interprets capabilities as 'what people can do or be with their entitlements', and that allow people to define for themselves the criteria for development they value (Chambers 1997, after Scoones 1997, p. 6). The sustainable livelihood framework, the SLA developed by Scoones, sets up a non-exhaustive

list of ‘capitals’ comprising natural, economic and financial, human and social capital, which he brings close to the notion of Sen’s ‘entitlements’ by calling them ‘endowments that they [people] have access to and control over’ and which include tangible and intangible assets (Scoones 1997, p. 8). The term ‘functionings’ did not enter into SLA parlance, but it might be associated with ‘livelihood outcomes’, that is, what has been achieved through a certain livelihood strategy, based on available livelihood resources (capitals). One of the main achievements of the SLA in comparison to the ‘new household economics’ is the systematic consideration of structures, processes, formal and informal institutions that support or impinge upon access to resources and available livelihood strategies (Scoones 1997, pp. 4, 11f). Again the SLA here follows Sen’s call for the investigation of the role of social institutions and mechanisms in access to entitlements.

Those ideas finally also fed into conceptualisations of social vulnerability to climate and environmental change in the works of Chambers (1989), Watts and Bohle (1993), Adger and Kelly (1999) as well as in Blaikie et al.’s (1994) access-to-resource model. Their reliance on the entitlement approach is expressed in statements such as, for example, ‘The response to climate change is facilitated and constrained by the same architecture of entitlements as adaptation to other social and environmental stresses’ (Adger and Kelly 1999, p. 255) or ‘Any strategy envisaged as feasible for coping with future climate change must be rooted in a full understanding of the complex structure and causes of present-day vulnerability’ (Bohle et al. 1994, p. 37).

Migration figures prominently within the new household economics and the sustainable livelihood frame. It is considered a major livelihood strategy applied to accumulate resources and to reach social upward mobility or at least to avoid downward mobility. In livelihood research and the SLA, migration is treated as one of the major accumulation strategies in addition to land acquisition and labour recruitment (de Haan and Zoomers 2005, p. 39), agricultural in- and extensification and livelihood diversification (Scoones 1997, p. 14). In this sense the ‘new economics of labour migration’ (NELM), with its focus on remittances as a means of income diversification and informal risk insurance, clearly fits into the school of thinking of ‘household economics’, which investigates income and survival strategies of the poor. Scoones also refers indirectly to the NELM when he speaks of ‘migrancy and remittances’ as an alternative to rural credit schemes that fail to cover the financial and investment needs of rural households (Scoones 1997, p. 14). Migration—within the SLA as well as within the NELM—works as a substitute for the deprivation of in situ entitlements such as local food production, income or educational opportunities. At the same time migration cannot be realised by everyone and is thus also related to capability. In research on social vulnerability and adaptation to climate change Adger et al. (2002) accordingly investigated the role of migration and remittances, which are now promoted by the IOM and reflected in the fourth strand of the ‘climate migrant’ debate (see Chap. 1).

When considering the role of migration for livelihood strategies some caution is nevertheless indicated. The migration option relies strongly on societal factors such as supporting networks and labour market demand, and thus also

entails considerable risk of failure. Besides its costs and risks of failure, migration increases the ‘multi-locality of livelihoods’ and thus hampers coherent household decision-making (de Haan and Zoomers 2005, p. 39). The household as the unit of analysis, moreover, obfuscates internal household hierarchies and structures of power that determine who within the household effectively has access to a household’s resources and who can effectively take advantage of the achieved functionings or livelihood strategy outcomes (Faist 2000, pp. 29–61). The household is also not the only form of collective resource accumulation. Other social formations such as village communities, clans, associations and networks equally facilitate accumulation and command of assets. Even the nation state can be regarded as a realm of collective resource allocation. Any of these social formations, however, can determine if and how individual members can take advantage of their accumulation capacities. For some, and not necessarily a minority, they might constrain resource accumulation at the individual level and thus hamper the capability and development of freedom of those individuals. For those who are capable, migration can, however, equally lead to the fragmentation of social ties between household and community members, which reveals that not only do individuals depend on such social units, but also that the social units depend on the membership of individuals.

From the viewpoint of the capability approach, which focuses on the individual, migration could best be described as a means—a strategy—to achieve certain functionings. The distinction between means and functioning is, however, a bit fuzzy, because the process of organising for certain means can take on the characteristic of realising a functioning, and sometimes functionings can equally be regarded as intermediate steps taken to reach other, superior, functionings. Thus, in the process of organising for migration, reaching mobility appears as a functioning, while ultimately is undertaken to achieve other functionings. For some people mobility might moreover appear as a value in and of itself. In any case, to be mobile—whether practiced or not—is an expression of capability.

