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Migration, Risk Management and Climate Change: Evidence and Policy Responses

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Contents

Introduction – Climate Change and Human Mobility After Paris

Introduction

Following the climate negotiations in Paris which made more space than ever for the issue of human mobility, against emerging scientific evidence, and against the background of an ongoing refugee crisis in Europe, it is time for the international community to pursue an evidence and needs-based protection framework for environmental migrants and people displaced by climate stressors.

The current refugee crisis in Europe is about a brutal civil conflict in Syria and not about climate change. However, it sends a signal about the kinds of human movements we will see in the future as climatic stressors, such as storms, droughts, heat waves and sea level rise increasingly impacts jobs, food security, and the stability of urban and rural areas.

Science

What does current science say about human mobility and climate change? Science points to widespread current and future biophysical impacts of anthropogenic climate change (IPCC 2012, 2014; Fung et al. 2010). Human mobility—migration, displacement, potentially planned relocation—are themes woven through the Fifth Report of the Intergovernmental Panel on Climate Change (IPCC 2014). The report notes emerging risks and threats that affect livelihoods, food security, and safety.

These key risks have political importance as well, because they inform the evaluation of "dangerous anthropogenic interference with the atmosphere" as laid out in Article 2 of the UN Framework Convention on Climate Change (UNFCCC). Article 2 outlines its ultimate objective as the 'stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system… in order to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable eco-

nomic development to proceed in a sustainable manner'. One way to think about Article 2 is maintaining a 'safe operating space for humanity' (Röckstrom et al. 2009). These key risks are "potentially severe adverse consequences for humans and socio-ecological systems resulting from the interaction of hazards linked to climate change and the vulnerability of exposed societies and system" (IPCC 2014: 1043). These key risks include factors that have been directly linked to mobility pressures, in particular risks of food insecurity and breakdown of food systems, and risk of loss of rural livelihoods linked to insufficient water and reduced agricultural productivity.

Community-based empirical research across the world, such as the chapters in this book, indicate that people will move away from regions that climate change slowly renders uninhabitable, such as small island states in the Pacific affected by sea level rise and parts of South East Asia dealing with coastal erosion. They will move towards areas they hope will provide safe and sustainable livelihoods. Almost half of the world's population depends on agricultural production for their livelihoods, and this sector is most severely impacted by a changing climate. Evidence from this literature, including scholarly leaders publishing chapters in this edited volume, underscores that vulnerable households use different forms of human mobility to manage climatic risks. Climate impacts such as changes in rainfall variability (untimely rain, unseasonal and unexpected precipitation, or shortfalls in rain) affect the stability of household livelihoods, which in turn can negatively affect household income and consumption (Afifi et al. 2015; Warner and Afifi 2014). Pressures to move involve multiple interacting systems and stresses—crop production, prices, and increased food insecurity (Adger et al. 2014; Oppenheimer et al. 2014). Now and in the future, research suggests that indirect, transboundary, and long-distance impacts (Oppenheimer et al. 2014) are expected to drive human migration and displacement when thresholds for livelihoods, food security, and safety are breached (Klein et al. 2014).

Policy

All countries and governments will be affected by people on the move whether those countries are areas of origin, transit, or destination. People will move either in anticipation of climate stressors or in response to them.

Over the past decade, discussions about climate change and migration, displacement, and planned relocation have moved from limited research or policy discussion to growing, robust evidence and significant policy milestones. The international community needs a robust legal framework to guide efforts to assist people on the move because of climate stressors. At the current stage, people leaving their countries due to climate stressors are not considered refugees under the Geneva Convention, which specifies that a refugee is fleeing from a "well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group or political opinion."

Climatic or environmental factors are not recognized as persecuting factors, and only some countries grant temporary protection status and waive visa requirements for migrants whose home country faces a severe natural hazard.

People who move are often particularly vulnerable and need a scope of assistance – from legal protection to access to labor markets, valid identification, and integration opportunities. The current situation in Europe shows us that we are not yet prepared for such large movements of people within or across borders. While the challenges of the current refugee situation are immense, governments and the international community are guided by national and regional policies that follow the clear normative and legislative framework of the Geneva Convention. Such policies and frameworks are currently not in place for environmental migrants.

In the autumn of 2015, over 100 governments have endorsed the Nansen Initiative Agenda for people displaced across borders in the context of natural disasters and the effects of climate change. This agenda, supported by the United Nations University as an Advisory Group member, helps point the way for filling legal gaps and providing evidence-based policy and operational support for vulnerable affected people. In Paris, the Conference of the Parties established a task force on human mobility to develop recommendations for the Warsaw International Mechanism for Loss and Damage (paragraph 50).

In the post-2015 world, all current signals point to a need to invest in research and policy analysis to develop a reference point which will not only help to protect vulnerable people but will also serve long-term sustainable development.

