



**Exploring Disaster Risk Reduction and Climate
Change Adaptation from a gender perspective
Insights from Ladakh, India.**



A thesis submitted for the degree of Doctor of Philosophy

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A thesis submitted to the School of Health Sciences and Social Care of Brunel University in partial fulfilment of the requirements for the degree of Doctor of Philosophy.

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March 2013

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ABSTRACT

Both Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) aim at reducing the vulnerabilities and enhancing the capacities of men and women when facing natural hazards and climate change. Despite conceptual bridges existing between both sectors, the literature suggests a lack of practical integration of objectives and approaches in the design and implementation of climate change-related and DRR initiatives as well as a lack of attention to gender issues. In parallel, studies repeatedly stress the necessity to (i) provide more empirical studies that re-contextualise climate change as just one of many issues faced on a daily basis by local communities, and (ii) emphasise the gender dimension of vulnerability to understand differences between men's and women's realities in relation to disasters and climate change.

This research explores the local dimension of the (lack of) integration of DRR and CCA through using gender as a lens. It uses the case study of the Himalayan province of Ladakh in India where the predicted impacts of climate change could seriously undermine inhabitants' access to water. Embedded within the theoretical frames of DRR and feminist political ecology, this research draws on concepts of gender, marginalisation, vulnerability and capacity in order to understand the local impacts of environmental degradation and the implications for policies and development projects.

When analysing the ways in which Ladakhi communities experience climate change and natural hazards in relation to their everyday risks, the vulnerability and capacity assessment conducted in this research shows that men and women face different everyday constraints which shape their views of their environment. The gender sensitive methodology and analysis also contribute to focus the attention away from hazards to emphasise the way people's vulnerabilities are inherently linked to unsustainable development which stresses the importance of designing integrated responses. Yet, when examining current interventions to tackle disaster risk and climate change in relation to Ladakhi communities' contexts, priorities and needs, a focus on gender and DRR highlights the gap between theories, policies and practices. Evidence from Ladakh contributes to show the dichotomy between the ineffectiveness of top-down interventions targeting climate change and disasters, and the gendered experiences of local communities in the face of a multitude of everyday risks that extend beyond climate change and natural hazards. Current DRR and CCA policies and projects reproduce a dominant focus on hazards and do not challenge established development models that are male-dominated and which promote people's (and disproportionately women's) vulnerability.

However, development interventions, in the context of Ladakh, appear more adequate to improve people's livelihoods with greater scope for inputs from the community level, which contribute to enhancing their capacities. Therefore, this thesis argues that emphasis should be placed on sustainable development practices in order to better address disaster risk and climate change as well as communities' everyday risks. It finally underscores the need to recognise and assess the interconnection of different structures and their impacts on people's daily lives at the onset of development strategies and to ensure that these are part of a sustainable, holistic and integrated approach to reducing vulnerability.

RESUME

L'objectif commun de la Réduction des Risques de Catastrophes (RRC) et de l'Adaptation au Changement Climatique (ACC) est de réduire la vulnérabilité et de renforcer les capacités des hommes et des femmes exposés aux aléas naturels et aux changements climatiques. Malgré les similitudes conceptuelles entre ces deux secteurs, la littérature suggère un manque d'intégration des objectifs et des approches dans la conception et la mise en œuvre des interventions de RRC et de ACC ainsi qu'un manque d'attention aux perspectives de genre. En parallèle, les études insistent sur la nécessité de (a) conduire des recherches empiriques qui illustrent la spécificité locale du changement climatique par rapport à d'autres contraintes quotidiennes vécues par les populations ainsi que de (b) souligner la dimension du genre dans la vulnérabilité afin de mieux comprendre comment les risques de catastrophes et le changement climatique sont vécus par les hommes et les femmes.

Ce travail de recherche explore la dimension locale de l'intégration des stratégies de RRC et ACC à travers une perspective de genre et en utilisant la région Himalayenne du Ladakh en Inde septentrionale comme cas d'étude. A travers le cadre théorique de la RRC et de l'écologie politique féministe, cette thèse se penche sur les concepts de genre, marginalité, vulnérabilité et capacité pour comprendre les impacts des risques environnementaux dans le quotidien des communautés locales et explorer les implications pour les politiques et les projets de développement.

L'évaluation des vulnérabilités et des capacités des communautés ladakhies permet de mettre en exergue les contraintes vécues différemment par les hommes et les femmes. La méthodologie et l'analyse de genre utilisées dans cette recherche contribuent à souligner que les facteurs de vulnérabilité et de capacité face aux aléas naturels sont les mêmes que ceux face au changement climatique. La vulnérabilité des hommes et des femmes est intrinsèquement liée aux problèmes de développement et de pauvreté qui touchent les groupes les plus marginalisés en premier lieu, d'où la nécessité de développer des politiques et des projets de RRC et de ACC intégrés.

Pourtant, l'analyse des stratégies actuelles en matière de RRC et ACC au Ladakh indique qu'elles apparaissent en décalage avec le contexte, les besoins et les priorités des communautés locales. Les données empiriques soulignent la dichotomie entre l'efficacité relative des interventions centralisées et technocratiques pour prévenir le risque en amont et le quotidien des populations locales faisant face à des problèmes liés à l'environnement mais aussi à leurs moyens de subsistance et à leur accès aux services de base. Les stratégies de gestion des risques reproduisent une approche centrée sur l'aléa plutôt que sur les causes de la vulnérabilité des hommes, mais en particulier des femmes, qui contribuent à transformer les aléas naturels et les impacts du changement climatique en catastrophes.

En revanche, les pratiques de développement au Ladakh se concentrent, elles, sur l'amélioration des moyens de subsistance des individus et des foyers les plus marginalisés. Elles apparaissent donc plus en adéquation avec une perspective de renforcement des capacités pour mieux prévenir les risques de catastrophe. Les résultats de cette recherche suggèrent en conséquence d'appuyer en premier lieu les pratiques de développement afin de mieux réduire les risques de catastrophes liés ou non au changement climatique, plutôt que de focaliser sur les approches de RRC et de ACC qui ignorent ou sous-estiment la vulnérabilité et le genre. Il convient également de reconnaître et d'étudier systématiquement l'interaction du changement climatique avec les différentes structures sociétales telles les inégalités économiques, les mutations sociales, la globalisation, la corruption, etc., qui impactent sur le quotidien et la vulnérabilité des communautés et sont considérées comme étant plus problématiques par ceux qui y sont principalement confrontés.

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ACKNOWLEDGMENTS

This PhD was funded by the Isambard Scholarship from Brunel University. I am deeply grateful to my supervisor Prof. Susan Buckingham for having supported my application and to Brunel University for having provided me with this financial support.

I express my sincere gratitude to Prof. Susan Buckingham and my second supervisor, Dr. Nicola Ansell for their encouraging guidance throughout this research. This thesis has enormously benefitted from their expertise, suggestions, valuable feedbacks and corrections. I am also grateful for their emotional support at a time when I needed it the most.

I would like to thank Dr. Ilan Kelman for his advice and support at different stages of this research and for his collaboration on several publications. I thank him as well as Dr. Jean-Christophe Gaillard, Dr. Maureen Fordham and Prof. Phil O'Keefe for their inspiring work and for their encouragements to continue further in the field of disaster risk reduction.

The methodology adopted for this research would not have been possible without the invaluable contribution of Krishnan Nair who participated in the fieldwork in Ladakh and provided this study with his time, ideas, insights and advice. I will always be deeply and sincerely grateful to him, for his love and support.

Thank you also to our interpreters Rigzin Angchuk and Stanzin Angmo for their professionalism, energy, dedication and great support during the collection of data.

Most of all, I would like to express my deepest gratitude to people in Ladakh who have accepted to participate in this research. My warmest thanks go to Tsewang Dolma and her family who have welcomed Krishnan and I for several months and made us feel like part of their home. Many thanks to Kaga Dorje, Kaga Phuntsog, Ache Tsetan, Ache Skalzang, Ache Achan, Ache Yanchen and Ache Kunzes as well as the neighbourhood of upper Chanspa for all their help and enthusiasm. I was and remain humbled by their generosity and kindness and feel deeply happy for having shared so many privileged moments of their lives.

Thank you to all interviewees from Leh and the villages of Saboo and Phuktse who gave their time, welcomed us in their homes and provided this thesis with so many inspiring stories and insightful perspectives on this topic.

I also gratefully acknowledge the participation of members of Non-Governmental Organisations in Ladakh. I would especially like to thank Tsering Dolma and Sonam Jorgyes for their welcoming and extremely valuable insights on the research topic.

At last but not least, I would like to thank my family, my friends and all those who accompanied me on this PhD journey for the last three years. I would especially like to thank Maureen and Bala, Stuart and Priti, Tricia and her family, for making their home mine whenever I was based in England, for their encouragements and for their support.

I now would like to finish with a few words in French:

A tous ceux qui m'ont accompagné durant ces trois ans de recherche et qui ont enrichi ma réflexion par leurs questions et leurs conseils ; à ceux qui ont partagé un peu de mon quotidien entre l'Angleterre et la France et à ceux qui sont aussi tombés amoureux du Ladakh ; à ceux qui m'ont entouré et épaulé dans les difficultés ; à ceux qui ont cru en moi ; je vous dois les encouragements

inestimables que vous avez su m'apporter et la joie immense d'avoir été jusqu'au bout de cette thèse.

J'aimerais remercier tout particulièrement mes parents, Bruno et Véronique, et ma sœur, Gladys, pour leur présence constante et leur soutien à toutes épreuves malgré la distance ainsi que ma famille et mes meilleur(e)s ami(e)s qui, j'en suis sûre, se reconnaîtront.

Pour conclure, j'aimerais reprendre les mots de Marie Darrieussecq pour dire que « *Toute écriture est politique puisque toute écriture est une vision du monde.* »

London, March 2013

AUTHOR'S DECLARATION

I declare that the work contained in this thesis has not been submitted for the award of any other diploma. To the best of my knowledge, it does not contain any material previously published or written by another person, except where due reference has been made in the text.

The ethical clearance for the research presented here has been sought and granted by the Brunel School Ethics Committee.

Name: **Le Masson Virginie**

Signature:

A handwritten signature in black ink, appearing to read 'Le Masson Virginie', with a large, sweeping flourish underneath.

Date: **07 March 2013**

ACRONYMS

ADPC	Asian Disaster Preparedness Center
CCA	Climate Change Adaptation
CRED	Center for Research on the Epidemiology of Disasters, Universite Catholique de Louvain
CBA	Community-Based Adaptation
CBDRR	Community-Based Disaster Risk Reduction
CDG	Climate and Disaster Governance
CDM	Clean Development Mechanism
CER	Certified Emission Reduction credits
COP	Conference of the Parties
CSDRM	Climate Smart Disaster Risk Management
DDMP	District Disaster Management Plan
DFID	United Kingdom Department for International Development
DRR	Disaster Risk Reduction
ECOSOC	United Nations Economic and Social Council
EM-DAT	Emergency Disasters Database (US Office of Foreign Disaster Assistance/CRED International Disasters Data Base)
FAO	UN Food and Agriculture Organisation
GERES	Groupe Energies Renouvelables, Environnement et Solidarités
GGCA	Global Gender and Climate Alliance
GHGs	Greenhouse Gases
HFA	Hyogo Framework for Action
IDS	Institute of Development Studies
IFRC	International Federation of Red Cross and Red Crescent Societies
IPCC	Intergovernmental Panel on Climate Change
ISDR	UN International Strategy for Disaster Reduction
LADHC	Ladakh Autonomous Development Hill Council
MDG	Millennium Development Goals
NAPA	National Adaptation Programmes of Action
NAPCC	National Action Plan on Climate Change
NGO	Non-Governmental Organisation
OXFAM	Oxford Committee for Famine Relief
SAPCC	State Action Plan on Climate Change
TISS	TATA Institute of Social Science
UN	United Nations
UNDP	UN Development Programme
UNEP	UN Environment Programme
UNFCCC	UN Framework Convention on Climate Change
UNIFEM	United Nations Development Fund for Women
UNISDR	UN International Strategy for Disaster Reduction
VCA	Vulnerability and Capacity Assessment/analysis
WEDO	Women's Environment and Development Organization
WHO	World Health Organization



Chapter 1

1

INTRODUCTION

1.1 The 2010 flood in Ladakh, India

In the summer of 2010, heavy monsoon rains swept across the South Indian continent triggering widespread floods and landslides that affected tens of millions people. In Pakistan, the ‘worst floods in 80 years’ killed 1,600 people and rendered 500,000 homeless (Reliefweb, 2010). Huge loss of lives, properties, livestock and inundated agricultural land further affected tens of thousands of inhabitants of Afghanistan, Nepal and China. In the Indian administered state of Jammu and Kashmir, monsoon clouds that normally do not pass across the Himalayan Karakoram range burst in a series of short but intense rainfalls throughout the province of Ladakh. The sudden torrential rain falling on barren slopes generated deadly flash floods and mudflows that affected more than 40 villages. In Leh town, the capital of Ladakh, 106 people were killed and critical infrastructure, such as water and energy supply, transportation links and communication networks, were partially or totally washed away (TISS-LAHDC, 2010).

Beyond the general statistics and official reports, testimonials of those who survived often draw more vivid pictures of the human and local dimension of disasters. One inhabitant of the suburban area of Leh explained how she managed to survive:

My husband and I were sleeping. The cat came in and could not stop wailing. I woke up because I thought the cat might be hurt or something. She looked like she was bleeding a lot but then I realised that she was just soaking wet. So I looked outside and realised how much it was raining. I woke my husband up and also my kids because I started to worry about the rain. We opened the door but then we could not close it because of the wind and the rain. We managed to shut the door and we went back to bed after placing buckets under the leaks in the roof. And then, the house started to shake. My husband and my son awoke and began to shout ‘We have to go out, the water is coming!’ We rushed out of the house and ran to our neighbours. A few minutes later, we looked back, but the house was gone. The rain stopped and everything was finished. I was so shocked; I thought I would go mad. We’ve lost everything. When we escaped we did not bring anything with us, we just saved the cat.
[Kunzes, 42 years old]

Relief interventions involved the mobilisation of local village leaders, district authorities, the central government, local and international Non-Governmental Organisations (NGOs), religious representatives and tourists present in the region as it is a famous trekking destination. Ladakh is also a politically strategic region bordered by Pakistan and China and thus highly militarized. The Indian army forces quickly organised rescue operations and helped in recovering dead bodies, clearing rubble and putting the main infrastructures back into service (TISS-LAHDC, 2010). Shelter camps were established, drinking water was provided in tankers and relief materials including food rations, blankets, kitchen utensils and building materials were distributed in the affected areas (Ibid).

Kunzes, the woman who lost her house, was provided by the government with a temporary flat in the new relocation area but explained that she did not want to stay there. Instead, she and her family lived with relatives for several months before converting one of her brother's fields, the following summer, and building her family a new house. The cost of the building was partly covered by the compensation given by the government and partly by their own savings. It took another six months after the winter to complete the construction and by summer 2012, the family was able to move into their new home. This enabled them to move closer to the centre of Leh which is an extremely touristic area. Given this location, she now intends to supplement her household's income by renting some of her rooms as accommodation for tourists. The majority of families who lost their homes in the suburban area of Leh were relocated further from the city centre and from the main road, undermining their access to livelihoods. Therefore, many of them, like Kunzes, chose not to stay. However, where Kunzes had the capacity to resettle in an area where she had the chance to improve her livelihood, others did not, and found themselves with the same living conditions that put them at risk in the first place. For instance, the majority of businesses and shops that were washed away alongside the main communication axes have been rebuilt two years later at the exact same location. This suggests that people often are forced, tempted or voluntarily choose to settle in hazardous locations because of economic daily constraints and other incentives (Wisner et al., 2004; Cannon, 2008).

Following this idea, not every natural phenomenon thus becomes a disaster. In fact, scientific studies along with testimonies from elder people, point out that Ladakh has been traditionally prone to natural hazards due to its sandy hilly terrain and arid climate and suggest that hydrological hazards have always occurred (Arya, 2011). Yet, the magnitude of the floods in 2010 created momentum to associate the disaster with climate change. Regardless of the scientific truth behind this statement, linkages between disasters and climate change often divert the attention from social factors that lead natural hazards to be disastrous. By focusing on the floods or other potential physical

manifestations of climate change, interventions from governmental and non-governmental organisations are distracted from exploring the social dimension of disasters i.e. the vulnerability of communities and individuals. For instance, what reasons lead Ladakhi people to settle in flood-prone areas? Are some groups more likely to suffer from the impacts of the same hazard than others? If so, what are the factors that enable some people to be less severely affected? To overlook these questions might prevent policies and projects from addressing the diversity of people's contexts and therefore from adequately helping local communities to cope and better recover from the impacts of natural hazards and climate change.