10.4 The Role of the ‘Entitlement’ and ‘Capability’ Approach

Most of the contributions to this volume do not refer to the role of capabilities, though many of them—explicitly or implicitly—do refer to the SLA and the NELM approach, and draw on the crucial insights of the entitlement approach. Chief amongst these is that unfavourable changes in a person’s or household’s tangible and intangible endowments constrains a person’s or household’s ability to achieve basic functionings such as adequate food, water or health. Unfavourable changes in endowments and exchange mapping likewise limit a person’s or household’s capability to realise desired functionings beyond the basic needs for ensuring survival. But the contributions equally highlight the negative repercussions of the capability to migrate in terms of social vulnerability and the trade-offs between individual capabilities and capable solidarity networks which may result. Cases

of impelled or forced migration and relocation, moreover, reveal the potential of human rights to protect entitlements and capability.

Richard Black, Dominic Kniveton and Kerstin Schmidt-Verkerk's integrated assessment of the sensitivity of existing migration drivers to climate change is largely concerned with the macro level perspective. It thus offers little opportunity to test it against the capability and entitlement or household approaches, which refer to the individual or household level and thus start from a micro perspective. Nevertheless there are some links associated with the idea of migration as a form of opportunity enhancement. If climate change upsets agricultural or industrial production and thus labour demand declines in the most important destination areas of internal migration in Ghana, unfavourable changes in the endowments of the affected labourers can result. It deprives the migrant workers of their entitlement to income in exchange for their labour, and their families at the place of origin from remittances as an additional source of income. Though income disparities between places of origin and destination are certainly not the only factors determining migration, migrant labourers in the Accra and West Coastal areas indeed do come from the poorer north of the country where there are few economic opportunities and environmentally harsh conditions that do not allow for productive agriculture. The sensitivity of the destination area to climate change might thus initiate new migration dynamics to other destinations with labour demand, which would (or at least ideally) allow those migrants to maintain labour migration as a strategy to enhance their and their homestead's income and thus to achieve substantive functionings. The breakdown of labour demand due to climate change might, however, equally lead to return migration to arid and poor homestead areas, if the workers were deprived of the capability—the choice—to enhance income and opportunities by means of labour migration. In the case of national and short-distance migration such a scenario is not unlikely, because the number of destinations with high labour demand is—particularly in developing countries—usually limited.

When it comes to international labour migration to the long-distance destinations of the developed world, for example the UK and the US where demand for social care and other services is high, an effective capability to migrate in turn proves to be highly dependent on transnational social ties to the Ghanaian diaspora community in those countries. Such intangible social assets are not available to the majority of Ghanaians. The type of labour demand also determines who of the potential migrants can effectively diversify his/her entitlements and thus the scope of personal capability, as seen in the example of Bangladesh. Though migrants to the urban centres in search of income opportunities are still predominantly young, poor and male, the need for female workers in the increasingly significant garment industry of Bangladesh now endows women with labour migration as an available means to enhance capability. Put more precisely, for females, migration becomes an additional optional functioning within their bundle of functionings from which they can choose, and which in turn enhances freedom of choice and thus capability. In sum, the contribution shows clearly how changes in external conditions cause both unfavourable and favourable changes in the entitlement exchange mapping of certain groups.

Robert McLeman and James Ford's contribution, in contrast, reflects the great diversity of ways in which migration and capability can be linked with each other. The authors elaborate on the question of how demographic changes, including migration, impact upon communities' vulnerability to climate change and their adaptive capacities. The four case studies share the notion that demographic change, including migration, has a particular impact upon social reciprocity networks. The strong social networks in the rural area of Ontario (Canada) had always been an important livelihood resource to solve communal challenges, including those caused by climate change such as clearance of streets from uprooted trees after one of the increasingly severe and frequent storm surges. Social capital is thus of great importance for organising everyday routine as well as cultural life. In one community, for instance, a historic grist mill had successfully been converted into a community centre to serve as a new venue for the winter carnival (formerly held outdoors), the latter thus becoming independent of the warming weather. It is exactly this social fabric, however, which becomes distorted by out- as well as in-migration. The young move to urban centres for education and employment, never to return. Their numbers are only partially 'replaced' by middle-aged town dwellers who buy out local real estate to enjoy rural living. Those newcomers, however, do not seek integration into local community life.