Chapters in This Volume

The largely evidence-based, case study-based chapters in this book reflect a collection of scholarly work that recognizes human migration as one of a number of attempts of vulnerable households to manage risks including climatic stressors. Chapters span three major veins of examination in the dynamics of migration linked to climatic stressors: the role of remittances in enhancing (or not) adaptive capacity of families that do have one or more migrant members; the interactions of decisions about livelihood security and how migration fits into those decision patterns; and the role of land tenure and related policies in migration and relocation in land-constrained areas like the Pacific ocean.

Remittances

In their chapter on the role of remittances, Banerjee et al. ask whether and how remittances help reduce the vulnerability of recipient households to a flooding in the Upper Indus subbasin. The vulnerability assessments find that remittance-recipient households are marginally less vulnerable than non-recipient households and are

less likely to reduce food consumption during floods. Interestingly, for farming households, non-remittance-recipient households may demonstrate other forms of adaptive capacity, such as changing agricultural practices in response to floods.

In a second coauthored chapter, Banerjee et al. explore the relationships between mobility, remittances, and adaptive capacity in the rural Sagarmatha transect of Koshi subbasin of Nepal through building farm assets such as farm size, livestock, irrigation, and farm mechanization. They find little difference in the flood response strategy of remittance-recipient and non-recipient households but find that the longer a time a household receives remittances, the more likely it is to reduce its farm holding.

Kagan uses the lens of a case study in Tuvalu to analyze empirical evidence of the relationship between remittances and disaster risk management. The author finds that while remittances form a key part of coping strategies after a disaster, there is insufficient evidence to suggest that remittances improve ex ante risk management.

Bendandi and Pauw ask whether remittances could constitute international adaptation finance. They find that incentives for diaspora communities need to be provided in order to channel remittances toward adaptation. They conclude that remittances can help to support adaptation at household and community level.

Livelihoods

Brandt et al. analyze risk management and migration decisions in the face of climate variability and water scarcity in two rural areas near La Paz, Bolivia. Their findings correlate with that of the growing literature that social, economic, and environmental factors drive decisions about managing livelihood risks with migration.

Cascone et al. explore the potential of resilience-building measures and circular migration programs as part of household strategies to diversify livelihoods and manage risks associated with environmental and climate change in Las Palomas, Central Mexico. The authors find that sending one or more migrants abroad as a risk management strategy at the household level can allow the rest of the household to stay where they are and to increase their adaptive capacity through increased income and livelihood risks reduction.

Stojanov et al. examine household adaptation strategies in the face of floods between 1997 and 2012 in selected rural municipalities in the Bečva river basin in the northeastern part of the Czech Republic. Their research revealed a link between difficulty migrating and social consequences, meaning that the increasing occurrence of floods is a serious problem for residents who cannot leave, because they had limited opportunities for resettlement.

Etzold and Mallick find that translocal households with migrants employ livelihood choices, human rights, and freedoms that enhance their resilience to environmental and socioeconomic risks. They argue that it is necessary to move beyond

framing migration as a failure of adaptation to environmental risks and instead recognize the normality of people's mobility, the persistence of regional migration systems, and the significance of the practices and structures that enable Bangladeshis to live secure translocal lives. Such a change in perspective has significant repercussions for the politics of climate change adaption and the management of migration.

Land

Simonelli examines migration and limits to adaptive capacity in the isolated Kandholhudhoo fishing community in the Maldives. The author proposes that policy responses are needed—particularly tailored to the vulnerabilities of small island states—which more fully utilize options for internal migration, with implications for population densities, island structural integrity, and economic resource bases.

Gharbaoui and Blocher examine the role of customary land tenure and land use in complex relocation processes in the Pacific. Against a historical analysis of ancestral and recent community relocation and land tenure in Fiji, the authors argue for participatory adaptive relocation processes which consult, cooperate, and negotiate with customary leaders of both sending and receiving communities at an early stage.

Finally, in the last chapter of the book, McLeman traces how migration in policy and research has increasingly been framed in terms of vulnerability and adaptation. The author examines critiques of this conceptualization and suggests promising avenues for further theoretical development and policy discussion.

Looking Forward

Looking forward, science is needed that will inform decisions about climate-resilient development pathways which includes human mobility. It is common for debates to form around normative questions such as whether different forms of mobility are a "positive" form of adaptation or an indicator of the severity of climate impacts. What will be important moving forward, however, is a focus on leaving no group of vulnerable people behind in the quest for improved human welfare. Climate change poses significant challenges to this overarching aim of the Sustainable Development Goals. What will emerge in the next rounds of research will be an understanding of human mobility as a global process of societies adjusting culturally, geographically, politically, and economically to the adverse effects of climate change.