The overriding aim of this research is to assess the relevance of disaster and climate-related interventions in relation to local communities' context, priorities and needs. It draws from the linkages between the literatures on disaster and climate change and relies on empirical evidence from Ladakh. It also adopts a gender perspective to particularly explore the attention given to differences between men and women by policies and projects in relation to disasters and climate change. This research objective as well as the justification for using a gendered approach will be further explained in the following sections.

1.2 The development of disaster paradigms

When she tried to explain the reasons why such a disaster might have happened, Kunzes said that God must have been angry with the way Ladakhi society has evolved and the fact that people have become individualistic and lost their spiritual values. She thought this may have led the deities to trigger the cloud burst to remind us all that we should live according to the Buddhist principles of caring for other people and for the environment. This perception illustrates how disasters are often summarised as purely natural phenomena and are therefore called 'natural disasters'.

The disaster literature has long been dominated by an approach that follows this view. Depicted as 'acts of God', 'natural disasters' were and are often perceived as the demonstration of power from deities or Nature against which humans can do little or nothing (See Kelman, 2008 for a review). This dominant view on disasters (also called the hazard paradigm (c.f. White, 1945; Burton and Kates, 1964)) focuses on the study of hazards i.e. *"a dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage"* (UNISDR, 2009: 17). This hazard-centred approach particularly emphasises the extreme dimension of natural phenomena (Gaillard, 2010) but recognises that it is their interaction with a vulnerable place, society

or ecosystem that may generate adverse impacts. The now common equation: Disaster Risk = Hazard X Vulnerability, underlines the duality between a natural (or human-induced) phenomenon and the concept of vulnerability. From the hazard-centred point of view however, vulnerability is often associated with physical processes that damage infrastructure and create unsafe locations for populations (e.g. Stewart, 2003; Kemp, 2007). This perspective emphasises the physical vulnerability of places, the exposure of a society to hazards and the characteristics of biophysical systems (topography, land cover, environmental conditions, etc.) that make a location vulnerable to natural phenomena (Füssel, 2007). In parallel, the dominant approach supposes that communities living at risk are unaware of their hazardous location and/or they lack knowledge of the frequency, duration or magnitude of hazards (see Maskrey, 1989 for a critique). In Ladakh, many organisations' representatives typically advanced that those who were affected by the floods should not have been living in hazard-prone areas. Disasters are thus considered as the consequence of poor individual or community perception of the risk and inappropriate behaviour (see Gaillard, 2010 for a critique).

Consequently, solutions to deal with hazards often rely on physical sciences to improve our knowledge of natural phenomena and improve our abilities to predict them. In this perspective, it is assumed that vulnerability and losses can be reduced through technology (Füssel, 2007). Interventions focus primarily on mitigating and/or controlling the physical impacts of hazards through costly engineering and defence infrastructure (Hilhorst, 2003) which involves the transfer of knowledge and experiences (Kates, 1971; Burton et al, 1978). Strategies also consist of developing hazard-based risk awareness campaigns and technology-based warning systems to alert communities allegedly unaware of their vulnerable living conditions (Gaillard, 2010). In the case of Ladakh, the fact that the majority of those who were affected by the 2010 disaster did not know they were living in a flood-prone area has led the District Disaster Management Plan to advocate the implementation of early-warning systems to warn people of the occurrence of hazards. These approaches are very much top-down oriented and assume that disaster management should be led by those who are expert in understanding hazards to help and rescue those supposedly ignorant (Ibid). After another flooding event in 2006 in Ladakh, post-disaster 'interventions' included the deployment of officers to oversee flood control measures supervised by the Indian Chief Minister (Khan and Van Beek, 2007) such as the "*the reconstruction of embankments*" (GreaterKashmir, 2006: article online). Yet, four years later, such interventions supposed to mitigate or 'control' floods have not prevented hundreds of people from being killed and losing their livelihoods.

This hazard paradigm still influences the majority of disaster risk policies and strategies worldwide. While these might have slightly reduced the impacts of natural events, studies suggest that they

usually fail to tackle the root causes of the problem and have not prevented an increasing occurrence of disasters (Christoplos et al., 2001; Wisner et al., 2004). Moreover, the dominant approach that focuses on studying, predicting and trying to prevent hazards through technical solutions only seems adequate for societies that can afford the cost of physical mitigation. Yet, the majority of people reported to have been affected by large-scale disasters between 1991 and 2001 live in Asia or Africa (EM-DAT/CRED, 2012). According to the World Bank (2001), 94% of the world's major disasters between 1990 and 1998 occurred in countries of the South. Many of these countries have limited financial and technological resources.

Drawing from the idea that not every society and individual can avoid natural hazards and/or deal with their impacts in the same way, disasters have been progressively considered from a different angle. This critical perspective recognises that although natural hazards have and will always occur it is the increased vulnerability of communities exposed to hazards that lead the latter to be potentially disastrous. Viewing disasters from the perspective of human behaviours has a long history (see Kelman, 2007 for a review). However, to explain the occurrence of a disaster by considering people's behaviours linked to socio-economic, cultural and political constraints independently from natural events was first formulated by pioneers such as O'Keefe et al. (1976), Hewitt (1983) and Lewis (1999). The conceptualisation of disaster origins have evolved from an initial focus on the 'natural' to progressively explore the socio-economic and political construction of catastrophes i.e. the reasons explaining why a community is more likely to be affected and the social constraints that force exposure to hazards and create vulnerability (O'Keefe *et al*, 1976; Hewitt, 1983; Cannon, 1994; Lewis, 1999; Pelling, 2003). Thus for advocates of this 'radical approach', the sole analysis of hazard characteristics and people's behaviours with regard to risk is clearly not enough.

In the context of Ladakh, such an approach will typically look at the reasons why the flood generated so much damage in 2010 by looking at the social construction of vulnerability. For instance, Kunzes was indeed living in a prone-flood area and was unaware of it but what were the reasons that led her family to settle in this area in the first place? She explained that they could simply grab a piece of land on which to build their house. According to her, this was the cheapest option to settle near the capital where more livelihood options concentrate and where most of her relatives live. By doing so, they could keep the amount of money they were borrowing at a lower level in order to afford the cost of labours for building their house. There are countless other examples from Ladakh, where inhabitants of remote villages migrate to the capital expecting to access more diverse and secure resources to help them provide for their families (Goodall, 2004). As elsewhere in the world and especially in the global South, migrants often end up in marginalised suburban areas which offer

available land but are prone to natural hazards (Wisner et al., 2004; Texier et al., 2009). Looking at the societal constraints that render particular groups vulnerable to hazards enables us to explore the root causes of disasters which often lie in unsustainable development trends of societies (Wisner et al., 2004). Rapid urban population growth, increasing and unequal levels of production and consumption, economies based on short-term profits, pressure on natural resources and 'progress' that is not usually culturally adjusted are all such structures that negatively impact on the environment, generate inequalities between and within societies and partly explain why certain groups find themselves suffering more from the impacts of natural hazards.

This also points out the areas where Disaster Risk Reduction (DRR) strategies should concentrate. The United Nations International Strategy for Disaster Reduction (2009: 10) defines DRR as:

The concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events.

DRR is thus supposed to prevent or reduce the risk of a hazard becoming a disaster through interventions that do not solely focus on the natural phenomenon but which also aim to tackle the root causes of vulnerability (Wisner et al., 2004; Gaillard et al., 2010). Equally, DRR strategies ideally draw upon the concept of capacity which recognises that despite their vulnerabilities, people are also able to face, cope with and recover from disaster shocks they experience based on resources or livelihoods they possess (Twigg, 2001; Davis et al., 2004). In the case of Kunzes for instance, she might have been vulnerable due to a combination of economic constraints, lack of information and ineffective urban planning that led her family to settle in a flood-prone area but she also benefitted from a strong social network including her neighbours who offered them shelter in the aftermath of the disaster and her family who provided her with a land to rebuild her house.

1.3 Linkages between disasters and climate change

According to a wide body of knowledge, there has been a rise in the occurrence of extreme weather events and associated hydro-climatic hazards over the last few decades (Freeman et al., 2003). Changes in the current climate are believed to be accelerated by increasing CO₂ emissions resulting from anthropogenic activities (IPCC, 2007). Resulting impacts include the global warming of the atmosphere which generates changes in rainfall patterns, modifications in local climate regimes, the rising of the sea level, the melting of glacial areas and a likely increase in the intensity and frequency

of climatic-related phenomena (Ibid). According to Freeman et al. (2003: 4) [...] *“climatic developments coupled with the increased concentration of the world’s population in vulnerable urban areas, poses an increasing risk from natural disasters [sic]”*.

Following the disaster of 2010 in Ladakh, press reports and early studies suggested a link between the flood-related disaster and climate change (e.g. Singh, 2011; Banoo, 2012). In parallel, many inhabitants of Leh and surrounding villages perceived the cloudburst as one impact of climate change which is, according to them, a manifestation of Nature’s anger. Explaining the increasing occurrence of disasters by reference to climate change is a current trend typically followed by many policy-makers and reinforced by the media (Radford and Wisner, 2012). The current popular discourse on climate change often stresses alarmist predictions of biophysical impacts threatening ecosystems and human societies (Nelson et al., 2009) with the effect that damage caused by a cyclone or the multiplication of droughts and resulting famines are viewed as consequences of climate change. Current disasters related to natural hazards are thus increasingly associated in public opinion with the effects of a changing climate. Kelman and Gaillard (2008) argue that climate change has become a ‘scapegoat’ blamed for problems which have existed for a long time. This diverts attention away from the societal factors causing disasters and away from other chronic and creeping issues such as poverty, lack of sanitation, food insecurity or the depletion of natural resources which existed long before and may cause as much, if not worse, damage as the impacts of climate change (Ibid).

This is not to suggest that climate change does not constitute a serious issue undermining the development of societies. However, the increasing attention to predicting the nature, intensity and frequency of environmental changes associated with the climate recalls the emphasis placed upon studying hazards to tackle ‘natural disasters’. Yet, the physical dimension of hazards or climate change does not fully explain why certain impacts are potentially disastrous in particular areas and for specific groups. Therefore, there is also a social dimension to climate change that goes beyond the sole analysis of the threat (Kelly and Adger, 2000).

In order to tackle climate change, measures vary between focussing on mitigation i.e. reducing greenhouse gases (GHG) emissions, and adaptation i.e. preparing human societies to deal with the impacts of a warmer atmosphere. Mitigation efforts thus aim to prevent the impacts of climate change from happening in the first place but have encountered political reluctance linked to the economic resources and societal transformation that they entail (Garvey, 2010). In parallel, focusing on adaptation has been associated with the unwillingness to challenge current levels of consumption of energy and goods and economic growth-based development that is criticised for deteriorating the

environment and creating climate change in the first place (Godard, 2009). Nevertheless, the international community has recognised that an exclusive focus on mitigation cannot be enough to prevent significant environmental changes in the short-term (Nelson et al, 2009).

Given current unequal development, countries in the South are considered the most vulnerable to climate change impacts and therefore the most likely to suffer from them, whereas their contribution to GHG emissions is far less than those from industrialised nations. Increasing pressure has thus targeted rich countries to fund adaptation (Okereke and Schroeder, 2009). The increasing amount of funding from international institutions and governmental bodies allocated to CCA has created incentives for development practitioners to focus on this sector (Schipper, 2004; Mercer, 2010). CCA has been defined by Ayers and Huq (2009: 675) as *“a process, action or outcome in a system (ecosystem, household, community, group, sector, region, country), one which enables the system to better cope with, manage or adjust to changing conditions, stresses, hazards, risks or opportunities associated with climate”* (see Smit and Wandel, 2006 for a review). In this perspective, CCA includes strategies to reduce the vulnerability of people to the adverse impacts of climate change which very much concurs with the goal of DRR. Both CCA and DRR aims to assist people with means that will help them protect themselves, face, better recover from and adapt to the occurrence of hazards and environmental changes.

Given these synergies, a growing body of knowledge argues that climate change efforts should be integrated within DRR and should learn from decades of experience in attempting to reduce the risk of disasters (O’Brien et al., 2006; Mercer, 2010; Kelman and Gaillard, 2008; 2010). However, the increasing amount of funding dedicated to tackling climate change encourages many agencies and NGOs to give high visibility to adaptation and mitigation-based strategies and projects (Mercer, 2010). Studies have criticised the resulting creation of top-down interventions in the South which are driven by Western scientific discourse and priorities (Okereke and Schroeder, 2009). Many are said to be inappropriate to beneficiaries’ realities and involve strategies that do not take into account differences among locations, contexts and individuals (Gaillard, 2010). How is CCA effective, if the prescribed adaptation strategies such as tree planting or water resource preservation are undone by already existing developmental problems such as lack of sustainable livelihoods including access to water, sanitation issues, pollution, urbanised hazard-prone areas or social inequalities?

Therefore, some studies stress that CCA should not only be integrated within DRR but both CCA and DRR should be encompassed in wider development planning (O’Brien et al, 2006; Mitchell and Van Aalst, 2008; Christoplos, 2008; Mercer, 2010). However, the literature suggests that this has not been

implemented in practice and that the climate change sector seems to work within its own sphere (Kelman and Gaillard, 2010; Mercer, 2010; Romieu et al., 2010). It also points out that there is not enough empirical evidence to help explain this dichotomy, a gap that this research partly offers to fill.

1.4 The gender dimension of disasters and climate change

The vulnerability of people facing climate change and natural hazards varies according to geographical, social, economic and political contexts but also in terms of social stratifiers such as age, gender, ethnicity, physical ability, sexual identity or religious beliefs (Wisner et al., 2004). Individuals' contexts influence their belonging to minority groups or groups that are discriminated against within their society and who are usually disproportionately affected by disasters (O'Brien et al., 2008). Differences between men and women constitute a typical example where the particular realities of one group compared to the other are frequently ignored or underestimated (Fordham, 2012). In 1984, the Women and Geography Study Group of the IBG (1984: 21) wrote: *"Surely things are different these days and women have equal rights with men? Why should we any longer need to stress the existence of inequality based on gender?"* I, too, wondered whether considering gender differences would be meaningful for this study. It was actually the research process, based on a gender-balanced methodology, that led me to refocus the topic and identify gender as a cross-cutting issue between DRR and CCA.

Gender is defined as *"the array of socially constructed roles and relationships, personality traits, attitudes, behaviors, values, relative power and influence that society ascribes to people on a differential basis"* (Enarson, 2009: 17). For the past four decades, gender studies, largely inspired by feminist theories, have continuously documented gender differences in terms of people's status, roles, needs or priorities both at the household and community levels. They have also stressed that men and women face different everyday constraints which often lead to imbalances to the detriment of women. The latter usually find themselves with lower status and more limited livelihoods opportunities. Because gender shapes the distribution of resources, wealth, employment, decision-making and political power, rights and entitlements (UN, 1999), it constitutes a crucial variable to understand people's vulnerability and capacity facing disasters or long-term environmental changes.

According to Momsen (2010), studies have shown that societies tolerating gender-based discrimination are characterised by higher levels of poverty, slower growth and lower standards of living whereas gender equality enhances development. The importance of eliminating gender-based discrimination has thus been recognised at the international level as a crucial component to foster

development efforts and achieve people's well-being. One of the eight Millennium Development Goals (MDG) to be achieved by 2015 aims to promote gender equality and women empowerment. Momsen (2010:8) writes:

Gender equality does not necessarily mean equal numbers of men and women [...] in all activities, nor does it mean treating them in the same way. It means equality of opportunity and a society in which women and men are able to lead equally fulfilling lives.

Despite the international recognition of the need to guarantee women's rights and efforts to develop indices to measure gender equality (see Dijkstra, 2006 for a discussion), Friedman and Gordesky (2011) note a lack of progress in social justice to the detriment of women. They argue that *"insufficient attention has been given to factors holding inequality in place, such as cultural norms that maintain the gendered division of labor, the restrictions on women owning land, or customs that condone violence against women"* (Ibid: 11).

By assuming gender equality and overlooking gender differences, there is a risk for development projects, DRR and CCA strategies to not only be unjust, but to be also rendered inadequate and unsustainable. Humanitarian practitioners, followed by some researchers and decision makers, have thus slowly but increasingly incorporated a gender perspective on disaster (Phillips and Morrow, 2008; Fordham, 2012). However, as Fordham (2012) suggests, the disaster field, both research and practice, is still evolving in a patriarchal world. Many authors have criticised the male dominated discourse of development and DRR whereby differences in power, needs, vulnerabilities and capacities of men and women remain largely ignored and/or underestimated (Enarson and Morrow, 1998; Fordham, 1998; Philipps and Morrow, 2008). Disasters are not gender neutral and nor is climate change with regard to the marginalisation that men and especially women face in their daily lives at every level of the society on account of gender. The neglect of gender issues is thus also criticised within the climate change sector both in terms of mitigation and adaptation (Christensen et al., 2009; Dankelman, 2010). Drawing from the literature that critiques the neglect of in-depth social inequalities analysis between men and women, this research aims to incorporate a strong gender dimension to data collection and analysis in relation to DRR and CCA. This will help focussing on people's vulnerabilities to natural hazards and climate change and how there are addressed by discourses and interventions.