In the case of rural Ontario the capability of the young residents to search for better opportunities by migrating to the urban centres entails a trade-off with the community's capacity to organise communal life and its challenges effectively. The impact of out-migration on the community is thus comparable to that on households: joint and coherent decision-making becomes difficult, because distant members absent themselves from communal obligations and withdraw their labour and social skills from the bundle of assets available to the community. The retiring senior city dwellers who buy into the local estate market, residing only selectively during pleasant summer months and not integrating themselves into the local society, exercise a great level of choice. Their capability to establish a second dwelling place and to reside in it according to their personal timetable is indeed an expression of freedom. It is to the disadvantage of the community's adaptive capacities at large, however, because it does not compensate for the out-migrating youth, and it eventually deprives the locals from accessing the more attractive (and expensive) lakeside properties for fishing, raises prices and taxes, and leads to gentrification, segregation, greater inequality and social disarticulation. Though it is not common to speak of capabilities of a community, it is nevertheless obvious that the mobility—as a capability—of some diminishes the capabilities of others, because they lose collective accumulation capacities and social capital as constitutive assets useful for realising certain functionings they need or appreciate to live the life they want and used to live.

In the Iqaluit case, the capital of Nunavut, high in-migration of Inuit population from other Nunavut communities, high birth rates amongst the Inuit population, and in-migration from out-of-province Canadians for labour opportunities resulted in an extraordinary population growth rate. Here, in-migration contributes to an increasing mismatch between old experienced hunters and a young population inexperienced and increasingly uninterested in hunting, which—together with the

warming climate and accordingly changing animal migration patterns and environmental conditions—leads to the advancing fragmentation of the self-sustaining food supply and to its substitution by market mechanisms. Due to this mismatch between the young and the elderly, local knowledge and skills can no longer be transferred in the traditional way, nor are the remaining hunters willing any longer to share their prey for free with their (non-hunting) extended families. The capability to hunt and to move safely in the difficult and changing environment of Nunavut dissipates, and inhabitants become increasingly reliant on monetary income, the labour market and the social welfare system to fulfil the function to be food secure. At the same time the capital offers a much better education system so that the more traditional skills passed on by hunters will be replaced by modern skills such as speaking English, which is endowed to the young. To command both sets of skills would, however, be the most favourable combination of functionings in this environment and ensure the greatest capability. The current situation might instead lead to newly emerging migration of—young and English-speaking—Inuit population from Nunavut to urban centres of Canada with better job opportunities, because a livelihood outside of the labour market is no longer available to them. To the elderly, in contrast, such an option is not available.

The contribution of Soumyadeep Banerjee, Jean-Yves Gerlitz and Dominic Kniveton, which is explicitly based on the SLA and NELM approach, explores the possibility and utility of remittances as the most crucial benefit from migration for local adaptation. Access to remittances here clearly figures as an important means to ensure entitlements to food and to enhance local asset accumulation to cope with and prevent the repercussions of water stress (too much or too little water) on agriculture. Thus, income from remittances helps to compensate for the decreased capability to fulfil the function of food security by subsistence farming and husbandry. The labour migration option is, however, ridden with prerequisites. Households must be capable of dispensing with the labour of the migrating household members as well as enabling the successful transition to the destinations including travel costs or even costs of agents to access the labour market at destination places. Moreover, income opportunities there must prove stable and costs of transferring the money must not be too high. The results of labour migration were mixed. Though migrants had not been able to send remittances regularly and at high levels, they nevertheless contributed more than half to household income, which might be due to significant income disparities and opportunities between the rural sending communities and the urban destinations. Those households not capable of sending members were therefore assumed to have been caught in a vicious cycle of poverty because they were unable to substitute lost assets to acquire and produce food or to invest into adaptation by means of labour migration. Sending households nevertheless also contributed to improved terms of entitlement exchange of other households insofar as they procured goods and services from local service providers with their additional cash. The local service providers may themselves have been able to send members for labour migration, so that it remained unclear whether income generated directly (for migrant households) or indirectly (for service providers) from remittances also contributed to increasing levels of inequality, and thus also in experience of capability, between community members.