Both the emerging science (IPCC 2014) and the Paris outcomes acknowledge the relationships between a range of climatic stressors and forms of human mobility, the need for actions that reduce vulnerability factors and enhance resilience factors for affected people, and principles that can guide support and work on climate-related

human mobility. These major science and policy milestones in 2014 and 2015 thus provide insights into directions for research, policy, and operations in coming years:

- First, research can help fill gaps in understanding on factors which affect vulnerability or resilience of people who are moving and the networks they are part of (families, communities), and it offers insights into the factors and thresholds relevant to household decisions to move or not.
- Second, policies drawing on this research are needed to guide risk averting and minimizing actions, as well as actions to address human mobility related to climate change (displacement in particular).
- Third, action and support to address human mobility in the context of climate change will be needed which include participation of affected people, guided by the best available science and other knowledge systems (traditional, indigenous, local) and aimed at integrating these actions into relevant socioeconomic and environmental policies and actions.

Human mobility in the face of climate change is a risk management strategy and livelihood diversification strategy in the face of many pressures and aspirations to better human welfare. The chapters in this book examine evidence from Pakistan, Nepal, Bangladesh, Tuvalu, Bolivia, Mexico, the Czech Republic, and Pacific Region and bring cutting edge analysis, insights, and suggestions for research and operational work to help vulnerable people on the move in the face of climate and other risks.

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References

Adger, W. N., Pulhin, J. M., Barnett, J., Dabelko, G. D., Hovelsrud, G. K., Levy, M., Oswald Spring, Ú., & Vogel, C. H. (2014). Human security. In C. B. Field, V. R. Barros, D. J. Dokken, K. J. Mach, M. D. Mastrandrea, T. E. Bilir, M. Chatterjee, K. L. Ebi, Y. O. Estrada, R. C. Genova, B. Girma, E. S. Kissel, A. N. Levy, S. MacCracken, P. R. Mastrandrea, & L. L. White (Eds.), *Climate change 2014: Impacts, adaptation, and vulnerability. Part A: Global and sectoral aspects. Contribution of Working Group II to the fifth assessment report of the Intergovernmental Panel on Climate Change* (pp. 755–791). Cambridge/New York: Cambridge University Press.

Afifi, T., Milan, A., Etzold, B., Schraven, B., Rademacher-Schulz, C., Sakdapolrak, P., Reif, A., van der Geest, K., & Warner, K. (2015). Human mobility in response to rainfall variability: Opportunities for migration as a successful adaptation strategy in eight case studies. *Migration and Development*. doi:10.1080/21632324.2015.1022974.

Feng, S., Krueger, A. B., & Oppenheimer, M. (2010). Linkages among climate change, crop yields and Mexico–US cross-border migration. *Proceedings of the National Academy of Sciences 107*(32), 14257–14262. Changes by 2030. *Global Environmental Change, 20*(4), 577–585.

Intergovernmental Panel on Climate Change (IPCC). (2012). In C. B. Field, V. Barros, T. F. Stocker, D. Qin, D. J. Dokken, K. L. Ebi, M. D. Mastrandrea, K. J. Mach, G.-K. Plattner, S. K. Allen, M. Tignor, & P. M. Midgley (Eds.), *Managing the risks of extreme events and disasters*

to advance climate change adaptation. A special report of Working Groups I and II of the Intergovernmental Panel on Climate Change (p. 582). Cambridge/New York: Cambridge University Press.

Intergovernmental Panel on Climate Change (IPCC). (2014). Intergovernmental Panel on Climate Change: Climate change 2014: Impacts, adaptation, and vulnerability, Part A: Global and sectoral aspects. In C. B. Field, V. R. Barros, D. J. Dokken, K. J. Mach, M. D. Mastrandrea, T. E. Bilir, M. Chatterjee, K. L. Ebi, Y. O. Estrada, R. C. Genova, B. Girma, E. S. Kissel, A. N. Levy, S. MacCracken, P. R. Mastrandrea, & L. L. White (Eds.), *Contribution of Working Group II to the fifth assessment report of the Intergovernmental Panel on Climate Change* (p. 1132). Cambridge/New York: Cambridge University Press.

Klein, R. J. T., Midgley, G. F., Preston, B. L., Alam, M., Berkhout, F. G. H., Dow, K., & Shaw, M. R. (2014). Adaptation opportunities, constraints, and limits. In C. B. Field, V. R. Barros, D. J. Dokken, K. J. Mach, M. D. Mastrandrea, T. E. Bilir, M. Chatterjee, K. L. Ebi, Y. O. Estrada, R. C. Genova, B. Girma, E. S. Kissel, A. N. Levy, S. MacCracken, P. R. Mastrandrea, & L. L. White (Eds.), *Climate change 2014: Impacts, adaptation, and vulnerability. Part A: Global and sectoral aspects. Contribution of Working Group II to the fifth assessment report of the Intergovernmental Panel on Climate Change* (pp. 899–943). Cambridge/New York: Cambridge University Press.