1.5 Research objectives and outline of the thesis

Beyond the theoretical synergies between DRR, CCA and gender concepts, evidence suggests that

the integration of these three fields is not widely practised among researchers, policy-makers or NGO practitioners. In parallel, studies repeatedly stress the necessity to provide more empirical studies that re-contextualise climate change within specific locations and environmental contexts as just one of many issues faced on a daily basis by local communities (Dankelman, 2010; Wisner et al., 2012). In particular the literature underscores the necessity to emphasise the local dimension of the vulnerability of people and communities in facing potential changes in the climate, as DRR studies often argue (Wisner et al., 2004; Kelman and Gaillard, 2010).

In light of this scenario, the overall aim of this research is to deepen the understanding of the conceptual and practical linkages between DRR and CCA through using a gender perspective. It draws from the literature that advances the lack of integration of the two sectors in the design and implementation of climate-related and DRR projects as well as the lack of attention to the gender dimension of both disasters and climate change. This study aims at examining the relevance of climate change-related interventions to beneficiaries' local and gendered realities and whether the integration of the fields of DRR and CCA advocated by academics and policy-makers, are practised on the ground. Three primary objectives are thus addressed:

- I. Through using DRR frameworks and a gender perspective, to produce a holistic analysis of the way Ladakhi communities experience climate change and natural hazards in relation to their everyday risks.
- II. To explore current approaches and practices which deal with climate change and natural hazards and the way they conceive gender at the grassroots level.
- III. To identify and explain any disjunctures between approaches inscribed in climate-related interventions, DRR strategies and beneficiaries' realities.

Although this research is embedded in the field of human geography, it adopts an interdisciplinary perspective to generate knowledge in the fields of disasters and climate change, an approach successfully used, for instance, in the theses of Schipper (2004) and Akerkar (2011). It thus engages with theoretical literatures from development, political ecology and disaster, as well as feminist and gender theory. The articulation of key concepts arising from these literatures and their critical review will be presented in Chapter 2. This chapter presents the theoretical and conceptual framework that informs and has generated the research questions.

In order to address each objective, a qualitative methodology was adopted which relies extensively on empirical data from a case study.

Chapter 3 presents the epistemology that influences and underpins the research approach, the design of a gender-sensitive methodology, the rationale for using a case study and the research methods selected for collecting and analysing the data. The Himalayan region of Ladakh was chosen to provide a contextual depth of social, cultural and spatial insights to explore the integration of CCA and DRR in practice, and conceptually. This high-altitude cold desert is highly sensitive to environmental changes resulting both from climate change and from macro-economic factors. Studies suggest that Ladakhi communities are currently facing or likely to face exacerbated water fluctuations such as the 2010 flood, environmental degradation and short term shifts in agricultural practices (e.g. Nüsser et al., 2012). By using the case of Ladakh, this research provides a geographical perspective on climate change in mountain areas in the global South although recognising that all such regions are unique. The term 'South' is privileged throughout the thesis to designate poorer, mainly non-industrial countries in contrast to the 'North' which groups richer countries allegedly 'developed' thanks to industry and global trade (Corbridge, 2009). Although the North America and Euro-centred regrouping of South countries have been criticised (Ibid), the dichotomy North/South is preferred to the distinction between 'developing' and 'developed' countries that is based on the assumption of a single economic growth-based model of development (Jackson, 2009).

Drawing from the literature documenting contemporary challenges faced by mountain communities, Chapter 4 provides the contextual and geographical background of the research. It explains that mountain communities not only live in geographical contexts that are more sensitive to global environmental change and experience climate change impacts earlier and in a more pronounced manner than other regions, they have also historically suffered from economic and political marginalisation which render them more vulnerable and undermine their capacity to cope with and adapt to change (Kohler et al, 2010; Gaillard and Kelman, 2012). Although climate change is likely to exacerbate natural hazards, generate environmental changes and affect the daily life of mountain communities, especially in the South, this chapter stresses that climate change is an additional driver of change among many others including population dynamics and pressures on resources, the globalisation of economies, migration patterns and mass tourism which all occur in the context of Ladakh. Overall, this chapter aims at contextualising the impacts of climate change in the broader context of sustainable development of mountain communities.

By examining how climate change relates to other structures, Chapter 4 supports the analysis and the understanding of the vulnerability and capacity assessment provided in Chapter 5. Such an assessment relies on data gathered through document analysis, participant observation, interviews and focus group discussions, and reviews the vulnerabilities and capacities of men and women in

relation to natural hazards, the predicted impacts of climate change and everyday risks. It combines conceptual frameworks from the disaster literature and offers a new way of analysing vulnerability and capacity in an integrated manner. This chapter also particularly considers the role of gender in shaping the vulnerabilities and capacities of people.

This assessment contributes to understanding the analysis in Chapter 6 of the way men and women in Ladakh perceive, explain and respond to the impacts of climate change compared with other hazards and everyday constraints. It also discusses solutions that people identify to tackle climate change and their opinions about adapting to their changing climate and environment. Overall, Chapters 4, 5 and 6 combine to draw a holistic analysis of the way Ladakhi communities experience climate change and natural hazards in relation to their everyday risks using DRR multiple frameworks and a gender perspective.

Chapter 7 describes development, DRR and CCA practices that are being implemented in Ladakh in regard to wider disaster and climate policies existing at the district, state and governmental level in India. The objective is to identify the extent to which organisations and institutions involved in development, DRR and CCA in Ladakh address vulnerability, capacity, gender and beneficiaries' opinions and priorities when designing national adaptation policies and implementing local projects.

Chapter 8 draws from the analysis of policies and projects reviewed in Chapter 7 to compare their relevance with the profile of local communities' realities and needs assessed in chapters 4, 5 and 6. This aims to identify and explain the potential disjunctures between approaches inscribed in DRR and climate-related interventions and beneficiaries' realities and needs. This chapter ultimately relates the findings from the case study to the literature reviewed in Chapter 2, to explore the extent to which climate-related interventions learn from DRR regarding both vulnerability and gender. It finally explores the limits constraining the effectiveness and relevance of interventions to address environmental shocks and trends and what recommendations can stem from these.

Finally, the conclusion will summarise the main empirical findings including the evidence showing how climate change is perceived and experienced as just one challenge among others faced by mountainous communities in Ladakh. There are similar drivers to disasters, to the adverse impacts of climate change and to unsustainable development yet DRR and CCA-related responses remain non-integrated with little attention to gender. The conclusion will finally discuss the relevance of using DRR frameworks and a gender perspective in the context of climate change and further implications for research, policies and projects.



Chapter 2

2

THE INTEGRATION OF CLIMATE CHANGE ADAPTATION AND DISASTER RISK REDUCTION WITH GENDER LENSES

This chapter presents the theoretical framework for integrating Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) concepts. In light of the previous discussion in the introduction, this chapter particularly engages with the disaster literature documenting the ‘radical paradigm’ or in other words the vulnerability based approach to disaster risk.

The first section of this chapter synthesises the main objectives shared by the disaster and climate change communities. It articulates key concepts such as vulnerability, capacity, adaptation and resilience used in both sectors, in order to point out synergies and incentives for integration as advocated in the literature. Based on this conceptual framework, the second section provides a critical review of the existing (lack of) integration of DRR and CCA by (i) academics, (ii) policy-makers and (iii) practitioners working in the fields of emergency and development. This aims at highlighting the potential limits that prevent both sectors from combining their agendas in theory and in practice. The third section adopts a gender perspective and reviews how gender has been addressed by both DRR and CCA. It then proposes to use gender as a cross-cutting theme to link DRR and CCA in a more integrated manner.

2.1 Why integrate DRR and CCA? Convergence of concepts and objectives

Both the climate change and disaster management communities have been increasingly addressing linkages between DRR and CCA (O’Brien et al., 2006; Schipper and Pelling, 2006; Thomalla et al., 2006; Kelman and Gaillard, 2008; O’Brien et al., 2008; Schipper, 2009; Mitchell et al., 2010; Romieu et al., 2010). From this documentation, a number of overlapping objectives and approaches has been identified and summarised. Firstly, both sectors aim at reducing the vulnerability of people and communities facing hazards and climate-related environmental changes. A second common objective

focuses on enhancing the capacities of people to face, cope with and adapt to hazards and long-term changes. Thirdly, both DRR and CCA have progressively emphasised the necessity to integrate bottom-up community-based approaches in order to design policies and projects more in line with local knowledge and experience. Such objectives inform the articulation of key concepts such as vulnerability, capacity, adaptation and resilience. However, this section will also highlight differences in the interpretation of these concepts that will ground the critical review of the limits preventing effective integration of both DRR and CCA.

2.1.1 Reducing the vulnerability of people and communities

In this section, the first part deals with the conceptualisation of vulnerability within DRR and the second part approaches vulnerability from the angle of the climate change sector.

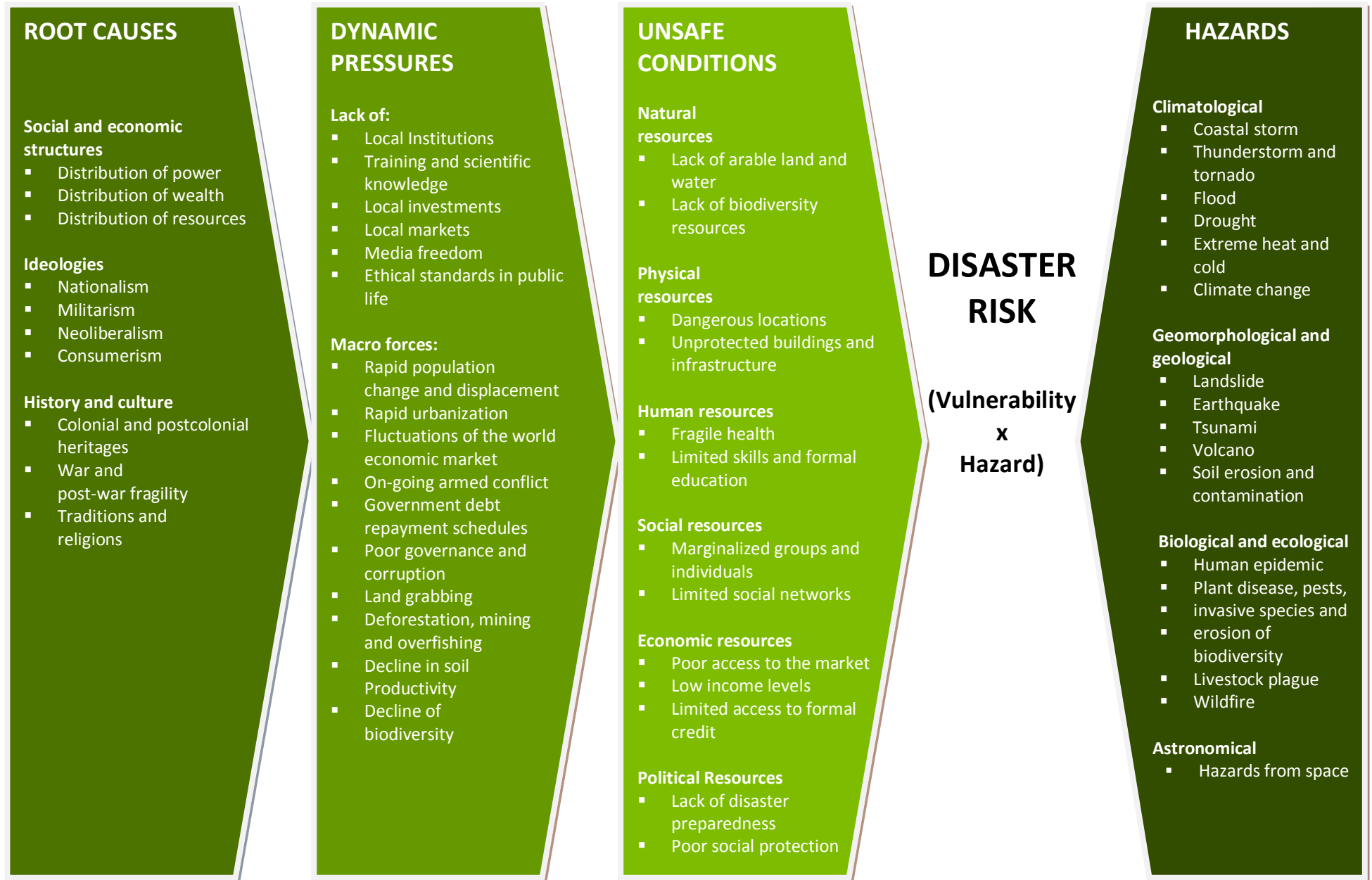
2.1.1.1 Vulnerability, marginalisation and sustainable livelihoods

Following the theoretical shift that acknowledges the human and societal dimensions of disasters, the concept of vulnerability became the central idea of the 'radical paradigm' (Blaikie et al., 1994). The United Nations International Strategy for Disaster Reduction (UNISDR) defines vulnerability as the "*characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard*" (UNISDR, 2009: 30). Many other definitions have been offered in the disaster literature (e.g. Timmermann, 1981; Liverman, 1990; Blaikie et al., 1994; Cutter, 1996; Hewitt, 1997; Dibben and Chester, 1999; Bankoff et al., 2004; Prowse, 2003; Kaspersen et al., 2005). Despite the differing conceptualisations, the emphasis is commonly placed on societies' susceptibility to be affected by hazards or in other words on the factors that lead a hazard to become a disaster (Cannon, 1994). Vulnerability is thus generated or maintained by a multitude of social, economic or political structural factors which determine poverty, community marginalisation, conflicts, rapid urbanisation or environmental degradation. These factors reinforce vulnerability in the sense that they lead to increased exposure to hazards and prevent certain people from assembling the necessary means to protect themselves and recover from shocks (Hewitt, 1997).

Successive conceptual frameworks have been suggested to identify the factors that make an individual or a community vulnerable to the impacts of natural phenomena and other crises (see Watts and Bohle; 1993; Cannon, 1994; 2001; Moser, 1998; Cardona, 2004; Turner et al., 2003). One of the most referenced frameworks is the Pressure and Release Model (see Figure 2.1) introduced by Davis (1978), developed by Blaikie et al. (1994) and later revised in Wisner et al. (2012). The PAR

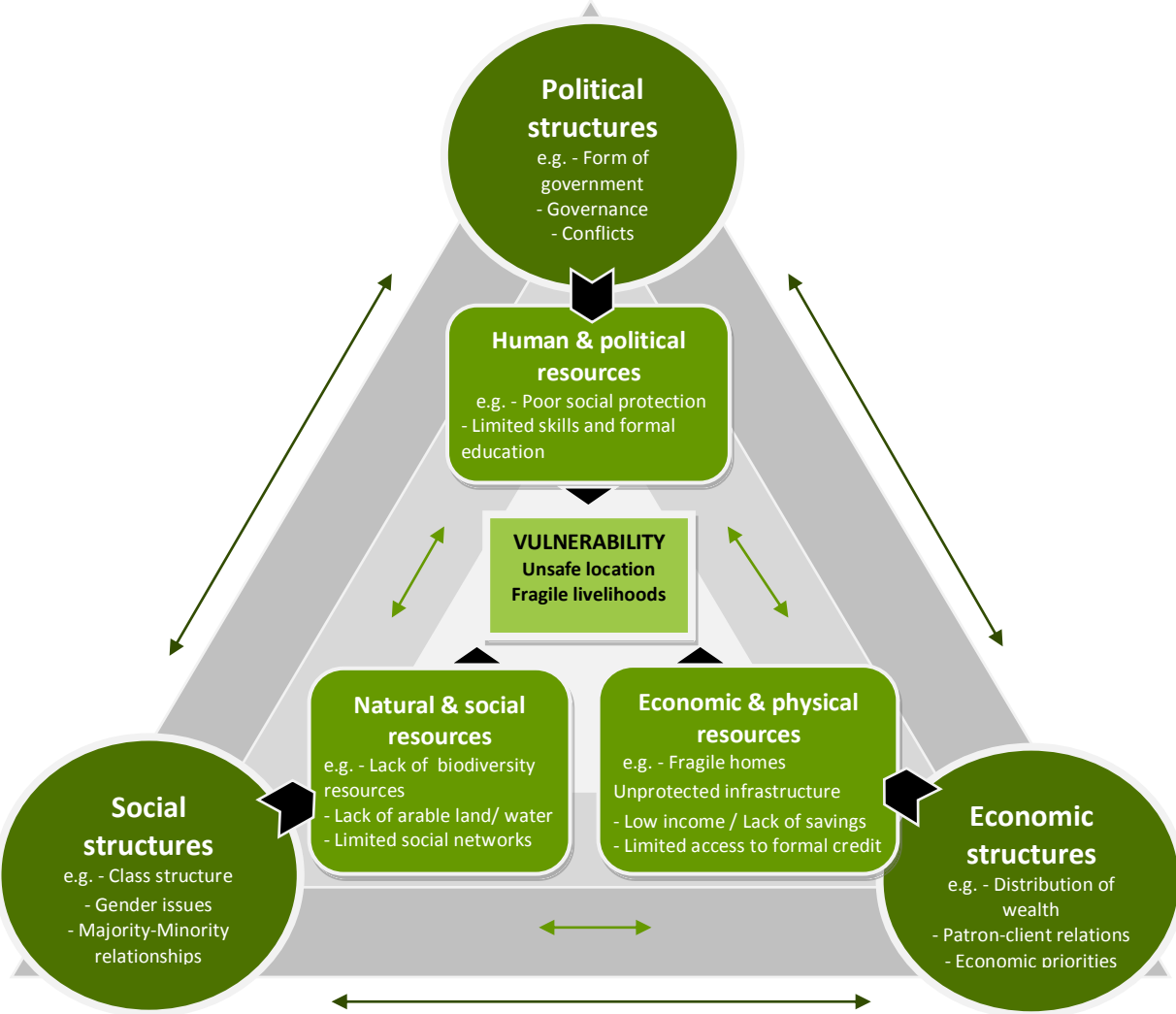
demonstrates that disasters result from the interaction between two opposing forces: hazard and vulnerability. Above all, this model shows the chain of three dimensions of constraints and pressures which lead to the vulnerability of a population. The first one, “*unsafe conditions*” defined as “*specific forms in which the vulnerability of a population is expressed in time and space in conjunction with a hazard*” (Blaikie et al., 1994: 25) is determined by “*dynamic pressures*”. This second dimension may include factors such as population growth, urbanisation, conflicts, environmental degradation, foreign debt and possibly climate change (Dibben and Chester, 1999). *Dynamic pressures* which determine *unsafe conditions* are influenced by a third dimension: *root causes* linked to socio-economic, demographic and political processes. To summarise, being at risk varies depending on numerous parameters, not only individual characteristics and decision making but also wider political contexts or economic environments which are correlated with each other (Blaikie et al., 1994).