Tanvir Uddin's econometric study of the coping capacities of Bangladeshi households after the severe floods of 1998 offers a detailed inquiry into entitlements to food by the affected population on the household level. The main focus on endowments and other economic entitlements to acquire food is consistent with Sen's entitlement approach, and the contribution thus offers valuable insights into how entitlement to food can be captured by quantitative and econometric approaches. Welfare, measured as calorie intake, was directly affected by flood-related crop failure and indirectly by increasing food prices and dropping wages due to flood-related economic breakdown. The entitlements considered as relevant to calorie intake and selected for investigation included: first, literacy of household heads and level of female education which imply better capability of crisis management and income generation; second, consumer assets, livestock and land holdings as assets that can be sold to buy food or which can be used to produce and sell food; and third, access to loans and food credits to invest in food production or to buy food, respectively. The chosen variables do not, however, include social capital in the management of such types of crises (as included in SLA) and the role of 'instrumental freedoms' of the capability approach beyond economic entitlements. By selecting calorie intake as the main indicator of welfare it ignores Sen's work on the standard of living, where he concludes that the scope of capability, that is, the real freedom of choice, is the more comprehensive and appropriate measure of wellbeing.

Though only a limited number of the means and conditions determining the functioning of food security have been captured, the results are sobering. The econometric comparison of households along the chosen characteristics showed that, in particular, consumer assets, female education and food credits consistently proved crucial to redress, maintain and improve calorie intake—the function necessary for food security. The role of livestock and landholdings was less clear, which is assumed to be related to different degrees of damage of those assets by the flood, consecutive crop failure and/or difficult market and marketing conditions for those assets and their production. Food credits, which played an important role in ensuring calorie intake, turned out to be problematic: though they mitigated food shortage at the first instance, they burdened households with long-term debts, which hindered long-term recovery. Debt burden reduces the bundle of available functionings or the scope of capability, because income has to be spent on debt payments. The author suggests that such repercussions could possibly be avoided if food credits are substituted for remittances. This option is, however, dependent on the terms of exchange mapping. It has thus to be kept in mind that income generation by (skilled) employment could only take effect after the very slow recovery from economic decline in the aftermath of the floods. The capability to substitute food credits for remittances in these circumstances might thus have been limited with the exception of those who had or could send household members at/to destinations outside of this large-scale disaster area.

In sum, the case studies of the first part of this volume show that the potential of migration for adaptation is limited and can even have adverse effects such as increases in social inequality and social fragmentation. It depends, ultimately, on who migrates where and with what resources. The contribution of McLeman and

Ford, moreover, showed that out- and in-migration may cross-cut and this may exponentiate the resulting declining entitlements for those who do or cannot migrate.

The contribution of Chloé Vlassopoulos is difficult to discuss within the frame of the entitlement and capability approaches, which are designed for the analysis of the individual and household level, and not for discourses. It could nevertheless be argued, with caution, that her discourse analysis reveals that changes and shifts in the debate are related to the incapacities of the respective institutions to anchor the issue of climate change adaptation within the political realm. This incapacity is again shaped by structures and processes, here mainly of inter-state relationships. It leads to a failure to design adequate policy responses to support affected populations and thus to a failure to maintain and enhance their capabilities to cope with the challenges of environmental and climate change. The narrowing of policy responses to support for circular labour migration, whose potential is entirely determined by labour demands in destination countries, and for planned relocation, with all its pitfalls for maintaining sustainable livelihoods, might turn out to be of limited success and in some cases even an additional disaster. This underscores the point that public discourses on policy choices do not only have an enabling role, as suggested by Sen, but that discourses and their dominant actors—often represented by influential institutions—can equally limit policy choices and work to the disadvantage of those who cannot effectively participate in such debates. The role of institutions, mainly of formal ones, is of importance to the remaining contributions of part II as well.

Volker Böge describes in detail the challenge of maintaining a high degree of capability of communities threatened by the complete disappearance of their homesteads and who are therefore compelled to relocate. Inadequate institutional response appeared to be a major challenge to the success of the autonomously organised relocation process of the Carteret islanders to Bougainville (both Papua New Guinea). Those affected had been very engaged in making the—in the long run—unavoidable relocation from their sinking island a self-initiated and self-governed process. Even the name chosen for this relocation initiative, Tulele Peisa, which means ‘sailing the waves on our own’, emphasises the will to uphold their human agency and remain the masters of their destiny. Project plans were moreover characterised by a great sensitivity to the capability dimension of the host community.