Oppenheimer, M., Campos, M., Warren, R., Birkmann, J., Luber, G., O'Neill, B. C., & Takahashi, K. (2014). Emergent risks and key vulnerabilities. In C. B. Field, V. R. Barros, D. J. Dokken, K. J. Mach, M. D. Mastrandrea, T. E. Bilir, M. Chatterjee, K. L. Ebi, Y. O. Estrada, R. C. Genova, B. Girma, E. S. Kissel, A. N. Levy, S. MacCracken, P. R. Mastrandrea, & L. L. White (Eds.), *Climate change 2014: Impacts, adaptation, and vulnerability. Part A: Global and sectoral aspects. Contribution of Working Group II to the fifth assessment report of the Intergovernmental Panel on Climate Change* (pp. 1039–1099). Cambridge/New York: Cambridge University Press.

Röckstrom, J., Steffen, W., Noone, K., Persson, A., Chapin, F. S., III, Lambin, E., Lenton, T. M., Scheffer, M., Folke, C., Schellnhumber, H., et al. (2009). A safe operating space for humanity. *Nature, 461*, 472–475

Warner, K., & Afifi, T. (2014). Where the rain falls: Evidence from 8 countries on how vulnerable households use migration to manage the risk of rainfall variability and food insecurity. *Climate and Development, 6*(1), 1–17. doi:10.1080/17565529.2013.835707.

Part I
Mountain Areas

Chapter 1
An Index Based Assessment of Vulnerability to Floods in the Upper Indus Sub-Basin: What Role for Remittances?

Soumyadeep Banerjee, Muhammad Zubair Anwar, Giovanna Gioli, Suman Bisht, Saleem Abid, Nusrat Habib, Sanjay Sharma, Sabarnee Tuladhar, and Azeem Khan

1.1 Introduction

Mountain households tend to pursue a multi-income livelihood system, which combines farm and non-farm options. The non-farm strategies include wage employment, trade, and labor migration to varying degrees (Kreutzmann 1993). Labor migration can benefit recipient households through financial and social remittances.[1] The rationale behind remittances as a 'risk mitigation strategy' comes from growing evidence that they tend to be a counter-cyclical shock absorber in times of crisis (Agarwal and Horowitz 2002; Osili 2007).[2] In mountain contexts of the global South, lack of formal employment opportunities, precarious land rights, subsistence agriculture, along with the lack of access to financial instruments and social protection, severely limit the ability of people to cope with crisis and insure themselves against risks (e.g. economic, environmental, social, and political). The incomes from in-situ livelihood sources and labor migration are unlikely to be disrupted by

[1] Migrants facilitate a circulation of ideas, practices, and identities between destination and origin communities. These are referred as social remittances (Levitt 2001).

[2] Some studies also show that remittances can be pro-cyclical, because migrants' decision to remit is also driven by factors such as investment in physical and human capital (see e.g. Cooray and Mallick 2013).

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environmental hazards at the same time (Osili 2004). Financial remittances (hereafter remittances) have been described as a form of a household sponsored insurance system (Yang and Choi 2007; Paulson 2003), and a substitute for social security (Schrieder and Knerr 2000). Labor migration has shown to also enhance access to information and expand social networks (ADB 2012).

Over the past three decades, the framing of the nexus between migration and environmental change has shifted from that of securitization (Suhrke 1994; Myers 2002) with a narrow focus on environmental pull-factors and forced migration, to developmentalisation (Felli 2013; Bettini and Gioli 2015). Developmentalisation fosters the idea that *labor* migration could represent a legitimate and positive adaptation strategy to (global) environmental change (Foresight 2011; Warner et al. 2012). The 'migration as adaptation' thesis could be considered as a subset of the 'migration and development' discourse,[3] and is conceptually grounded on the merging of the New Economics of Labour Migration (Stark and Levhari 1982; Stark and Bloom 1985) and Sustainable Livelihoods Approach (Scoones 1998). This provides a framework for understanding mobility as a household strategy for managing various types of risk. Literature shows that remittances contribute to the welfare of vulnerable households by easing the fulfillment of basic needs such as purchasing food, housing, equipment, and paying for education and healthcare (Lindley 2009; Deshingkar 2006). Despite the fact that remittances seldom benefit the poorest households (Mazzucato et al. 2008) and may increase existing inequality at the micro level (Le De et al. 2013), econometric studies highlight that remittances may reduce the level and severity of poverty (World Bank 2012). Furthermore, the literature increasingly points at the crucial role of remittances during environmental disasters (for a review see Le De et al. 2013). For example, the IOM (2014:8) indicated that "in the context of natural or manmade catastrophes and crises, remittances and migration can support the resilience of populations both staying and going". Mohapatra et al. (2009) demonstrate that remittance recipient households in Ethiopia could use cash reserves to confront shocks to food security due to drought. Non-recipient households had to sell their livestock. Remittances also proved crucial for recovery in the aftermath of the 2004 Asian tsunami (Laczko and Collett 2005).