Figure 2.1. Pressure and release Model and the progression of vulnerability (Adapted from Wisner et al. 2012)



In the same framework scheme, Gaillard (2006), later developed in Wisner et al. (2012), suggests that vulnerability can be approached independently from hazards. The ‘triangle of vulnerability’ (see Figure 2.2) highlights that social, economic and political structures determine a lack of access to a number of resources which leads to the marginalisation of communities and/or individuals and therefore to their vulnerability regardless of the nature of the threat.

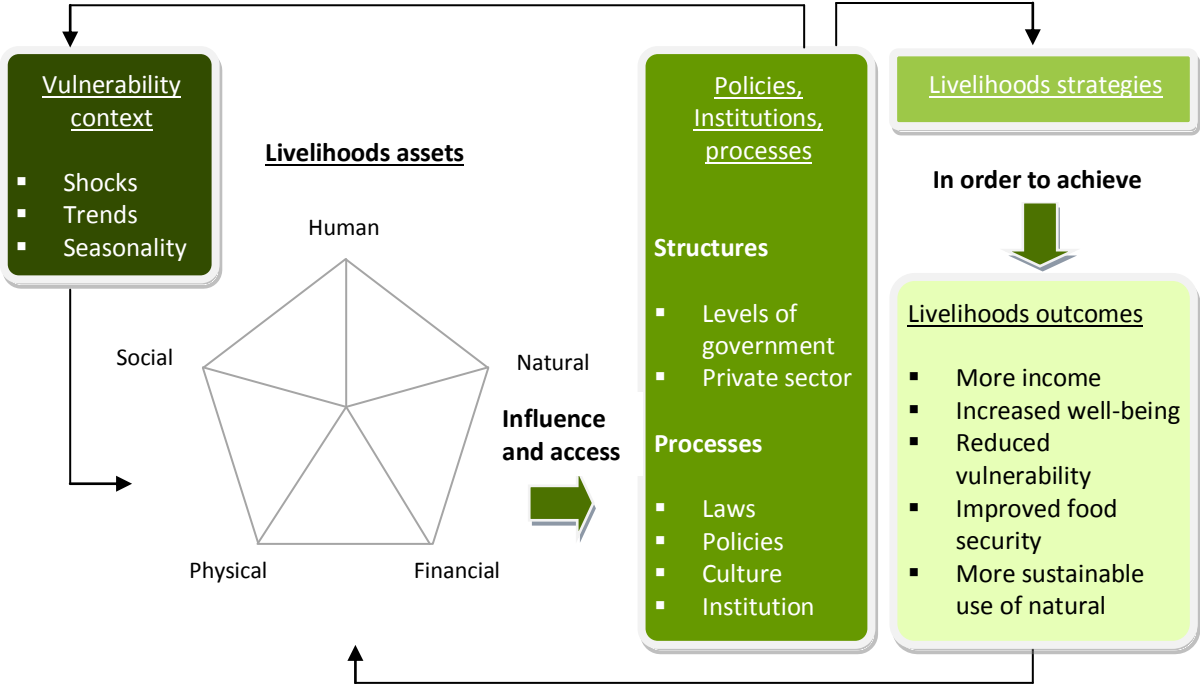
Figure 2.2. The triangle of vulnerability (Adapted from Wisner et al. 2012)



These two frameworks highlight that the radical paradigm emphasises resources or livelihoods as a fundamental determinant of vulnerability. A livelihood, as defined by Chambers and Conway (1992:1), “comprises people, their capabilities and their means of living, including food, income and assets”. People’s ability or inability to access to a large, resistant and sustainable set of resources determines their capacity to secure the means to protect themselves in facing the impacts of hazards

and recover from damage (Wisner et al. 2012). Sources of income vary and may comprise economic, natural or physical resources, social networks or cultural knowledge and so on, which can be used to satisfy basic needs i.e. water, food, shelter, clothing or cultural values (Wisner et al., 2004; Wisner et al., 2012). The literature also refers to the concept of ‘sustainable livelihoods’, i.e. livelihoods that enable people to cope with and recover from the impacts of natural hazards, crisis and social disruption without undermining other resources not only in the short term but also for future generations (Chambers and Conway, 1992). The Sustainable Livelihoods framework (see Figure 2.3) has thus been extensively used to highlight (i) assets that people own, (ii) activities they adopt in order to pursue livelihood outcomes (income, education, health, reduced vulnerability, etc) (iii) factors that determine poverty and (iv) how these dynamics interact (Chambers and Conway, 1992; Scoones, 1998; DFID, 1999; Carney, 2003). The relevance of using this framework in relation to livelihoods and vulnerability to disasters has also been analysed by Twigg (2001) and Cannon et al. (2003).

Figure 2.3. The Sustainable Livelihoods Framework (Adapted from DFID, 1999)



In other words, one can assess vulnerability through the livelihoods people possess because these reflect their marginalisation at geographical, social, economic and political levels (Gaillard, et al. 2010; Wisner et al., 2012). Firstly, those geographically marginalised are usually the first ones to be hit by a disaster because they live in areas prone to hazards or because their remoteness reduces

possibilities for external assistance (e.g. Ehsan-ul-Haq, 2007). However, avoiding living or working in a hazardous environment is often dictated by the nature and strength of other livelihoods (Cannon, 2000).

Secondly, socially constructed status, roles and norms on the basis of gender, age or sexual orientation for instance creates unequal levels of social marginalisation. For instance, there is a gender dimension to disaster (developed in section 2.3) whereby women often find themselves with fewer livelihoods opportunities which impacts negatively on their vulnerability (Parpart, 1995; Fordham and Ketteridge, 1998; Fordham, 1999). Age and disability also influence the ability of people to face threats, for example by not being able to react or move quickly, which typically affect the elderly the greatest (HelpAge International 2002; Ngo, 2012). The eldest, the youngest and the disabled may be dependent on other members of the household or community to fulfil their daily basic needs making them even more vulnerable to face risk if they find themselves alone (Ibid; Cannon, 2000). Furthermore, ethnicity and the membership of ethnic minority groups, certain categories of caste or religious communities, play crucial roles in shaping vulnerability (Gaillard, 2012). For instance, the majority of indigenous people worldwide suffer from ethnic discrimination, often preventing them from having equal access to public services, employment, education or health care (Taylor, 2007; UNPFII, 2008). Numerous studies have shown that prejudice sometimes forces them to live and work in areas prone to hazard without access to warning systems or other preventative measures (Torry, 1978; Beauclerk and Narby, 1988; Gaillard and Le Masson, 2007; Mercer et al., 2007). Additionally, illiteracy rates are higher among minority groups and language barriers prevent access to disaster notices and instructions (Abramovitz, 2001; Salick and Ross, 2010). Inequalities between dominant groups and poorer classes, ethnic minorities, disabled people or women generally reflect issues in terms of social cohesion within communities. Those discriminated against are as a consequence more vulnerable because their social capital (i.e. support and aid provided by family, community or group network members) could be hampered by a lack of solidarity and help in times of crisis (Magnan, 2009).

Thirdly, there is clear evidence that disasters disproportionately affect the poor worst which relates to people's economic marginalisation. Some rural communities have become economically vulnerable because local production systems have changed from subsistence living to a market-based economy (Gaillard, 2007). Economic marginalisation reinforces geographical vulnerability because many people settle in hazard-prone locations to satisfy more pressing short-term needs than the hypothetical occurrence of natural hazards (Winchester, 2000). People may also not have other choice but to live in dangerous locations led by social factors that further marginalise them. Poor

people struggle to have access to sustainable and sufficient incomes which undermine their access to basic services and often worsen their physical and mental health status and their ability to cope with illness and injury resulting from a hazard (Cannon, 2000; Wisner et al., 2004). Their situation is exacerbated when disasters strike (Abramovitz, 2001). With no insurance, they lose household goods and resources making the reconstruction process even harder (Cannon, 2000). Thereby vulnerability is both a cause and a consequence of poverty (Dibben and Chester, 1999). However, vulnerability cannot be addressed purely in terms of poverty, because this simplification would fail to explain why, at equal income levels, people suffer differently from disasters because of other factors of marginalisation (Bankoff, 2001; Gaillard, 2010). Khosla and Masaud (2010) for instance have documented that those living in informal urban settlements are disproportionately affected by the occurrence of hazards because (i) the overcrowding of dwellings in slums makes them compete for few existing basic services, (ii) the unavailability of land forces them to settle in high risk areas without any security of tenure, (iii) they usually rely on informal livelihoods with low incomes and dangerous working conditions (e.g. hours of daily work exceeding 12 hours, scavenging dumpsites, working in polluted environments) and (iv) because of the lack of infrastructure.

Fourthly, social status and access to economic livelihoods are almost always determined by political processes and the distribution of power (Mascarenhas and Wisner, 2012). For instance, for those unable or unwilling to protect themselves, social protection can be a substitute to decrease their vulnerability. It includes disaster management strategies such as preparation and rescue provided by local or national government, civil defence, fire department or other relevant organisations but also everyday social support such as cash transfers for the elderly and unemployed, which can protect their livelihoods. However, this clearly depends on political processes and the type of state and institutions within which they operate (Cannon, 1994; Kelly and Adger, 2000; Wisner et al., 2004; Kelman, 2009; Magnan; 2009). Whether the country benefits from a good level of wealth or struggles with debt payment; whether it fosters adequate welfare distribution or institutionalises income inequalities and tolerates corruption; whether it bans social discrimination against minority groups or turns a blind eye to it; these factors influence the political marginalisation of individuals and communities which in turn influences vulnerability. In other words, the state partially creates adequate or inadequate conditions for access to incomes, housing, health care, education and social protection and overall influences people's ability to build their livelihoods (Hewitt, 1997; Cannon, 2000). In terms of disaster management, the type of governance, national priorities and orientations also determine the application of precautionary measures for hazard preparedness such as the planning of rescue operations, the implementation of infrastructure, the effectiveness of urban planning and land zoning regulations, etc (Cannon, 2000).

Access to stable and sufficient livelihoods is therefore determined on one side by political, social, economic or historical structures that go beyond individuals' reach (Wisner et al., 2004) and on the other side, by social factors such as age, gender, physical ability, religion, caste and ethnic affiliations which usually create inequalities between and within groups preventing certain people from accessing a set of resources (Ibid). This highlights the interconnection between different structures and the social construction of individuals' marginalisation in their daily life and their vulnerability in facing hazards (Wisner et al., 2012). This also stresses the everyday dimension of marginalisation and vulnerability compared with hazards often characterised as extraordinary events (Gaillard, 2010). Wisner et al. (2012: 25) explain that "[s]ocial and economic threats to daily needs, especially to food security, are almost always more pressing than threats from rare or seasonal natural hazards". For instance, for illegal immigrants, the fear of being evicted or deported is greater than the risk of staying in an area prone to hazard but located near to sources of incomes (Gaillard et al., 2008; Le Masson, 2008). In this regard, many scholars have documented case studies where livelihoods can also be a source of hazards such as volcano slopes which often provide available land to settle or to use for agricultural purposes or cattle grazing (Dibben and Chester, 1999) or dumpsites which often constitute the only financial resources for marginalised urban dwellers (Le Masson et al., 2009). Gaillard (2010: 222) advances that: "*Such an intimate relationship between livelihood and vulnerability justifies that many people have no other choice but to face natural hazards to sustain their daily needs*". Hence, numerous studies have demonstrated that the poorest do not take action to reduce their exposure to risks because their main priority is to avoid short-term risks linked to poverty: hunger, unemployment, health problems, social considerations, etc. (e.g. Wisner et al., 2004 ; Gaillard et al., 2008; Texier et al., 2009; Le Masson et al., 2009). Hence, one speaks about everyday hazards (UNDP, 2004; Gaillard, 2007) or 'permanent emergency' (Bankoff, 2001) which link vulnerability and poverty. Inadequate sanitation, malnutrition, absence of health care systems, unemployment, lack of stable incomes or domestic violence are example of these everyday hazards which hinder development efforts increasing vulnerability to hazards (Narayan et al., 2000; Wisner and Pelling, 2009). Conversely, disasters often reveal significant disparities in socio-economic and political status, geographic location, access to basic services and the recognition of human rights (Masika 2002; Demetriades and Esplen, 2008). Therefore, the effectiveness of efforts to reduce vulnerability are limited if they are not viewed within the broader context of sustainable development (Glantz, 1994; Venton and La Trobe, 2008). The assessment conducted in this thesis follows this idea and will analyse the vulnerability of Ladakhi communities to hazards and climate change in relation to wider development structures.

2.1.1.2 Vulnerability in the context of climate change

In the context of climate change, reducing people's and communities' vulnerability to hazards involves looking at the conditions that create the susceptibility of societies to the impacts of climate change. Although some of these impacts are hazards already known and researched in the sector of DRR, the concept of vulnerability has still been redefined according to the nature of the threat i.e. climate change. Some authors argue that this reconceptualisation has been relatively divorced from DRR (Gaillard, 2010; Schipper, 2009; Romieu et al., 2010; Kelman, 2010).

According to Füssel (2007), vulnerability is generally defined in a more integrated manner in the context of environmental and climate change whereby both the physical and socioeconomic dimensions of vulnerability are acknowledged. De Chazal et al. (2008) explain that assessments tend to focus on the human-environment interaction and on the vulnerability or 'socio-ecological' systems (Turner II et al., 2003; O'Brien et al., 2004) rather than on the sole vulnerability of people or the sole vulnerability of ecosystems, places or other physical elements. More detailed reviews of the conceptualisation of vulnerability to climate change have been conducted by Adger (1999, 2006), Handmer et al. (1999), Klein and Nicholls (1999), Olmos (2001), Downing et al. (2001), Brooks (2003), Cutter (2003), Downing and Patwardhan (2004) and Füssel and Klein (2006).

Overall, Tanner and Mitchell (2008) explain that the poverty and development literatures have increasingly influenced the conceptualisation of vulnerability to climate change through emphasising the combination of social, economic, political and environmental factors operating at a variety of levels (see Kelly and Adger, 2000; Eakin and Luers, 2006; Leichenko and O'Brien, 2008). It recognises that assets people possess will determine their vulnerability to shocks and stresses (Adger et al., 2004) but that access to these assets depends on wider structures such as empowerment, human security or corruption (Yamin et al., 2005; Klein et al., 2007; Tanner and Mitchell, 2008). For instance, political structures have a fundamental role in the context of climate change. In creating and agreeing on mitigation policies to reduce greenhouse gases (GHG) emissions or supporting alternative renewable energies, states create a political environment that can either strengthen or undermine efforts to tackle the expected impacts of climate change. The social construction of vulnerability approach is thus often referred to the 'political economy' approach to vulnerability (Füssel, 2007). By looking at factors shaping climate change risk regardless of the physical and environmental processes, 'the political economy' approach appears similar to the radical paradigm of DRR. For instance, Kelly and Adger (2000: 328) draw from the DRR literature to define vulnerability as:

the ability or inability of individuals and social groupings to respond to, in the sense of cope with, recover from or adapt to, any external stress placed on their livelihoods and well-being. [...] We use the term 'social vulnerability' to underline the emphasis of this approach on the human dimension [...].