Programme components designed to secure and enhance the capabilities of the community included establishing a sea transport service between the place of origin and the new settlement to maintain the social relationships between those staying behind and the pioneers, and thus seeking to prevent the social fabric of the Carteret community from fragmenting. It also opens the opportunity for exchange of goods which might become crucial to maintain those who decided to stay on the island as elderly and deeply entrenched people frequently do. To establish mobility between customary and new places of living is not just a matter of saving lives, but also of fulfilling the social duties of the young toward the older generation. Similarly, the relationships with and responsibilities toward ancestors and unborn generations can only be meaningfully maintained if access to the Carteret Islands is ensured—at least for some time. Not being able to fulfil such deeply felt duties is likely to cause psychological trauma. The spiritual and psychological dimensions of the uprooting caused by relocation were taken into account in the

ceremonies meant to welcome the relocation pioneers at the destination. Though the spiritual dimension is not given due consideration in the entitlement approach, which is confined to the legally accepted means to acquire certain goods such as food, it is contained within the capability approach which regards a high degree of 'capability' as a high degree of freedom to live the life one chooses and appreciates, which certainly includes life's spiritual or religious dimensions.

With respect to the host communities Tulele Peisa puts great emphasis on establishing social relations favourable to integration. Exchange programmes between the elders and leaders of both incoming and receiving communities, the consideration and promotion of inter-marriages, and the felt need to improve the standard of living of the host communities and to make relocation appear to be an advantage for both sides are all measures intended to advance 'bonds and social cohesion' between the new neighbours. Solidarity and reciprocity networks, as could be observed also in the contribution by McLeman and Ford, are thus crucial to successful adaptation and management of stress. In this case, the failure of integration was not, however, the result of a general unwillingness on the part of the newcomers, but was related to former political and violent tensions, a prior civil war between Bougainville and the central government, which did little to make outsiders feel welcome. Thus, having been unable to establish new social ties successfully, the Carterets islanders failed to prevent the conflicts they wished to avoid. This failure was also due to the unsolved question of land for the resettlers and their access to natural resources. Entitlement to land thus proved to go beyond spiritual questions and to be a 'hard issue' which could have been solved—at least partly—by purchasing land with money. Such financial assets were not, however, part of the entitlement bundle at the disposal of the islanders. This had been expected to be provided by external support through the government, which nevertheless allocated too little (two million instead of 14 million) and even then did not disburse the allocated funds due to bureaucratic mismanagement and, most likely, corruption. This institutional failure hindered Tulele Peisa to a large extent from realising its objectives successfully, with the result that families returned to their sinking island because of resource conflicts despite all efforts at careful and sensitive planning.

Jeanette Schade explores in greater detail how planned relocation as a response measure to climate migration deprives communities and their members of crucial livelihood resources, which causes them to lose their entitlements to food and to the means for realising other substantive functionalities and thus also their capability to choose freely between livelihood options and strategies. Those impaired entitlements range from accessing land and water to produce food, to accessing adequate housing, education and health services. They also include mobility to organise for certain functionalities such as maintenance of health or generating income at a distance. In some cases entitlement to food was even limited to what Sen labeled 'transfer entitlements' (Sen 1981, p. 2), that is, food owned by others who have given it freely, in other words food aid. It is obvious that food entitlement which is restricted to transfer entitlements displays a very low level of capability or even the opposite of capability and freedom, which is complete dependency and absence of choice. Moreover, communities frequently experience relocation—particularly when it is forced—as traumatising, resulting in social disarticulation and

fragmentation, which deprives them additionally of the social capital of their community life. Again the greater mobility of the working age population helps on the one hand to ensure the functioning necessary to acquire enough food at the household level, but on the other leads to greater isolation of those who stay behind.

In search for an institutional frame that safeguards the entitlements of those subject to planned relocation, Schade proposes a human rights approach derived from the Basic Principles and Guidelines on Development-based Evictions. The application of such guidelines within an institutional setting that enables their enforcement would be an example of how institutions can contribute to the protection of entitlements to livelihood resources and associated substantial human rights as well as procedural rights that allow the affected to have a stake in decisions about relocation plans. Though fulfilment of substantial rights such as access to water, food, clothing, housing and health are certainly vital to survival, it is procedural rights in particular that are, from a capabilities perspective, crucial to protecting human agency in leading a self-determined life, freedom of choice and welfare beyond nutrition intake. Thus, the contribution covers both human rights as an instrument to enhance individual capability and the institutional settings required to improve their enforcement.

Megan Bradley and Roberta Cohen deepen the discussion on protection gaps in dealing with so-called environmental migrants, refugees and internally displaced persons. Of particular concern to them are those who cross international borders, who flee slow onset disasters, and who become stateless due to the complete disappearance of state territory as in the case of small island states. It is these victims of environmentally caused cross-border flight and gradually impelled migration and statelessness who are not covered at all by existing regimes or normative frameworks. But the frameworks in place for dealing with those who are internally displaced due to natural disasters do also suffer from deficiencies. Bradley and Cohen therefore scan existing international arrangements for legal and organisational gaps, and display a clear preference for a human rights-based approach. It is their observation that policy responses frequently become discriminatory in practice toward minority and vulnerable groups, including women, if they lack effectively applied human rights-based standards. Inequitable access to aid, discriminatory evacuation plans and gender-based (sexual) violence are common results.