There is limited empirical evidence on relationships between environmental stressors, adaptation, and human mobility in Pakistan. A study by Mueller et al. (2014) that spanned over 21 years (1991-2012), linked individual-level information from the survey to satellite-derived measures of climate variability (Mueller et al. 2014). The findings indicate that in rural Pakistan heat stress has consistently increased long-term migration of men, driven by a negative effect on farm and non-farm income; whereas floods have a modest to insignificant impact on long-term migration. A study by Gioli et al. (2014) in the bordering region of Gilgit-Baltistan (i.e. Hunza and Yasin valleys), studied the role of migration and remittances in the

[3] The evolution of migration and development discourse has been discussed by de Haas (2012), and Gamlen (2014). For a discussion about similarities between the 'migration as adaptation' and 'migration and development' discourses, refer to Banerjee et al. (2012) and Bettini and Gioli (2015).

aftermath of two environmental shocks, the 2010 floods, and the landslide originating at the Attabad Lake in upper Hunza, considered as proxies for future climate impacts. This study found a high incidence of male circular labor migration (undertaken by 76 % of the surveyed households), occurring predominantly at the provincial and national level. The circular labor migration peaked in 2010 – the year in which the two environmental shocks had occurred – with 34 % of all the migrants' first migration occurring during 2010–2012 over a period spanning from 1985 to 2012. Many of these households had resorted to mobility as a coping mechanism in the aftermath of a shock, rather than as a proactive livelihood diversification strategy. Among those who lost their land (less than 1,500 m^2) and those unable to move (due to the lack of financial resources, employable skills, and human capital; family obligations; and illnesses) were significantly poorer (60 % less income) than the rest of the subsample. This highlights the need for aid agencies and governments to enhance outreach among the most vulnerable segments of society, i.e. those who are unable to 'self-insure' their lives through remittances (Gioli et al. 2014). Banerjee et al. (2011) focused on the relationship between water hazards and migration pattern in rural areas and the effect of remittances on the adaptive capacity of recipient households in four countries (Nepal, India, Pakistan and China) across the Hindu Kush Himalayan region (Pakistan: Chitral District, Khyber-Pakhtunkhwa Province). The likelihood that household members would migrate for work is higher among rural communities exposed to rapid onset water hazards (e.g. riverine or flash floods) than those exposed to slow onset water hazards (e.g. drought). The likelihood of labour migration is higher among households located in rural communities affected by very severe drought compared to households in less severely affected rural communities.

The increasing literature on remittances in times of crises indicates that remitted assets have a significant role in the aftermath of natural disasters (Bettin et al. 2014), and influence the vulnerability of remittance recipient households. The IPCC (2014:28) defines vulnerability as "the propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts including sensitivity or susceptibility to harm and lack of capacity to cope and adapt. The extent to which remittances can contribute to reduction of vulnerability requires further exploration. Remittances may be a significant source of disposable cash during a crisis; however, their role in reducing the vulnerability of a household by building medium term and long term assets is little understood. Past research (de Haan 1999; de Haas 2012) suggests that the development outcome of migration is context dependent. Therefore, it is likely that the effect of remittances on vulnerability will be context dependent. This context is critical to vulnerability as well. For example, livelihoods in mountain regions are often characterized by a lack of insurance and formal measures of social protection. As elsewhere, livelihoods vulnerability is embedded in everyday power relations influenced by class (Mustafa 2005; Pelling 1998), gender (Sultana 2010), and ethnicity (Bolin 2007) among other factors (*social vulnerability*). There is a high prevalence of family farming and livestock rearing and widespread dependence on natural resources, all of which are highly sensitive to environmental and climatic changes (*biophysical vulnerability*). Mountain populations are often

marginalized in terms of political participation and inclusion in political and institution building processes (*political vulnerability*, see Wisener and Luce 1993).

This chapter analyses the vulnerability of remittance recipient and non-recipient households in the flood-affected rural communities of Upper Indus Sub-Basin (UISB). A vulnerability assessment has been conducted to characterize the adaptive capacity, exposure, and sensitivity of remittance recipient and non-recipient households. This chapter will explore whether the remittances have a role in reducing the vulnerability of households to floods, by attempting to answer the following question: How is vulnerability of remittance recipient households to floods different from that of non-recipient households? We adopt an index based approach to explore the aforementioned question. It provides a metric for quantitative analysis of a household's vulnerability to a specific environmental stressor. This chapter is organized as follows. The next section provides an overview of the research methodology, research method, and study area. Then, we present empirical evidence in order to characterize vulnerability in remittance recipient and non-recipient households. Finally, the policy implications of these findings are discussed.