Therefore, in the same way that the DRR literature has been characterised by a critical development of paradigms, Romieu et al. (2010) suggest that the conceptualisation of vulnerability within the climate change community seems to have equally evolved from an emphasis on extreme events expected to be exacerbated by global warming to the progressive integration of societal constraints making certain population more sensitive and exposed to the adverse impacts of climate change than others. However, Kelly and Adger (2000: 328) further stress that:

[...] we are concerned with identifying robust, policy-relevant recommendations and conclusions regarding vulnerability to long-term climate change that are also relevant to immediate needs and, hence, consistent with a precautionary approach to the climate problem.

This illustrates the tendency of climate change studies to accentuate the need for redefining vulnerability in the context of uncertainty in order to draw a clearer picture of the threat. According to Kelly and Adger (2000: 325), such a redefinition aims to “*provide a starting point for the determination of effective means of promoting remedial action to limit impacts [...]*”. Romieu et al. (2010: 160) highlight the fact that since both physical and social scholars are concerned with measuring and/or assessing vulnerability of either a particular geographical area, a sector or a social group, “*climate change vulnerability assessment has been presented as an essential step toward predicting the impacts of climate change and assessing adaptive capacity within social and social-ecological systems*”.

Therefore, this conceptualisation of vulnerability has been refined to better fit the context of climate change. It draws significantly on the definition provided by the Intergovernmental Panel on Climate Change (IPCC) according to whom 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 variation to which a system is exposed, its sensitivity, and its adaptive capacity.

On the one hand, authors, such as Romieu et al. (2010: 160) consider that this definition has provided more detailed concepts and therefore “*new perspectives to natural disaster risk reduction*”,

such as the term 'adaptive capacity' (see section 2.1.2.2 below). On the other hand, the IPCC definition has been criticised for providing a hazard-centred conception of vulnerability which emphasises the physical processes of climate change (Tanner and Mitchell, 2008; Gaillard, 2010) and therefore does not acknowledge the progressive shift of the social construction of vulnerability.

Such a shift stresses that people who are the most marginalised in their daily lives are likely to be the most vulnerable to the impacts of climate change as they would to any other hazards. Therefore, reducing the vulnerability of people and communities whether to climate related environmental changes or to natural hazards implies, in both cases, the necessity to tackle the societal factors preventing certain people from protecting themselves, facing and quickly recovering from potential damage.

2.1.2 Enhancing the adaptive capacity and resilience of people and communities

In the same way that DRR and CCA communities advocate the reduction of people's vulnerability, both sectors acknowledge, in parallel, the necessity to enhance the capacities of individuals and communities to help them face hazards, and/or develop adaptation strategies to environmental changes and overall to improve their resilience (Venton and La Trobe, 2008).

2.1.2.1 The concept of capacities in DRR

When disasters strike, there is a common assumption that people affected are left with nothing, prone to panic and despair leading them to wait for outside help in a passive way (Quarantelli and Dynes, 1972; Wenger et al, 1975). This idea, largely spread by the media, underestimates or ignores the ability of people to face danger, to cope with emergencies and recover from damage (Le Masson et al, 2009; Gaillard, 2010). Similarly, authors have denounced the top-down tendency of industrialised nations and western agencies to provide needy poorer countries with patronizing external assistance (Hewitt, 1995; Bankoff, 2001; Gaillard, 2010). One observes a similar attitude in disaster preparedness where populations are onlooker beneficiaries of patronizing and technocratic projects (Hewitt, 1997; Cannon, 2000).

Yet, many studies have demonstrated that, in contrast, those affected are the first to react during emergencies and the majority tend to organise themselves to provide first aid relief (Quarantelli and Dynes, 1972; Davis, 1978; Wisner et al, 2004; Ehsan-ul-Haq, 2007; Le Masson et al, 2009; Texier et al, 2009). Emergency and development practitioners introduced the concept of 'capacity', referring to

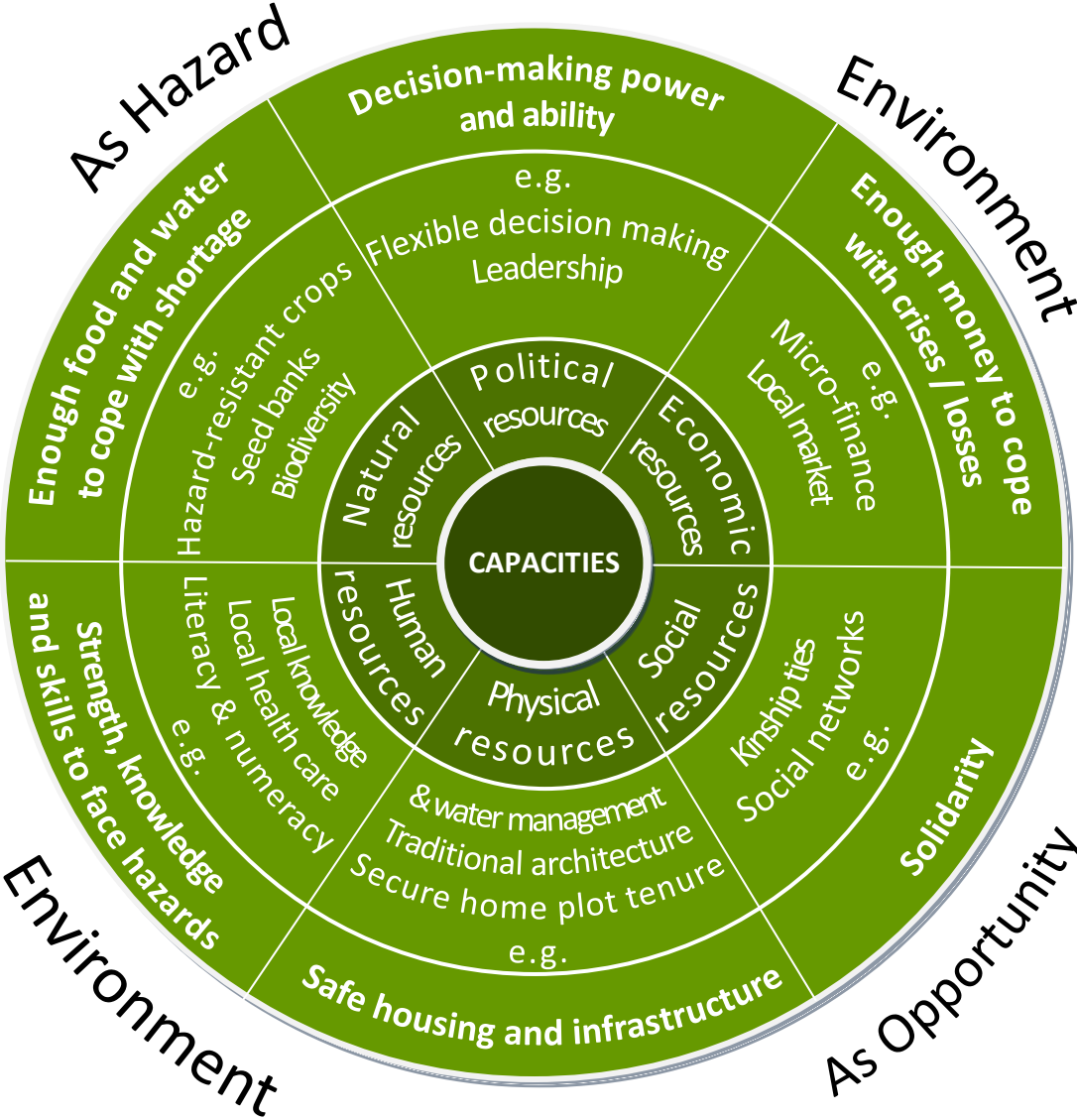
people's ability to cope with hazard impacts and to recover from damage (Anderson and Woodrow, 1989; Hewitt, 1997; Wisner et al, 2004). While the radical paradigm emphasises the necessity to analyse factors that explain a group's vulnerability, researchers have progressively recognised the equal need to acknowledge people's capacities to protect themselves and to adapt to constraints that influence their hazardous conditions or threaten their livelihoods (Wisner et al, 2004; Gaillard, 2010).

Capacities are defined as resources that people can access, use and rely on to help them cope with shocks they experience (Davis et al., 2004). 'Coping capacity' or 'coping strategies' also refer to: "*The ability of people, organizations and systems, using available skills and resources, to face and manage adverse conditions, emergencies or disasters*" (UNISDR, 2009). Start and Jonhson (2004) define coping strategies as measures adopted to face the crisis in the short term in order to preserve basic survival resources. For example, Devereux (1993) shows that in times of famine, household members adopt strategies that consist of, (i) imposing rationing, (ii) changing their diet where meals will be less nutritious or diversified and (iii) reducing the number of people to feed, for example by sending children to other family members. In summary, the United Nations Development Programme (UNDP) (2004: 26) notes that "*Everyday hazard can build cultures of resistance to danger*" whereby people develop coping strategies reflecting indigenous knowledge and intrinsic capacities.

In this perspective, capacity is strongly linked with vulnerability. However, drawing on Davis et al. (2004), Gaillard (2010: 220) notes that "*Capacities are not the opposite end of vulnerability on a single spectrum, because highly vulnerable communities may display a large array of capacities*". Therefore, in contrast to factors of vulnerability influenced by political, social, economic, geographical and historical structures which go beyond the individual and community level, capacities are more embedded within communities' intrinsic resources, knowledge and organisational functioning (Ibid). This however, does not prevent people's capacities from also being influenced by structural factors. For instance, the type of state and governance that operates can enable or hinder people's opportunities to develop social networks or to have access to basic services and information (Cannon, 2000). Sen's work (1981) has extensively documented how wider structures such as political decisions might lead the most marginalised groups to suffer from a lack of 'entitlements' i.e. access to resources that would enhance people's capacities (Christoplos, 2012).

As illustrated by Figure 2.4, Wisner et al. (2012) show how the same typology of resources used to assess people's livelihoods and vulnerability can also reflect people's capacities. This model will help the vulnerability and capacity assessment conducted in this thesis.

Figure 2.4. The Circle of capacities (Adapted from Wisner et al., 2012)



2.1.2.2 The concept of adaptation to climate change

Adaptation has become a central concept in climate change related discussions since it has been recognised that the exclusive focus on mitigating CO₂ emissions will not prevent certain climate patterns from shifting. Facing these impacts, there is a consensus that societies needs to adapt i.e. “to adjust to practices, processes and systems in order to ameliorate negative effects and take advantage of opportunities associated with climate change” (IPCC, 2007). Numerous alternative ways of defining adaptation have been formulated (e.g. Smit et al., 1999; Burton et al., 2002; Füssel and Klein, 2002; Smit and Wandel, 2006; Ayers and Huq, 2009; Nelson et al., 2009). Despite the different

typologies, adaptation is usually considered as a strategy to (i) reduce one's vulnerability facing adverse impacts of climate change, (ii) embrace new circumstances and conditions brought by changes and overall (iii) modify one's practices, as an individual or as a wider social group, to maintain or develop our livelihoods and meet our basic needs.

Adaptation is commonly associated with the term 'adaptive capacity' as referred to in the IPCC's definition of vulnerability provided earlier. According to Adger and Vincent (2005: 400), adaptive capacity designates "*the capacity to modify exposure to risks associated with climate change, absorb and recover from losses stemming from climate impacts, and exploit new opportunities that arise in the process of adaptation*".

On the one hand, defining adaptation through actions undertaken to respond to climate change-related hazards or social disturbance appear similar to the concepts of capacity and coping strategies in DRR. Examples of adaptive measures include relocating one's home or subscribing to insurance to cover potential damage (Ibid). Both adaptation and coping strategies are processes which enable a natural or a human system to limit the adverse effects of climate change, better cope with and adjust to changing conditions but also to exploit potential benefits and opportunities associated with climate change.

On the other hand, adaptation strategies can also relate to different temporal and geographical scales. For instance, whereas capacities have been highlighted to be more embedded within communities' endogenous resources to help them cope and recover from disasters, adaptation strategies can be undertaken at a wider scale by governments or international institutions on behalf of society (Ibid). Moreover, while coping strategies are usually adopted in direct response to a disturbance in a post-event approach, adaptation strategies refer more to actions that can be developed in anticipation of future and uncertain longer term impacts of environmental changes. Dankelman and Jansen (2010) point out that coping strategies are not always sustainable or healthy (e.g. skipping meals, working longer hours, money lending and borrowing) whereas adaptation is more about adopting strategies in the long term to adjust to a changing context and environment.

This underlines the progressive conceptualisation of adaptation. While mitigation is supposed to alleviate or stop the problem from occurring, adaptation was previously considered as a strategy to adopt after the problem had arisen, which means that the vulnerability dimension of climate change and the role and constraints of socio-economic factors were seldom considered (Schipper, 2004). Adaptation could thus be seen as a reactive and spontaneous practice but has progressively been

understood more as an anticipatory and planned process. However, Tanner and Mitchell (2008) explain that initial adaptation strategies mainly relied on modelling of future climate change and related impact scenarios. Such an approach concurs with the hazard paradigm in the disaster literature and has been criticised for generalising the impacts of climate change to wide geographical areas despite “*the inherent uncertainty of predictions*”, and for its “*tendency to ignore wider factors affecting vulnerability to climate change*” (Ibid: 8). By trying to predict the impacts of climate change, there is a tendency for adaptation strategies to heavily rely on natural sciences, weather forecasting (Klein et al., 2007) and other similar measures favoured by the dominant approach to disasters.

However, in the same way that vulnerability and capacity are determined by political, geographical and socio-economic structures, adaptation has increasingly been highlighted as a process embedded within wider structures, particularly the governance that operates (Adger and Vincent, 2005; Klein et al., 2007). Nelson et al. (2009) emphasise that both vulnerability and adaptation are multiscalar in nature in the sense that factors impacting on vulnerability are influenced at a macro-level but effects and adaptive responses depend more on local contexts. Additionally, all drivers of change, including climate change, cannot be considered individually but as part of global systems that impinge on sustainable development. Anthropogenic adaptation and vulnerability reduction generally rely on activities and projects that aim to alleviate poverty or ensure environmental protection (Thomas, 2009). Agriculture and land-use policies, building irrigation systems or infrastructures and livelihood-diversification programmes are examples of options for adaptation to climate change (Ayers and Huq, 2009). They reflect the fact that objectives of sustainable development are interconnected with efforts of reducing the impacts of climate change.

2.1.2.3 The concept of resilience

Factors of vulnerability can hinder capacities to adapt. Equally, a lack of adaptive capacity or adaptation strategies can exacerbate people’s vulnerability (Magnan, 2009). This echoes the concept of resilience which is widely used in both DRR and CCA literatures (e.g. Klein and Nicholls, 1999; Cannon, 2000; Gallopin, 2006; O’Brien et al, 2006; Vogel et al, 2007).

The concept of resilience has developed across different disciplines, from psychology studies to physical sciences, before being used to define the abilities of ecosystems to absorb changes in order to survive (see Folke, 2006 and Manyena, 2006 for a detailed review of the concept). Numerous definitions have been offered to describe the resilience of natural milieus and then that of human

societies particularly when facing changes in the climate (e.g. Timmerman, 1981; Adger, 1996, 2000; Klein et al., 2004). The UNISDR (2009: 24) defines resilience as:

The ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions.

This definition suggests different strategies e.g. 'to resist' or 'to accommodate' which illustrate the various interpretations of the resilience concept which has yet to be universally defined (Manyena, 2006; Gaillard, 2010).

One approach considers lack of resilience as a component of vulnerability or in other terms that people's resilience reduces their vulnerability thanks to their access to livelihoods and specific capacities that help them prepare for and/or spontaneously face hazard risks (Cannon, 2000; Pelling, 2003). Although capacity and resilience have a similar meaning, the latter is considered as a broader concept encompassing capacity as a specific behaviour along with other DRR strategies (Twigg, 2009). Resilience has also been defined as the positive side of vulnerability rather than just a component (Folke et al., 2002). For instance, the Pacific Islands Applied GeoScience Commission explains that "*Vulnerability and resilience are two sides of the same coin. Something is vulnerable to the extent that it is not resilient*" (SOPAC, 2002). As these approaches address resilience in a pre-disaster dimension, it could be argued that they do not include other factors that intervene once the disaster has occurred and which determine people's abilities cope with a crisis and recover from the damage. For instance, NGOs interventions, relief efforts from authorities or governmental rehabilitation policies play a crucial role in enhancing or undermining people's resilience. Assessing these in the aftermath of a disaster proves useful to point out the coping strategies of those affected and highlight the aspects where external assistance is most needed (Gaillard, 2007; Le Masson et al., 2009).