Such effects, they explain, can be studied not only in cases such as Burma or China, but also in democratic societies. Though the US government applies human rights standards in its humanitarian aid abroad, it abstains from them in its domestic disaster management because it fears the threat of lawsuits in case of non-compliance. Evacuation, emergency aid and reconstruction during and in the aftermath of Hurricane Katrina revealed the extent of discriminatory practices within US governmental responses. Bradley and Cohen thus regard it a crucial institutional gap that most countries have not yet integrated human rights into their national disaster responses. They assert that the identification of vulnerabilities must be connected consistently with human rights to guarantee adequate protection of and attention to the needs of vulnerable groups. Moreover, they emphasise the importance of consultative processes to provide a voice to vulnerable groups, which become inaudible when top-down approaches are applied. Court cases, or the

threat thereof, are regarded by the authors as an important accountability mechanism that raises the awareness of governments about their duties and responsibilities according to internationally recognised human rights and humanitarian law. As an example they mention the lawsuit against Russia before the European Court of Human Rights addressing the state's failure to save lives and compensate survivors of the mudslides in the northern Caucasus. They stress moreover the role of public but independent institutions such as national human rights commissions to support monitoring of state behaviour.

The latter two contributions strongly emphasise the potential of human rights standards, laws and institutions to protect those who suffer from environmental degradation, natural disaster and inadequate policy responses. Such standards, it could be argued, function as safeguards that protect the capabilities of the affected mainly in two ways. They endow them with legal entitlements to substantial rights as well as procedural rights to participate in the decisions over their future life options. Embedded into international human rights law and treaty body monitoring, regional human rights courts and commissions, national supreme or constitutional courts, and other accountability systems such as national human rights commissions, ombudsmen, and a vital civil society, this seems an appropriate institutional frame that opens up the choice to complain or even to file a lawsuit against indifferent and reckless authorities. Embedding such entitlement to human rights may help the affected to maintain a greater freedom of choice and to exercise more human agency than they normally have in such emergency-like situations. The question arises whether Sen himself would have supported the idea of human rights, in particular social and economic rights, as an appropriate instrument to ensure economic entitlements and enhance capabilities. The following will therefore explore in more depth the relationship between capabilities and human rights within Sen's work.

10.5 Entitlements, Capability and Human Rights

There is considerable discussion as to whether Sen's entitlement and capability approaches can be assumed to support human rights approaches to development and disaster management. This question must be raised particularly with regard to substantial human rights that constitute legal entitlements to minimum standards of food security, health services, housing, education and so on. In line with Edkins' critique that 'entitlement to food' in Sen's interpretation does not entail any 'right to food' (Edkins 1996, p. 559), de Haan and Zoomers also argue that 'entitlement' according to Sen means 'what people *can* have, rather than what they *should* have; [and only] the latter is a right' (de Haan and Zoomers 2005, p. 35). An ODI Briefing Paper, in contrast, asserts that 'starvation' occurs 'as a consequence of shifts in entitlements resulting from exercising rights that were legitimate in legal terms' (ODI 2001, p. 2). They thus refer to the interpretation of 'entitlements' as a kind of ownership of commodities, production facilities

and labour power and the right to use and exchange them as elaborated by Sen in *Poverty and famines* (1981). Beyond that they take the position that Sen's idea of freedom comprises opportunity to be adequately fed, sheltered and so on (all components of ICESCR), as well as civil liberties (components of the ICCPR), and they point to the human rights parlance of the UNDP report of 2000 to which Sen contributed considerably (ODI 2001, p. 3). Moreover, the impact that Sen's work had—intended or unintended—on the development of the right to food concept encourages the assumption of a positive relationship between the capability and human rights-based approaches to development. In the scientific sphere it was Martha Nussbaum who argued particularly for capabilities to be interpreted as a species of human rights, and who developed a priority list of such rights which includes rights under the ICESCR (Nussbaum 2002).