1.2 Indices of Vulnerability at the Household Level

1.2.1 Research Methodology

A diversity of methodologies have been used to assess vulnerability. These include simulation based models (e.g. Brenkert and Malone 2005), indicator based approaches (e.g. Vincent 2007) and participatory exercises (e.g. Gupta et al. 2010). These methodologies have been applied to different systems or spatial scales of analysis: district (e.g. Hahn et al. 2009), community (e.g. Pelling and High 2005), sector (e.g. Eakin et al. 2011), and particular ecosystem (e.g. Shah et al. 2013). Secondary data (e.g. Brooks et al. 2005), primary data from household surveys (e.g. Hahn et al. 2009), and participatory exercises (e.g. Gupta et al. 2010) have been used to explore the aforementioned methodologies. In this study, vulnerability is conceptualized to be a function of three major components, namely adaptive capacity, exposure, and sensitivity. These major components are composed of sub-dimensions, which are comprised of attributes that can be measured through specific indicators. Adaptive capacity of a household is comprised of sub-dimensions such as financial asset, physical asset, natural asset, social asset, and human asset. Financial asset is represented by access to formal financial institutions and access to insurance. Natural asset is comprised of farm size, number of livestock, and changes in agricultural practice due to flood. Access to flood assistance, access to borrowing during floods, and participation in collective action for flood relief, recovery, and preparedness are attributes of social asset. Human asset is comprised of access to information, access to local alternative livelihood opportunities, and access to alternative livelihood opportunities in nearby localities. Physical asset has three

attributes, namely structural changes in houses to address flood impacts, access to storage options during floods, and farm mechanization.

Exposure of a household to floods is comprised of three sub-dimensions: Average financial damage to a household due to floods between 1984 and 2013, number of floods experienced by a household between 1984 and 2013, and average time required by a household to recover from the damages it had experienced due to flood. Sensitivity of a household to floods is comprised of well-being, water, food, and environmental dependence. The well-being sub-dimension is represented by reduction in spending on education and clothes due to flood, selling or mortgaging of household assets, and sending children to work outside the household as a result of floods. The water sub-dimension is comprised of the average time taken by a household member to collect drinking water for a normal day, lack of drinking water storage for emergency consumption during floods, and lack of arrangements to treat drinking water for consumption during floods. The food sub-dimension includes reliance on less preferred food items during floods, restricted food consumption by adults due to floods, not spending savings to procure food during floods, begging for food due to floods, and not collecting wild food due to floods. The environmental dependence sub-dimension is comprised of dependence on subsistence farming, crop diversification, dependence of household income on the primary sector, reduction in agricultural assets due to floods, dependence on environmental resources for the primary source of cooking fuel, and households with less resistant construction material for external walls.

This study has adopted the equal weighted design to construct the vulnerability index. Hahn et al. (2009) had assigned equal weight to all the indicators based on the assumption that all are of equal importance. Each major component, sub-dimension, and attribute contributes equally to the overall index. Once each of the attributes are standardized, they are averaged using Eq. 1.1, to calculate the value of each sub-dimension:

$$S_s = \frac{\hat{I}\pounds_{i=1}^{n} index_{a_s}}{n} \tag{1.1}$$

where S_s is one of the sub-dimensions of sensitivity, exposure, or adaptive capacity for a household in particular study area *s*. For example, sensitivity is comprised of sub-dimensions such as well-being, water, food, and environmental dependence, and n is the number of attributes in each sub-dimension. After value of each sub-dimension is calculated, they are averaged using Eq. 1.2 to obtain the major components, i.e. Sensitivity index (*SI*), Exposure index (*EI*), and Adaptive Capacity Index (*AI*):

$$M_s = \frac{\hat{I}\pounds_{i=1}^{n} w_i S_{si}}{\hat{I}\pounds_{i=1}^{n} w_i} \tag{1.2}$$

where M_s is a major component of vulnerability (i.e. sensitivity, exposure, or adaptive capacity) for a household in particular study area *s*, weight w_i is determined by

the number of sub-dimensions that contribute to a major component, and S_{si} is average value of sub-dimensions comprising each of the major components. The three major components were combined using the following equation:

$$VI_S = (EI\hat{a}\hat{}'AI)\hat{a}\hat{}—SI \tag{1.3}$$

Where VI_s is the vulnerability index for a household in a particular study area *s*, EI, AI, and SI are the exposure index, the adaptive capacity index, and the sensitivity index for the same household. The VI ranges from â^'1 to +1.