In this perspective, another approach considers resilience in a post-event dimension as the capacity to bounce back to the pre-disaster state and maintain characteristics prior to the disturbance by resisting change (Dovers and Handmer, 1992). However, such a definition of resilience has been widely questioned as it implies going back to former socio-economic characteristics that led people or communities to be affected by a climate related or natural hazard in the first place (Dibben and Chester, 1999). In other words, the resilience concept could allow a shortcut that reduces people's

resilience to the capacity to maintain the same vulnerable socio-economic conditions as the ones before a disaster (Cannon, 2000; Manyena, 2006; Le Masson, 2008).

A final approach thus favours the linkage between resilience and the capacity to adapt. An individual, a household or a community is resilient if it is able to recover from the damage through undergoing or absorbing change in order to adapt to new geographical, socioeconomic and cultural constraints and opportunities (Timmerman, 1981; Walker et al., 2004; Folke, 2006). This concurs with the literature on post-disaster reconstruction (e.g. Anderson and Woodrow, 1989) that emphasises the ‘opportunity’ brought by calamities to highlight unsafe and unsustainable practices and foster better planning strategies and development policies (Gaillard, 2010). In this perspective, social protection in the forms of supportive formal governance or informal mutual assistance between community members constitute a key characteristic of a disaster resilient community (Twigg, 2009).

Other characteristics of resilient societies have been identified by climate change researchers to inform the design of adaptation strategies (Tanner and Mitchell, 2008). This illustrates the alternative adaptation process that aims at drawing on vulnerability assessments, people’s coping mechanisms to current variations in the climate and the support of social and institutional structures to build the resilience of communities at risk (Burton and van Aalst, 2004; Prowse and Scott, 2008). Despite different definitions of the concept, Twigg (2009: 8) summarises that “*A focus on resilience means putting greater emphasis on what communities can do for themselves and how to strengthen their capacities, rather than concentrating on their vulnerability to disaster or environmental shocks and stresses, or their needs in an emergency*”. Overall, O’Brien et al. (2006) argue that the concept of resilience highlights linkages between DRR and CCA.

2.1.3 Relying on bottom-up community-based approaches

The assessment of vulnerability, capacity or resilience often enables communities, researchers and development practitioners to highlight strategies to adopt in order to reduce people’s vulnerability on the one hand and enhance their capacities or resilience on the other. Wisner et al. (2012) emphasise, however, that it is difficult for people to directly tackle factors that create vulnerability because these depend on wider geographical, socio-economic, historic-cultural and political structures beyond individuals’ reach. In fact, it proves easier to focus on enhancing people’s capacities because, as highlighted when defining the concept of capacity, communities and individuals often rely on local, intrinsic resources and knowledge that help them cope with the

impacts of hazardous events (Ibid). Numerous studies have thus documented DRR projects to strengthen households and communities' capacities through activities that rely on the participation and inputs of those primarily concerned (Chambers, 2007; Maceda et al., 2009; Delica-Willison and Gaillard, 2012). They show that the more local people are included in the design and the implementation of risk reduction projects, the more efficient the community response appears when a crisis occurs (e.g. Lewis, 1999; Mileti et al., 1999; Van Aalst et al 2008). Studies have also documented how participation of local communities in disaster response has reduced the amount of damage (e.g. Texier et al, 2009) and how outside development projects or relief strategies that ignore local needs have worsened the vulnerability of those the most affected (Childers, 1999; Le Masson et al, 2009). In fact communities usually adapt to change based on their knowledge and experience of their environment and often know what constraints need to be addressed to strengthen their capacity even though these remain out of their political reach (Mercer, 2012). Studies thus stress the necessity for interventions from governments and NGOs to draw on these practices to provide communities with adequate resources (see Delica-Willison and Willison, 2004; Gaillard, 2010).

Rather than rejecting the mobilisation of top-down assistance which often proves necessary in post-disaster contexts for organising large scale evacuations, implementing major medical operations or the clearing of wreckages and remains of a disaster, Gaillard (2010) argues that external aid should ideally support community capacities rather than act as a substitute with the risk of creating dependency. According to Kelman (2010), not all extreme events require external assistance. *"Instead, using local knowledge about existing coping strategies can help determine whether or not relief operations would be supportive or interfering"* (Ibid: 213).

In this perspective, Community-Based Disaster Risk Reduction (CBDRR) aims at involving communities in the evaluation of their vulnerabilities and capacities, in the design of DRR measures and in their implementation (Abarquez and Murshed, 2004; Heijmans, 2009). According to Delica-Willison and Gaillard (2012: 711), three principles characterise CBDRR: *"[i] people's participation and empowerment, [ii] development-oriented activities and [iii] a multi-stakeholder approach"*. In this regard, CBDRR recognises differences among people within the same community for instance according to gender and ethnicity, which shape different perceptions of risk, different vulnerabilities and different capacities. By often relying on participatory techniques of data collection or participatory methodologies (e.g. Wisner et al., 1991; Chambers, 2007), community-based assessments privilege strategies that are culturally, socially and economically acceptable within the context of community members (Gaillard, 2010). Such strategies often draw on people's livelihoods

in order for them to simultaneously secure and sustain their capacities to meet their daily needs and to face natural hazard related risks (Benson et al., 2001; Cannon et al., 2003; Twigg, 2004). CBDRR adopted measures thus vary between disaster risk-related actions (e.g. planning evacuations routes, deciding stock points in times of food shortages, agreeing on warning signals) and development projects including the building of small infrastructure linked to agriculture or transportation and the provision of basic services such as water supply or health care (Delica-Willison and Gaillard, 2012). Therefore, CBDRR not only aims at tackling the root causes of vulnerability to disasters, it also contributes to fostering sustainable prosperous living conditions and well-being (Ibid).

However, Delica-Willison and Gaillard (2012) synthesise some of the challenges faced when implementing CBDRR in practice. For instance, how to actually enforce the process of empowerment when CBDRR activities still usually rely on the expertise of external facilitators? There exist different levels of understanding of hazards and the causes of disasters between community members, NGO practitioners, policy-makers and researchers. Going through the process of building awareness and information, dealing with power issues and ensuring the participation of different groups requires time and funding. Logistical and funding constraints have often led CBDRR initiatives to be short-term and therefore challenge the ownership of the project by the community (Ibid).

Despite these issues, the DRR sector has long documented the relevance of community-based initiatives to tackle risks in order to address local needs. In contrast, the CCA sector has only recently shifted from a primarily top-down approach to one that recognises the diversity of communities' experiences of climate change and the way they cope with their changing environments (IIED, 2009). An increasing number of climate-related studies now emphasise that adaptation is a process that local communities must control and not endure (Thomas, 2009) and that their participation in vulnerability assessments as well as in the development of adaptation strategies is fundamental to ensure accurate, relevant and successful projects in order to address local needs (van Aalst et al., 2008; Nelson et al., 2009). The literature also emphasises the capacity of local communities to develop their own adaptation measures in response to already existing or expected impacts of climate change and to identify their priorities for securing their livelihoods (Dankelman and Jansen, 2010). This echoes the recognition surrounding the concept of capacity in DRR whereby vulnerable people should not be considered as victims waiting for external assistance in a passive way but as capable of developing adaptation strategies on their own terms (O'Brien et al., 2008). Besides, there are countless examples of societies which, throughout centuries, have had to adapt to variations in the climate in order to survive (e.g. Gaillard, 2007). Therefore, bottom-up strategies that fully involve

local communities in decision making (e.g. Community-Based Adaptation-CBA) are now widely encouraged in the CCA community (e.g. van Aalst et al., 2008; Kelman et al., 2009; IIED, 2009).

However, studies have also shown that in many instances climate change appears as an abstract issue, somehow disconnected from people's daily life and everyday constraints (e.g. Ireland, 2012). In Nepal for example, some communities perceive economic and political insecurity as a greater threat to their livelihoods and well being than climate change (ICIMOD, 2009). In Tibet, Byg and Salick (2009) have explored people's perceptions of climate change in different villages. While many inhabitants' observations of climate change impacts were consistent with scientific predictions, other accounts reported impacts that were different and advanced moral and spiritual reasons to explain these impacts on their environment. These accounts are frequently perceived as irrelevant or superstitious by scientists, which fuels the common assumption that traditional knowledge at community level may be insufficient to deal with new risks and changes associated with climate change (Mitchell et al., 2010). However, it is increasingly recognised that taking into account people's insights into local concerns of climate change would help foster relevant measures of adaptation at the local scale (Byg and Salick, 2009). Moreover, the fact that local knowledge can sometimes disprove scientific models (Birkman and von Teichman, 2010) and that climate change or natural hazards do not constitute the primary concerns of communities reflects the necessity to look at people's particular contexts. The combination of different kinds of knowledge and the participation of communities in the design of DRR and CCA projects can ensure that interventions are relevant to their everyday realities and local-level experiences (Le Masson and Kelman, 2010). Overall, O'Brien et al. (2008: 20) summarise that *"bottom-up approaches promote locally-appropriate measures, empower people to change their own lives, and encourage greater ownership of disaster risk reduction and adaptation actions"*.

2.1.4 Conclusion

To conclude, overlapping approaches between DRR and CCA have been increasingly addressed by academics from both communities. As highlighted by O'Brien et al. (2006: 75), synergies become evident *"when one considers the shared understanding of risk as a function of hazard and vulnerability"* both in the contexts of DRR and CCA. Although, disasters and climate change have been and are still often being reduced to the environmental and physical process or hazard in itself, the literature has shown the progressive shift in looking at the social construction of vulnerability. Both DRR and CCA aim at reducing the vulnerabilities and enhancing the capacities of people and communities when facing climate-related environmental changes and other natural hazards. This

requires DRR and CCA strategies to address the structural factors that shape the marginalisation of certain groups at geographical, social, economic and political levels. People who find themselves marginalised may not be able to access sufficient, secured and sustainable livelihoods which undermine their capacities to face, cope and recover from the adverse impacts of hazards and climate change. Therefore the common approach that consists of building the resilience of people and communities to tackle risks and adapt to change has been identified as one of the many signs of convergence between both sectors (O'Brien et al., 2008). This illustrates the conceptual bridges existing between vulnerability, resilience, adaptation and capacity and their practical application when relying for instance on community-based DRR or CCA. However, and despite evident synergies, the different interpretations of objectives and concepts between and among disaster and climate change researchers has created confusion (Romieu et al., 2010). This raises issues that might make the integration of DRR and CCA challenging both at the conceptual and practical levels.

2.2 From theory to practice: what challenges limit the integration of DRR and CCA?

This section critically reviews the existing (lack of) integration of DRR and CCA by academics, policy-makers and practitioners working in the fields of emergency and development. This aims at highlighting the potential limits that prevent both sectors from combining their agendas in theory and in practice.

2.2.1 DRR and CCA in academia: differences and redundancy

There is a general consensus that both sectors have much in common and both would mutually benefit from a wider integration of each other's frameworks and strategies in a holistic approach toward dealing with environmental change (Schipper, 2009). Despite common goals and the use of similar terms, concepts such as vulnerability have been interpreted differently both between and within the DRR and CCA sectors (Schipper, 2008; O'Brien et al., 2008). Both DRR and CCA advance strategies that overlap with other sectors of society. Interventions to reduce people's vulnerabilities, alleviate their poverty or enhance their capacities to face hazards and adapt to climate change are often, if not always, linked with the agriculture, health, education or employment sectors (Birkmann and von Teichman, 2010). Although DRR and CCA could be seen as additional distinct sectors, Birkmann and von Teichman (2010) write that while it has been argued that the relatively new CCA should be mainstreamed within DRR (e.g. UNFCCC, 2008; UNISDR, 2008, 2009; Prabhakar et al., 2009), the more specific DRR should be encompassed in the general CCA (e.g. Smit and Pilifosova

2003; Few et al., 2006). However, the literature highlights that despite overlapping objectives, common approaches and the use of similar concepts, both the DRR and CCA communities have remained isolated from each other in practice (O'Brien et al., 2008). Several reviews of existing convergence and divergence between the two sectors have been offered to highlight obstacles to integration (see Schipper and Pelling, 2006; Thomalla et al., 2006; Venton and La Trobe, 2008; Mitchell and Van Aalst, 2008; O'Brien et al., 2008). The following section reviews some of the differences in conceptual frameworks and other factors creating practical barriers to effectively link DRR and CCA.

2.2.1.1 Differences in theoretical frameworks

The first potential constraint relates to differences in areas of expertise. For instance, although DRR and CCA address similar hydro-meteorological hazards e.g. storms, floods or heatwaves, studies advance that there are differences in the types of hazard covered by both sectors (Venton and La Trobe, 2008; Mitchell et al., 2010). While the disaster management community has developed expertise to deal with a wide range of natural phenomena such as geological or biological hazards, CCA experts look at longer term climatic impacts such as loss of biodiversity and spread of climate-sensitive disease. One could argue however, that such a distinction of areas of hazard expertise is irrelevant because (i) there exist DRR frameworks that encompass risks associated with erosion of biodiversity and other climate related impacts (Kelman, 2010; Wisner et al., 2012) and (ii) recognising that DRR and CCA are not the same does not change the consensus that both should develop an integrated approach towards their common objectives of addressing vulnerability (Venton and La Trobe, 2008).

Secondly, Birkmann and von Teichman (2010) argue that both sectors work on different spatial and temporal scales. While DRR studies and projects are more grounded within specific geographical areas to analyse hazards and vulnerabilities, scenarios predicting the impacts of climate change are primarily built on a global scale. In fact, numerous studies have criticised the lack of down-scaled data and the lack of consideration of local contexts which undermine the identification of relevant adaptation strategies (e.g. Lamadrid and Kelman, 2012). In terms of temporal scale, the climate change literature repeatedly raises the challenge of formulating adaptation strategies in a context of uncertain risks in the long run (Kelly and Adger, 2000; O'Brien et al. 2006; Romieu et al., 2010). In contrast, DRR is thought to concentrate more on existing or recurrent risks (Thomalla et al., 2006; Mitchell et al., 2010). However, and again, a consensus exists both in DRR and CCA that strategies to address both recurrent hazards and future climate uncertainties should be designed in the broader

context of long term sustainable development (Venton and La Trobe, 2008; Mitchell et al., 2010). Therefore, one could question why differences in scale constitute a reason to prevent the integration of both sectors.

Thirdly, various scholars suggest a lack of common norms in the use and definition of similar concepts (Birkmann and von Teichman, 2010; Schipper 2009; UNISDR 2008; Romieu et al., 2010). Section 2.1. has pointed out how vulnerability, capacity or resilience are being conceptualised differently in DRR and in CCA. Reasons for this are not clear. For instance, Füssel (2007: 163) asserts that *“The pressure-and-release model and the resilience approach have not been widely applied in the climate change context”* but he does not offer a reason why not. Birkmann and von Teichman (2010: 177) claim that the collaboration between both communities is hindered by weak links existing between the type of knowledge of CCA and DRR scientists and practitioners. For instance, as shown in the previous sections, DRR has long recognised the value of traditional/indigenous knowledge for developing relevant strategies to tackle risk. In the climate change sector however, such knowledge is often thought to be insufficient to build resilience because of the types and scales of climate-related risk that have yet to be experienced (Mitchell and van Aalst, 2008). Yet, this ‘different type of knowledge’ argument can be questioned judging from the many redundancies between the definitions of key concepts. For instance, authors whose conceptualisation of social vulnerability to climate change is repeatedly used as a reference in CCA studies are significantly drawing on research conducted in DRR. This is illustrated by the definition of ‘social vulnerability’ provided by Kelly and Adger (2000) highlighted in the previous section. Kelly and Adger (2000) explored the case of households and communities in Vietnam facing the impacts of tropical storms. Measures they identified to reduce people’s vulnerability include poverty reduction, income diversification and equitable distribution of resources. These recommendations address the societal constraints creating disaster risk and very much concur with DRR frameworks that stress the necessity to tackle the root causes of vulnerability facing hazards. Therefore, despite the lack of common norms and expertise, DRR and CCA sectors still tend towards similar outcomes. Perhaps, one of the major reasons is the segregation of sectors and the lack of integration of advancements from other disciplines.