Sen's work is, however, ambivalent on the matter of human rights. The capability approach as described in *Development as freedom* (1999) is embedded into the normative language of freedom. Sen emphasises the importance of political and civil liberties, which are anchored in the ICCPR. He makes no similarly strong references throughout his writing to the economic, social and cultural human rights (ESC rights) of the ICESCR, although it would seem appropriate to do so at many points. In his introduction, for example, he mentions inter alia poor economic opportunities and systematic social deprivation, insufficient access to health care, clean water, functional education and economic and social security as major sources of 'unfreedom' (Sen 1999, pp. 3, 15). Nevertheless he refrains from using ESC rights language to support his argument. In addition, in his elaboration on 'instrumental freedoms', i.e., those crucial to achieve development, he lists a mixture of ICCPR and ICESCR related freedoms, but refrains from using rights language in the case of the latter. He prefers to call them (1) political *freedom* on the one hand, but (2) economic facilities, (3) social opportunities, (4) transparency guarantees and (5) protective security, on the other hand (Sen 1999, p. 38; emphasis added).

Sen's reluctance to speak out in favour of a comprehensive human rights approach to development—including economic and social rights—is not a case of neglecting to examine philosophical disputes about the societal role and status of rights. This becomes obvious in his elaboration on reproductive rights in *Development as freedom* (1999, p. 211ff) and in his early article on *Rights and agency* (Sen 1982), where he proposes a 'goal-rights system'. Such a system is his favoured approach to avoiding the pitfalls of the philosophical traditions of the 'welfarist consequentialist/utilitarian' and the strictly 'constraint-based deontological' view of rights. The former values rights only as 'instrumental' means to maximise right-independent utilities and thus often has a tendency to privilege the interests of majorities within a society over minority rights. The latter, in contrast, ascribes intrinsic importance to rights and has thus a predisposition to claim fulfilment of rights irrespective of the possibly negative consequences of that fulfilment for the realisation of overall utilities and for the fulfilment of other rights and the rights of others (Sen 1982, pp. 4–7).

The 'goal-rights system', Sen suggests, instead allows for the 'inclusion of right-based considerations in the goals themselves (and thus permits its direct use in the evaluation of outcomes and consequences), but it does not deny the use

of instrumental considerations as well' (Sen 1982, p. 16). He actually seeks a rights system that offers room for considering the social ordering of rights as well as for the consequence analysis of their realisation in a particular situation. In other words, Sen seeks to overcome the shortcomings of the utilitarian/welfarist approach to rights as purely instrumental and those of the deontological approach which does not take into account the consequences of the realisation of rights, with his own 'goal-rights system'. Already in the early 1980s he preferred goal-rights to 'take the form of rights to certain capabilities', and calls it a 'capability rights system', if all goals take that form (Sen 1982, p. 16). Such goals should include both negative rights (*freedom from* fear, coercion, misery, etc.) and positive rights (*freedom to* actively realise certain rights), which implies respecting and facilitating the necessary means for the fulfilment of rights. According to Martha Nussbaum, Sen thus acknowledges the importance of rights as 'side constraints for the pursuit of social well-being' (Nussbaum 2002, p. 9).⁴

It would be far from correct, however, to deduce accordingly Sen's support or tacit approval of ESC rights as rights. In later writings he distinguishes between 'substantive opportunities' and 'freedom of processes', which correlates with substantive and procedural rights respectively. The capability approach, he emphasises, can be 'helpful in understanding the opportunity aspect of freedom and human rights'; but he also makes very clear that it 'distinguishes appropriately between whether a person is actually able to do things she would value *doing*, and whether she possesses the *means or instruments or permissions* to pursue what she would like to do', and states that the capability approach highlights the first and thus 'resists an overconcentration on means (such as income and primary goods)' (Sen 2005, p. 153). Though the capability approach enables an investigation of variables that explain differences in capabilities and sets of personal means, and though Sen certainly recognises unfreedom—being deprived of substantial freedoms—as a major cause of poverty and famine, he actually resists the idea of legal rights to certain means or commodities.

The explanation for this resistance lies in the philosophical traditions Sen belongs to. He explained his reluctance to offer a list of central capabilities as being linked to his respect for democratic deliberation, which does not allow for predefining such substantial capabilities (cp. Nussbaum 2002, p. 14). He cannot see how such a 'canonical list' can be drawn up and how its items can be weighed against each other in their respective priority without considering a specific context (Sen 2005, p. 157). Sen even explicitly opposes himself to the philosophical tradition of John Rawls and the 'difference principle' in his *Theory of justice* (1971), which calls for 'distribution-sensitive aggregation of personal utilities' (Sen 1982, p. 4f), that is, mechanisms for the distribution of means and primary goods (Sen 2005, pp. 153f, 156f). He thus clearly positions himself in the dispute between liberals and communitarians, which was prevalent in the US during the 1970s and 1980s, on the communitarian side. The latter rejected all attempts to pre-define common goods (as Rawls did) but saw them as subject to democratic deliberation (cp. Schade 2002). Thus political and civil rights, it can be said, are

⁴ Sen himself does not use the term 'side constraints', except when referring to Nozick's philosophical reflections (Sen 1982, p. 12). See Nozick (1974, pp. 28–29).

actually thought of as preceding economic and social rights and as enabling rights that allow citizens to claim such social and economic rights.