According to the New Economics of Labour Migration (NELM), migration is a risk sharing strategy of the household to diversify resources in order to minimize income risks (Stark and Levhari 1982). By broadening the space through migration of one or more household members in search of employment, a household attempts to overcome constraints to its development (Stark and Bloom 1985; Stark and Lucas 1988), weakly developed credit and insurance markets (Taylor 1999), and invest in productive activities and improve their livelihoods (de Haas 2007). The costs and returns of migration are shared by the migrant and sending household (Stark and Bloom 1985; Stark and Lucas 1988). Remittances maintain a functional linkage between the migrant worker in the destination area and the migrant-sending household in the origin community. In this study, a household was considered to be a remittance recipient household if it had received remittances from any household member who had lived and worked in another village or town in the same country or another continuously for 2 months or more at any time during the last 30 years. A household not conforming to this definition was considered to be a non-recipient household. Further elaboration of the research methodology could be found in Banerjee et al. (forthcoming) and Banerjee (forthcoming).

1.2.2 Research Method

A survey was conducted in Hunza, Ghizer, Gilgit, and Chitral districts from October 2014 to March 2015. These districts are considered as one aggregated areal unit, and are representative of the Upper Indus Sub-basin (UISB). The survey gathered primary data on socio-demographic characteristics (age, gender, ethnicity, educational level of the household head), household assets (financial, human, physical, natural, social), prior occurrence and economic damages due to floods between 1984 and 2013, flood response strategies, food and non-food expenditure, livelihood practices (access to land, types of crops grown, livestock rearing, labour migration), and income sources. A list of all flood affected villages was prepared for the study area.[4] The selection of households involved a two stage process. First, villages are selected using the Probability Proportional to Size (PPS). Second, an equal number of households is selected using systematic sampling within each selected

[4] If a village had experienced a riverine flood or flash flood at least once since 1984, it was considered as flood affected.

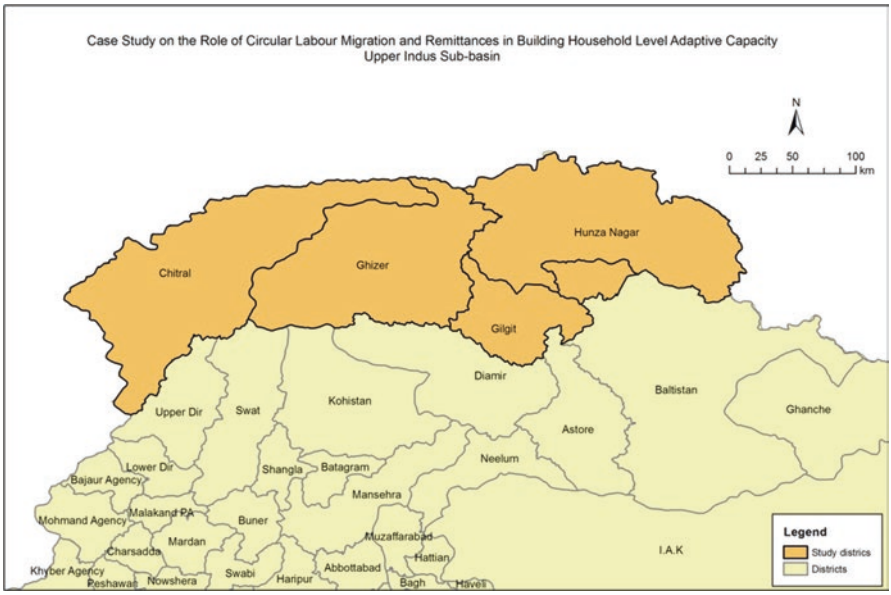

Fig. 1.1 Map of the study districts in the Upper Indus Sub-basin (Source: Migration Case Study, Himalica programme, ICIMOD)

village. A sample size of 360 households is estimated, 180 each for remittance recipient and non-recipient households.[5] The primary sampling unit was 20 households (10 each for remittance recipient and non-recipient households) in each village and therefore, 18 villages were selected. At the end of the survey, a sample size of 358 was achieved; 179 remittance recipient households and 179 non-recipient households.

1.2.3 Description of the Study Area in the Upper Indus Sub-Basin (UISB)

The study area lies in the UISB, where the observed climate trends are anomalous. As opposed to the Eastern Himalayas, the UISB is experiencing since decades cooling trends in the summer season, and increasing or stable precipitations throughout the year (Fowler and Archer 2006; Bocchiola and Diolaiuti 2012), accompanied by mass gains in the glaciers of the Karakoram (Bolch et al. 2012). This case study covers four districts in the UISB: Hunza, Ghizer, Gilgit, and Chitral (see Fig. 1.1). Hunza, Gilgit, and Ghizer are located in the region of Gilgit-Baltistan (Eastern

[5] If at any time during the past 30 years a household had received financial remittances from any household member who had lived and worked in another village or town in the same country or another continuously for 2 months or more, it was referred as a remittance recipient household.