2.2.1.2 The lack of acknowledgement and integration of previous work

The previous sections have shown that both DRR and CCA rely on concepts that have been developed in a variety of disciplines in natural and social sciences. Yet, numerous studies highlight that the formulation of climate change related concepts and policies have been constructed rather

independently from other sectors and previous work. For instance, drawing from the anthropological literature that has long documented the role and abilities of individuals and societies to respond in different ways to environmental changes, Nelson et al. (2009) argue that current climate change related discussions do not acknowledge what has been learned in terms of adaptation in previous research. Similarly, Kelman (2010) points out that numerous references from the 1970s whereby academics have used a development perspective to research climate-related vulnerabilities are often considered out of date and therefore dismissed from current climate change discussions and conceptualisations. As introduced earlier, the IPCC's definition of vulnerability by climate change experts has been criticized for being hazard driven. Gaillard (2010) considers that it focuses on assessing the impacts of extreme events and changes resulting from climate change which echoes the dominant approach to disasters. Through the construction of climate change as an 'environmental problem' (Eriksen et al., 2011) and the focus on uncertainty, the emphasis is placed upon the impacts and the uncertainty of 'what will happen' which is consistent with the hazard paradigm and top-down measure to monitor and predict natural phenomena (Ibid). For instance, Prabhakar et al. (2009) consider that one of the best ways to mainstream CCA within DRR is to address future and possible climate change impacts based on climate scenarios coupled with future socio-economic scenarios to obtain future risk. But other scholars argue that by addressing the problem of climate change primarily through mitigation as well as top down strategies to facilitate people's adaptation to its impacts, there is a risk of ignoring or overlooking the same development-related factors underpinning vulnerability to disasters (Tanner and Mitchell, 2008; Eriksen et al., 2011).

Hence, some authors (e.g. Schipper and Pelling, 2006; Gaillard and Kelman, 2008, 2010; Mercer, 2010; Gaillard, 2010) warn against a 'reinvention' of concepts with a lack of acknowledgment of what has been developed in other disciplines and what has been learned and improved from the theoretical evolution of disaster paradigms. Drawing from previous work and acknowledging a field's history can, according to Kelman (2010: 213), "*assist in avoiding similar mistakes, if the lessons from the critiques are learned and implemented*". Additionally, taking into account experience and methods developed in DRR which are relevant to adaptation can avoid wasting time and ensure efficiency of climate change efforts (Mitchell and van Aalst, 2008; Venton and La Trobe, 2008). Therefore, DRR researchers and practitioners have repeatedly called for, not only the integration of CCA within the more experienced DRR, but also the integration of both within a holistic approach towards sustainable development (Schipper and Pelling, 2006; O'Brien et al., 2008; Kelman, 2010).

This, however, requires researchers, policy makers and civil society to question the dominant development pathways that have been advocated and followed so far and which have created environmental degradation and increased economic and social inequalities (Eriksen et al., 2011). Kelman and Gaillard (2008) have denounced how the scientific discourse on climate change and the focus on the impacts distract policy makers, particularly national governments, from looking at the causes of unsustainable development and disasters. Gaillard (2010) summarises that “[p]inpointing a phenomenon of global scale and diffused responsibility enables governments to evade their own responsibility in addressing the root causes of vulnerability”. Ensuring the creation and respect of laws such as building codes, fighting the corruption of civil servants or denouncing the over exploitation of natural resources by national and multinational companies are examples of development policies that governments should enforce rather than blaming climate change for the occurrence of disasters (Kelman and Gaillard, 2008).

For Schipper (2009) this is not only applicable to CCA but also to the DRR community which has so far remained focussed, in practice, on the impacts of extreme events. In short, both sectors primarily apply the dominant approach to risks, whereby the root causes of disasters are being ignored. Schipper (2009) also argues that DRR has proven to produce strong frameworks to reduce people’s vulnerability to hazards. CCA, which is relatively new, can and should learn from experience gained in an older sector by integrating adaptation strategies in DRR projects already being carried out. Similarly, DRR activities could also integrate the long term perspective of CCA in order to ensure their sustainability, for example through climate change awareness (Ibid). For authors such as Birkmann and von Teichman (2010: 182) “*DRR goals, strategies and measures have to be revised, and in part modified, to meet the goals of CCA more effectively*”.

Overall and drawing from Few et al. (2006), O’Brien et al. (2008) emphasise the need to learn from experiences in both DRR and CCA research in order to better integrate and coordinate efforts of both communities to reduce vulnerability to extreme events and promote adaptation to the impacts of climate change. Consequently, a growing consensus emphasises that unless both DRR and CCA are integrated within a holistic approach to sustainable development, practical efforts to tackle poverty and vulnerability and build resilience will remain superficial (Tanner and Mitchell, 2008; Schipper, 2004, 2009; CARE, 2010; Kelman, 2010).

2.2.2 The integration of CCA and DRR by policy makers

The next section successively presents (i) the primary approach to DRR by policy-makers, (ii) political negotiations to tackle climate change, (iii) whether DRR and CCA are integrated in policies and (iv) some of the constraints preventing practical synergies.

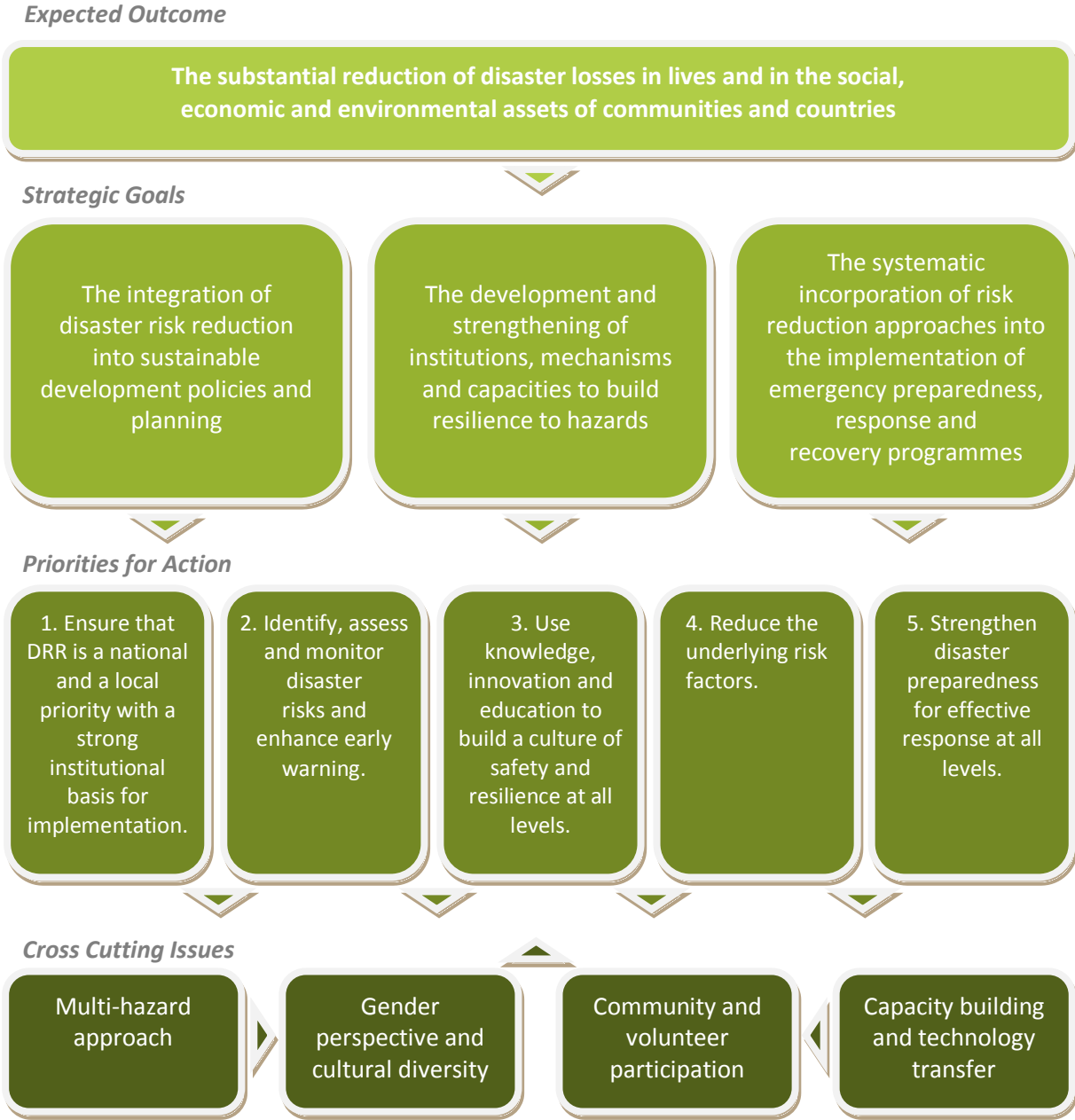
2.2.2.1 The differing political integration of the vulnerability approach to DRR

Following the radical paradigm's development among disaster risk scholars from the 1970s, the vulnerability based approach to disasters has been progressively inscribed in policy documents at the international level (Gaillard, 2010). From the 1990s, international institutions have increasingly recognised the fact that hazards generate impacts that differ according to the levels of vulnerability and capacities of individuals and communities to absorb shocks and recover from damages (e.g. UNDP, 2004). Policy makers thus began to consider vulnerability reduction as intrinsically linked to sustainable development processes in order to efficiently tackle disasters impacts (UNISDR, 2005; King, 2008). Several UN strategies (The International Decade for Natural Hazard Reduction (IDNHR) from 1990 to 1999 and the United Nations International Strategy for Disaster Reduction (UNISDR), 2005, 2009)) enabled DRR policies to slowly integrate ideas from the vulnerability paradigm. In 1994, the World Conference on Natural Disaster Reduction in Yokohama underlined the failure of the dominant approach to reduce the number of disasters (Bankoff, 2001). From the emphasis on predicting, controlling and preventing hazards, policies have thus slowly acknowledged the necessity to address the underlying factors that turn extreme events into disasters. In 2005, the UNISDR developed the Hyogo Framework for Action (HFA) '2005–2015: Building the Resilience of Nations and Communities to Disasters' which was adopted by 168 countries during the World Disaster Reduction Conference in Kobe (See Figure 2.1).

The HFA draws a reference framework for governmental and non-governmental organisations to implement DRR through hazard mitigation measures, preparedness activities and long-term strategies to reduce vulnerability and tackle the root causes of disasters (see Figure 2.5). It recommends interventions that are adequate with the cultural, social, economic and political contexts in which they are implemented and highlights the role of communities' participation in DRR (Wisner et al, 2004). It also places the emphasis on livelihoods as one of the crucial determinants of people's vulnerability in facing hazards (Le Masson et al., 2009). Moreover, and although the HFA considers national governments as the primary responsible stakeholders for achieving disaster resilience, it also encourages the collaboration between governments, the scientific community,

Non-Governmental Organisations (NGOs), local community organisations as well as the private sector (UNISDR, 2005).

Figure 2.5. Hyogo Framework for Action (Adapted from UNISDR, 2005 and Twigg, 2009)



By acknowledging the importance of livelihoods in shaping vulnerability and the necessary collaboration between policy-makers, researchers, NGO practitioners and the civil society to build the resilience of communities, the international political framework for DRR clearly draws on theoretical recommendations from the academic sector. Twigg (2009) however, emphasises some potential limits to the enforcement of the framework. For instance, the fourth Priority for Action (See Figure 2.5) which aims at reducing the underlying risk factors encompasses a variety of different

measures from 'environmental and natural resource management' to developing 'sustainable livelihoods' or to adopting 'physical protection, structural and technical measures'. Twigg (2009) argues that some of these strategies directly tackle the hazard aspect while others cover broader social and economic structures shaping long-term vulnerability. "*Grouping all these issues under the same general heading may be confusing, with a risk of some important questions being overlooked as a result*" (Twigg, 2009: 13).

Despite the progressive shift of international policies mainly in UN agencies, the vulnerability approach to disaster remains ignored by other international institutions such as the International Monetary Fund (IMF) and the World Trade Organisation (WTO) (Gaillard, 2010). Moreover, the shift has not yet operated at the national level where many countries' political strategies to deal with disaster risk remain hazard centred (Ibid; O'Brien et al., 2006). National policies typically consider disaster management through post-event response rather than in terms of developing DRR strategies according to people's vulnerability (Schipper, 2009). Part of the reason includes the allocation of funding. According to Freeman et al. (2003), the increase of the number of disasters worldwide over recent decades has generated an increase in the amount of post-disaster funding from the international donor community. The expectation of receiving financial support once an event has occurred may diminish the incentive for countries to invest to prevent the disaster happening in the first place (Ibid).

2.2.2.2 Political negotiations to tackle climate change: mitigation vs adaptation

The growing global concern about changes in the climate began approximately in the 1980s (Birkmann and Teichman 2010). The international community progressively recognised climate change as an environmental phenomenon with potentially disastrous impacts, resulting from the human-induced increase of GHG. The two mechanisms of action involve mitigation and adaptation.

Primary political strategies have focussed on the mitigation of GHG emissions i.e. measures to reduce CO₂ emissions (O'Brien et al., 2008). The United Nations Framework Convention on Climate Change (UNFCCC), adopted at the Rio Earth Summit in 1992 and ratified by 195 countries, sets an overall framework for intergovernmental efforts to tackle the challenge posed by climate change. In order to strengthen this Convention, the Kyoto Protocol was adopted in 1997 to legally bind developed countries to GHG emission reduction targets by 2012.

As the Protocol advocates emission reduction without jeopardizing development and economic growth (Okereke and Schroeder, 2009) it offers Parties certain means of meeting their targets through market-based mechanisms including the emissions trading, known as ‘the carbon market’ and the Clean Development Mechanism (CDM) (see box 2.1). It took several years however, for these mechanisms to become effective (Ibid). Yet, the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC, 2007a) states that in order to stabilize the global temperature rise to about 2°C, global anthropogenic GHG emissions would have to be reduced by 50 to 85% of 2000 levels by 2050. In 2007, the UNFCCC Conference of Parties (COP) in Bali initiated the Bali Action Plan (BAP) which sets the foundations for the new international climate change agreement to succeed to the Kyoto Protocol by 2009 (UNFCCC, 2012). However, and although parties agreed two years later, at COP15 in Copenhagen, to set up the long-term goal of limiting the maximum global average temperature increase to no more than 2°C, no agreement was adopted on how to achieve this objective practically (Ibid). The necessity to reach a globally binding regulatory regime was agreed at the Durban COP in December 2011, but any legal protocol is unlikely to become effective before 2020 (World Bank, 2012). The slow process of climate negotiations appears contradictory with the urgency to reduce GHG emissions stressed by scientific reports and suggests the lack of political commitment towards mitigation (e.g. the US did not ratify the Kyoto Protocol). The main argument often advanced by countries to justify their inaction highlights the uncertainty of climate change projections (Garvey, 2010). To progressively reduce the consumption of fossil fuels and to meet agreement targets entails diverting financial resources away from other sectors which might be politically risky (Ibid). Yet, the Stern Report, a review commissioned by the UK to explore the economics of moving to a low-carbon global economy, indicates that achieving stabilisation would annually cost around 1% of global Gross Domestic Product (GDP – an economic indicator of the general wealth of a country). In contrast, annual costs of inaction, including damage associated with the impacts of climate change, are estimated between 5% and 20% of global GDP each year, emphasising that ‘the benefits of strong and early action far outweigh the economic costs of not acting’ (Ibid: vi). However, and beyond the global recognition that governments should reduce their GHG emissions, the Stern Review has also been criticised for the limits in using a cost-benefit analysis linked to the measure of GDP which contributes to perpetuate the idea that traditional economic

Box 2.1 Mechanisms under the Kyoto Protocol (UNFCCC, 2012)

Emissions trading allow countries that have emission units (i.e. levels of allowed emissions) to spare, to sell this excess capacity to countries that are over their targets. Since carbon dioxide is the principal greenhouse gas, people speak simply of trading in carbon. Carbon is now tracked and traded like any other commodity.

The Clean Development Mechanism allows a country with an emission-reduction commitment under the Kyoto Protocol to implement an emission-reduction project in developing countries. Such projects can earn saleable certified emission reduction (CER) credits, each equivalent to one tonne of CO₂, which can be counted towards meeting Kyoto targets.

growth can be both sustained and answer the problem of climate change (Spash, 2007). Justifying mitigation because it is cheaper should not divert the attention away from alternative approaches to ensure the development of human societies without harming the environment (Ibid).

In parallel to mitigation, adaptation as a strategy was first discussed at the international level at the Earth Summit in Rio in 1992. Taking steps to build communities' resilience and minimise damages and costs associated with predicted short-term changes in the climate has been advocated as essential, as long as it is associated with mitigation efforts to tackle climate-related risks in the long run (Stern, 2006). In fact, adaptation by itself cannot solve the problem of climate change and entails the idea that societies can adapt to the negative consequences of the current economic growth-based development without challenging it. The concept of adaptation has typically been promoted by climate change sceptics and economists to stress the capacity of humanity to adapt in order to minimise the necessity to engage in mitigation measures (Garnaud, 2009). Adaptation has thus been associated with the unwillingness to challenge current dominant economic systems and level of consumption of energy and goods (Godard, 2009) that damage and pollute the environment.