Though this dispute was discussed against the background of the nation state as the largest social unit of such a community, this positioning translates into the question of ‘transnational social rights’ as well and here the communitarian perspective actually opposes the cosmopolitan perspectives of a global society with common normative standards (Faist 2011, p. 443ff). It is thus not surprising that Sen—with regard to international human rights—states that not everybody ‘must always agree to the same view of the exact specification of human rights’. His communitarian viewpoint, with a certain bias toward nationally confined communities, entails his resistance to acknowledge the universality—or more precisely the universal meaning—of human rights across political communities, thus transcending their respective value systems. He instead persists in emphasising the ‘process aspect of freedom’, ‘information pluralism’ and the ‘dialogic contribution’ of human rights to ‘public reasoning’ (Sen 2005, p. 155f, 2012, p. 97f). Though he regards human rights to be important they still should be subject to public dispute, in his view. And though he acknowledges human rights as a moral institution—as ethical rights—he rejects viewing them primarily in legal terms, that is, as legal rights. He even states that he ‘would argue against the adequacy of a rights-based approach that would tend to be woven, in one way or another, around law’ (Sen 2012, p. 93). In this way he is clearly stating that he rejects the attempts of others to interpret his thinking as supporting human rights-law based approaches.

10.6 Conclusions

It cannot thus be argued that Sen regards himself as a pioneer of human-rights based approaches to development and disaster management. Rather, Sen distinguishes the law-based approach from other approaches to fulfil the ethical claims inherent in human rights such as food aid programmes, investment into social and economic opportunities, public discussion and lobbying, shaming and blaming, many of which strategies are pursued by nongovernmental organisations in the field of development (Sen 2012, p. 94). This gives the impression that Sen regards the rights or law-based approach as something in contrast to these other approaches, something mutually exclusive. This is strange and self-contradicting for several reasons:

Interpretation of law such as the general comments of the respective human rights commissions on the treaties that interpret international human rights law, as well as the process of signing and ratifying international human rights treaties and their protocols, are themselves subject to public discussion and parliamentary—or at least political—decision-making. They can be regarded as the result of deliberation on the global level. The deliberation between states is accompanied by contributions to such public and political discourses of globally engaged civil society actors. It is certainly true that such deliberations at the international level do not enjoy the same degree of democratic legitimacy as do democratic processes on the national or smaller scales

because of the lack of democratic procedures and power imbalances between states as well as within international civil society actors. There are, however, many nation states that offer less possibility for deliberation than the global scale.

The existence of international human rights—not only as ethical but also as legal rights—is an important basis for the advocacy work of international and national NGOs and for approaches to strategic litigation. To reduce international human rights to ethical rights would undermine the ability to file lawsuits to enforce respect, protection and fulfilment of human rights at supra-national levels, which is in fact already possible insofar as nation states are members of regional human rights systems. It is, moreover, within the frame of the capability approach to assess the relationship between human rights law and its enforcement institutions and capability and, if positive, to build upon such institutional approaches ‘geared to enhancing, securing and guaranteeing entitlement’ (Sen 1986, p. 28).

Finally, regarding Sen’s support for ownership rights and economic entitlements ‘legally’ available to a person—in particular property rights and obligations to adhere to contracts in the exchange of products and labour—there is a normative bias at work. He implicitly accepts their value as a legal base of our societies without questioning them as a legal right or demanding them to be subject to public debate as he does with other human rights. There is no logical explanation why the right to property has less of an ethical character of a ‘natural’ or ‘pre-existing right’ of all human beings than those other human rights. All of them are part of the International Bill of Human Rights and by acknowledging this one but not the others, Sen has implicitly already made a ranking of such rights.

Interpretation of the capability approach is, however, not only up to Amartya Sen, and can and is pursued by others as well, who are likely to be less ‘doomed to remain somewhat contaminated by my [Sen’s] earlier thinking’ (Sen 2012, p. 92) regarding the priority of civil rights over economic and social rights.

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