Karakoram). Chitral is located in the Khyber-Pakhtunkhwa province (Hindu-Kush). Despite belonging to different politico-administrative units, these areas have similar physical and socio-economic characteristics, and since the 1980s have followed comparable patterns of development, largely resulting from the implementation of the Aga Khan Rural Support Program (AKRSP)[6] model. These valleys are characterized by an extreme environment and an arid climate. Agricultural production is made possible by the high incidence of solar radiation, and a complex indigenous irrigation system relying on melt-water channeled directly from the glaciers to the flat areas at the bottom of the valleys. These irrigation oases (less than 1 % of the Karakoram region) offer limited space for agricultural production (Kreutzmann 1993, 2011). The vast majority of the population owns small pieces of land transmitted from generation to generation along patriarchal lines. Most of the grazing areas are communal and assigned to different villages according to customary laws. Wheat is the main crop, and since the 1970s it has been heavily subsidized (in the form of tax exemption) by the Government of Pakistan. There has been a significant reduction in per capita availability of agricultural land and grazing pastures as a result of the growing population and environmental hazards. Local communities are increasingly shifting from an agropastoral economy to a combined subsistence-labor system (Ehlers and Kreutzmann 2000). Within the latter system, the households pursue risk prone mountain agriculture with external income-generating opportunities, such as labor migration, wage labor, and trade. The non-farm income from external sources has been facilitated by pivotal infrastructure development, such as the Karakoram Highway. Rising levels of education have also contributed to increasing the share of people employed in governmental jobs and in the tertiary sector (Malik and Piracha 2006). Yet, most households cultivate land and rear livestock on a small scale.

1.3 Results

1.3.1 Livelihoods Portfolio

This section provides an overview of the livelihoods portfolio of remittance recipient and non-recipient households. The majority of surveyed households (92 %) have access to farm land. On average, a household has 0.84 ha (remittance recipient: 0.94 ha, non-recipient: 0.76 ha). Remittance recipient households own almost all of the farm land to which they had access (97 %). Non-recipient households own approximately two-thirds of their farm land (67 %), and have mainly leased the rest. These households grow wheat, maize, and summer vegetables. Some of the households also grow apple, apricot, and walnut. Average income from crop sales for

[6] Since the 1980s, various NGOs and in particular the Aga Khan Development Network (AKDN) and its Aga Khan Rural Support Program (AKRSP) have introduced cash crops such as potatoes and orchards (mostly almonds, apricots, grapes, and cherries).

remittance recipient and non-recipient households during the year preceding the survey is estimated to be USD 981 and USD 1,847 respectively. The economic status of the household is represented by the average monthly per capita expenditure (MPCE) of the households, which comprises food and non-food expenditure. Remittance recipient and non-recipient households in the bottom expenditure category ('low income households') sell staple crops. The average income from the sale of staple crops during the 12 months preceding the survey among remittance recipient and non-recipient households in the bottom expenditure category was USD 2,298 and USD 1,412 respectively. In the top expenditure category ('high income households'), sale of staple crops is largely limited to non-recipient households. The average income from sale of staple crops among non-recipient households in the top expenditure category (USD 3,189.06) is far higher than that of remittance recipient households in the same category (USD 143.03). This indicates that the sale of staple crops is a means of acquiring cash to address basic needs and urgent necessities among non-recipient and 'low income' remittance-recipient households. Most of the households have access to livestock (96 %), but less than 2 % of households have reported the sale of livestock and livestock products as a major source of household income.

Contribution of salaried employment from local non-farm sources, business or trade, and daily wages from local non-farm sources vary greatly among recipient and non-recipient households. Non-recipient households have better access to in-situ non-farm livelihood opportunities such as salaried employment, daily wage, and small business. Salaried employment from non-farm sources in the locality is a major source of income for one-third of non-recipient households and one-fifth of remittance recipient households. Another one-fifth of non-recipient households have reported daily wages from non-farm sources in the locality as a major source of household income; compared to that of less than one-twentieth in remittance recipient households. Around one fourth of non-recipient households identified business or trade as their major source of income, while only one-tenth of remittance recipient households have reported business or trade as the major source of household income. On the other hand, two-thirds of remittance recipient households and a quarter of non-recipient households have a household member who commutes to work. These commuters are men of working age, and employed in the defense, public administration and education sectors. Overall, non-recipient households have better access to local non-farm income opportunities than remittance recipient households.

Remittance recipient households have substituted the local non-farm income sources with remittances, which is the major income source for one-third of remittance recipient households (see Fig. 1.2). Migration from the study area is predominantly internal in nature. Among 364 migration episodes between 1984 and 2013, over three quarters are associated with an urban destination (84 %) in Pakistan. Popular migration destinations are located in Gilgit-Baltistan, Punjab, Khyber-Pakhtunkhwa, and Sindh. A large number of these migrant workers are employed in the formal sector. For example, over half of the surveyed migrant workers are covered by social security benefits (e.g. pension, provident fund, or insurance) or receive