Nevertheless, following the release of the IPCC's Third Assessment Report in 2001, the international community recognised that (i) mitigation efforts alone would not prevent negative impacts from occurring in the short-term, (ii) countries in the South would be disproportionately affected given current uneven development (Okereke and Schroeder, 2009) and (iii) we could not expect societies to progressively adapt to these impacts given the rapid pace of environmental changes (Nelson et al, 2009; Dubois, 2010). Adaptation thus became an important strategy to limit the negative impacts of climate change especially at the local level for societies which are likely to be hit the hardest and soonest. However, the Stern review estimates that the annual cost of adaptation in countries of the South will reach tens of billions of dollars (Ibid) which puts a strain on national budgets in the South that are already constrained by limited economic resources and debt repayment schemes. International negotiations have thus highlighted the (in)justice dimension of climate change whereby poorer nations, more vulnerable and more likely to suffer from climate change impacts, would suffer the most from climate change even though they have contributed the least to GHG emissions. Conversely, industrialised nations pollute the most but also have more financial and material means to apply mitigation and adaptation strategies (Garnaud, 2009; Okereke and Schroeder, 2009). Increasing pressure has therefore targeted rich countries to fund adaptation and facilitate processes of understanding CCA in terms of cost and justice (e.g. the 5-year Nairobi Work Program (2005-2010) (UNFCCC, 2007; IIED, 2009).

Different sources of financial and technical assistance were created by the UNFCCC (e.g. the Special Climate Change Fund (SCCF) or the Adaptation Fund) (UNFCCC, 2001). However, Okereke and Schroeder (2009) argue that resources are far from adequate to meet adaptation needs. In parallel, initiatives were set up to enhance the scientific capacity of the South to assess climate change vulnerabilities and adaptations and inform adaptation planning and action (e.g. Assessments of Impacts and Adaptations to Climate Change implemented by the United Nations Environment Programme; National Adaptation Programmes of Action (NAPAs) for Least Developed Countries (LDCs) UNFCCC, 2002)). However, policies fostering adaptation measures have been criticised for being poorly coordinated, excessively bureaucratic, top-down in nature and for reinforcing patterns of injustice and domination (Okereke and Schroeder, 2009; Worthy and Jones, 2011). The design of NAPAs, for instance, do not necessarily build on local knowledge and realities and do not guarantee the allocation of adequate financial resources to those who need it the most (see Le Masson and Kelman, 2010 for a critique). In 2010, the Cancun Adaptation Framework (CAF) was adopted at COP16 in Cancun, Mexico to reaffirm that adaptation must be addressed with the same level of priority as mitigation (UNFCCC, 2012). Overall, rather than developing specific adaptation strategies divorced from broader national development policies, there is a consensus that recognises the necessity to mainstream adaptation within sustainable development planning and implementation (Venton and La Trobe, 2008). However, national adaptation plans are only at the onset while limits can be raised regarding the way adaptation funding is allocated to countries who need it the most. Worthy and Jones (2011) explain for instance that the UK provides the majority of its climate finance for adaptation in the form of loans dispersed through the World Bank's Pilot Program for Climate Resilience (PPCR). The PPCR however has been criticised for being a top-down model "*not designed to meet local needs nor build local ownership of projects and lacks transparency*" (Worthy and Jones, 2011: 5).

2.2.2.3 The integration of DRR and CCA at the international level... only ?

The necessity to mutually address the objectives of both DRR and CCA in a coherent manner has increasingly been addressed at the international level since the beginning of the 2000s and several conferences brought together the United Nations and international organisations to discuss the overlapping concerns and methodologies used by both communities (see Schipper, 2009 for a review). In 2005, the Hyogo Framework for Action, identified DRR as a key point of entry to implement climate change related interventions (UNISDR, 2005). In the 2007 Bali Action Plan, DRR strategies are identified as part of an integrated action on CCA (O'Brien et al., 2008). According to the UNISDR (2008: 9), "*the UNFCCC Parties have recognized that existing knowledge and capacities for*

coping with extreme weather events must be harnessed to adapt to climate change". Additionally, the UNISDR considers that requirements for CCA included in the BAP appear also relevant when applied in the DRR sector (see Box 2.2).

It could be argued that these efforts however, have remained on a conceptual level (Ibid). Although international institutions have reinforced their commitment to integrate both sectors in order to tackle the root causes of disasters and enhance communities' resilience to climate change, the shift from theory to practice by member nations has yet to take place. The Cancun Adaptation Framework for instance, only briefly mentions DRR in terms of implementing early warning systems, risk assessments and transfer mechanisms such as insurance. The fact that most countries remain focussed on a top-down hazard centred approach to deal with extreme events and the impacts of climate change (O'Brien et al., 2006) does not encourage governments to link vulnerability reduction strategies with sustainable development policies nor does it foster the integration of DRR with adaptation measures. Birkmann and von Teichman (2010) point out that 24 of the 38 'Least Developed Countries' that have conducted a NAPA (today 47 NAPAs have been submitted), have identified DRR as a priority requiring immediate action. Only seven of these 24 countries however, have identified projects that build on capacity building and preparedness while the others privilege the dominant way to tackle risk by focussing on monitoring and predicting natural phenomena and ignoring the vulnerability dimension (Ibid). In parallel, approaches to tackle climate change often advance that technology and innovations will be the answer to existing and future problems. For instance, the World Bank's framework on development and climate change sees *"technological innovation as a key driver to lower emissions and build resilience to climate"* (World Bank, 2012: 11) and supports accelerated development, commercialization and scale up of new technologies and related research. New technologies include agrofuels, i.e. liquid fuels produced from biomass grown in large-scale monocultures, which have been advanced as a solution to reduce the consumption of fossil fuels and limit GHG emissions. However, to provide agrofuel to more than two billions vehicles worldwide entails converting about one sixth of the planet's agricultural land (Garvey, 2010). This has generated land grabbing by

Box 2.2 Areas of action identified by the UNISDR over 2008 to systematically integrate both DRR and CCA into national development strategies:

- *Develop national coordination mechanisms to link DRR and CCA (encouraging the dialogue and consultation between experts from both sectors).*
- *Conduct a baseline assessment on the status of DRR and adaptation efforts (national assessments of hazard, vulnerability and capacity; review of existing national policies in disaster management, climate change mitigation, adaptation and development strategies).*
- *Prepare adaptation plans drawing on the Hyogo Framework using the concepts, language and priorities to ensure a comprehensive and integrated approach to adaptation (UNISDR, 2008).*

large companies as well as the conversion of tropical forest areas into fields by poor farmers to produce more profitable crops that can be transformed in fuel (Ibid). Consequences such as the clearance of forests, the intensive production of energy crops and increased irrigation all threaten ecosystems, generate land and water conflicts and challenge food security which aggravate people's long term vulnerability and could accelerate climate change rather than combat it (Environmental Justice, 2007). Moreover, to consider that technology will fix the problem, or at least protect people from the worst, entails the idea that innovations will enable societies to carry on following the current development model without challenging it or engaging in transformative solutions (Garvey, 2010).

The failure to agree on and implement concrete national adaptation policies linking vulnerability with key development issues such as poverty alleviation or land use planning shows, according to Kelman and Gaillard (2008), a lack of willingness to challenge the status quo. As mentioned previously, climate change appears convenient to explain the revival of disasters and other crises linked to food deprivation or the destruction of natural resources. This enables many governments and public authorities to avoid fulfilling their responsibilities to address the real causes of vulnerability which lie within the structure of societies (lack of basic services such as access to health care and education, denial of human rights, destruction of the environment, etc.). Blaming climate change for already existing problems also enables those with powerful interests to continue to manipulate living conditions or deprive some people of their livelihoods through unsustainable and destructive activities such as excessive or illegal logging, overfishing, large scale mining, disrespect of indigenous people's ancestral domains, unfair trade rules and gender-unbalanced policies (Kelman and Gaillard, 2008).

2.2.2.4 Practical barriers limiting integration

O'Brien et al. (2006) advance the notion that institutional differences partly explain the lack of synergies between DRR and CCA. They explain that the UNFCCC and the UNISDR are the main international organisations mandated to integrate the efforts of both sectors. Despite their overlapping agendas however, they are two different organisations with different approaches. On one side, the Conference of Parties (COP) of the UNFCCC is a well resourced, legal policy-making and implementing body that takes a mitigation and adaptation approach to tackle climate change (Ibid). On the other side, the UNISDR is "*a partnership of organisations that have an interest in reducing the risks posed by all hazards and is united and coordinated by a small and poorly funded secretariat in Geneva, Switzerland*" (Ibid: 75). According to the same authors, effective cooperation has been

limited between both organisations as well as with governments of nation members in charge of implementing DRR and/or CCA strategies whereas they could share the resources of the UNFCCC and the network and expertise of the UNISDR (Ibid).

Institutional incoherence and differences in governance also explain the lack of effective transfer of international policies into concrete action at the country level. DRR and CCA are often affiliated with different ministries and institutions which, according to scholars, undermines effective cooperation and sharing of responsibilities (Schipper, 2009; Birkmann and von Teichmann, 2010). While climate change mitigation and adaptation is usually taken up by environment, forest or meteorological departments, DRR is almost always a key responsibility of the interior and defence ministries (Ibid). Ministries have however, different mandates and funding schemes which underline differences of resources and limitations to integrate measures that may not be consistent with institutions' usual responsibilities (Ibid). Schipper (2009) questions whether restructuring national institutions in order to have one specific department that deal with both DRR and CCA would be a necessary measure, however, and whether this would ensure greater cohesion in practice. Overall, Harris and Cannon (2011) point out that the governance implications of linking DRR and CCA in the South has only begun to be researched.

Furthermore, funding schemes which do not often favour a multi-sector and integrative approach (Ibid) constitute an additional factor undermining the cohesion of DRR and CCA interventions. This is exacerbated by the fact that post-disaster responses tend to receive the most funding support (Freeman et al., 2003; Birkmann 2010) because they provide donors with quick visibility particularly when a disaster has attracted media attention (Kelman, 2010). Conversely, effective projects integrating DRR and CCA necessitate a long-term development perspective with long-term funding preferably before a disaster occurs, which means that these projects are not under the spotlight. In parallel, the overall attention to climate change-related issues has generated more political attention and financial support for mitigation and adaptation projects whereas DRR initiatives tend to receive less interest (Venton and La Trobe, 2008). Mitchell and van Aalst (2008) stress that this lack of practical convergence between DRR and CCA creates administrative inefficiencies, competition among the two sectors and, overall, the duplication of efforts compromising their effectiveness.

2.2.3 The integration of DRR and CCA by NGO practitioners

According to Benson et al. (2001) the sustainable reduction of disaster risk cannot be achieved by governmental agencies alone. NGOs, which typically tend to work with more marginalised groups in

society (Benson et al., 2001) have a crucial role in supporting community based initiatives. This approach has been followed by the majority of NGOs involved in DRR for the last couple of decades (Twigg, 2005). In parallel, while mitigation approaches have been privileged to tackle the actual occurrence of negative climate change, the fact that local communities are already and likely to be confronted with unavoidable environmental trends gives an incentive for NGOs to intervene and help the most marginalised groups to adapt.

2.2.3.1 Recognition of the need for community participation

Drawing from the 1980s approaches of people-centred development, as opposed to the Western dominant economic and technocratic interventions, development practitioners have progressively emphasised the recognition and empowerment of local communities’ autonomous actions to assert greater control over strategies impacting their lives (Lewis and Kanji, 2009). In the field of DRR, there is a growing consensus that most top-down preparedness and response projects are inadequate and ineffective to address the specific needs of vulnerable communities. Instead, the majority of NGOs that operate at the grassroots level with local communities increasingly advocate the potential of involving and building on local knowledge, resources and capacities (UNISDR, 2006). Hence, in the field of DRR, numerous frameworks have been developed by different NGOs in order to involve communities in the design and implementation of effective, adequate and sustainable projects (Abarquez and Murshed, 2004; UNISDR, 2006).

Table 2.1 offers a non-exhaustive list of some of the main frameworks developed by NGOs to assess vulnerability and/or capacities to disaster risk. Despite the differing methods and tools, they all have in common the promotion of the principles of bottom-up CBDRR, assisting field workers and communities in identifying the root causes of vulnerability and drawing up appropriate strategies and/or policies.

Table 2.1 List of vulnerability/capacity assessment frameworks developed by NGOs

FRAMEWORKS	ORGANISATIONS	REFERENCES
The Capacities and Vulnerabilities Analysis’ (CVA) framework		Anderson and Woodrow, 1989
The Participatory Vulnerability Analysis	ActionAid	ActionAid, 2000
Participatory Capacity and Vulnerability Assessment (PCVA)	OXFAM	Oxfam, 2002
CARE’s Household Livelihood Security Assessment. Toolkit for practitioners	CARE	CARE, 2002
Participatory Assessment of Disaster Risk	Asian Disaster	Abarquez and

	Preparedness Centre Tearfund	Murshed, 2004 TearFund, 2011
The 'Vulnerability and Capacity Assessment (VCA) Toolkit'	International Federation of the Red Cross and Red Crescent societies (IFRC)	IFRC, 2007
The ACCRA Local Adaptive Capacity framework	Africa Climate Change Resilience Alliance	ACCRA, 2011

The involvement of communities within project design and decision making processes is also being increasingly encouraged in the field of CCA. As mentioned earlier, Community-Based Adaptation (CBA) is a similar bottom-up approach that fosters community participation to determine and implement strategies to reduce the negative impacts of climate change on vulnerable populations (Ayers et al., 2012; Chishakwe et al. 2012). Similarly to CBDRR, the involvement of community is supposed to build upon local knowledge, assess factors of vulnerability, highlight existing coping strategies and identify new adaptive measures (Prowse and Scott, 2008). Although CBA is considered a relatively new, albeit evolving, field of activity (Chishakwe et al. 2012), the body of research that documents early lessons for CBA is growing fast (see Huq and Reid, 2007; IIED, 2009; Ayers et al., 2012). However, methodological frameworks to carry vulnerability and capacity assessments in the context of climate change have not been developed yet to the extent of those in DRR. The Climate Vulnerability and Capacity Analysis from the NGO CARE is one of the few examples where strategies to address climate change are being developed in combination with DRR for practical action at the community level. It suggests that successful adaptation should rely on the interaction of four key strategies namely:

- Promoting climate-resilient livelihoods strategies;
- Developing DRR strategies to reduce the impacts of increasing climate-related hazards on vulnerable households;
- Strengthening adaptive capacity of (i) local communities and (ii) governmental institutions;
- Addressing the underlying causes of vulnerability through evidence-based advocacy and influencing policies at regional, national and international levels with community-based experience (CARE, 2009).

It further stresses that *“the CVCA attempts to combine good practices from analyses done for development initiatives [...] and those done within the context of disaster risk reduction [...]. [It] facilitates analysis of the information gained from both types of assessments from a climate change perspective”* (CARE, 2009: 2). This framework informs the design of methods used during the fieldwork for this research. Other examples of frameworks to address both DRR and CCA in an integrated manner include the Climate Smart Disaster Risk Management (CSDRM) approach that was developed in 2010 by the Institute of Development Studies, Christian Aid and Plan International

(Mitchell et al. 2010). The CSDRM's primary objectives are to (i) tackle changing disaster risks and uncertainties, (ii) enhance adaptive capacity and (iii) address the structural causes of poverty and vulnerability (CDG, 2011). The Emergency Capacity Building Project (a platform of international NGOs active in emergency preparedness and response) recently published its 'Guide to Disaster Risk Reduction and Climate Change Adaptation' with ten principles to foster an integrated approach and *"provide development and humanitarian practitioners with a set of criteria for building disaster and climate resilience that is applicable across the program cycle in multiple sectors and varied contexts"* (Turnbull, 2013: 11). These initiatives show that linkages between both sectors are progressively recognised and transformed into sound NGO policies. Overall, organisations increasingly acknowledge that appropriate adaptation strategies designed to respond to the impact of climate change are measures that will most probably support DRR and vice versa because they aim to reduce long-term vulnerability (e.g. Pettengell, 2010; Van Aalst et al., 2008; Venton and La Trobe, 2008;).

2.2.3.2 The need for enforcing policies and learning from good practices

Publications from NGOs increasingly draw from the principles of sustainable development or the vulnerability approach to disaster (Gaillard, 2010). However, translating these into policies and developing methodological frameworks does not guarantee that concrete appropriate projects follow; neither does it ensure the replication of community-based strategies at a large scale. Twigg (2005: 2) questions the practical outcomes of community participation in DRR: *"The 'success stories' tend to be one-offs; and too many of them are superficial descriptions or public relations exercises"*. In fact, the literature stresses that, although policies and methodologies exist at the NGO level, the mainstreaming of concepts into practice has remained limited (Twigg and Steiner, 2002; Twigg, 2005; UNISDR, 2006). Twigg and Steiner (2002; 474) points out that *"[...] disaster risk reduction activity tends to be sporadic, poorly integrated with development planning, and largely unsupported by institutional structures and systems"*. Projects rarely address the root causes of vulnerability (Schipper, 2009) and often miss out on building upon local capacities (Luna, 2001; Mangones, 2001; IFRC, 2004; Venton, 2008; Shaw et al., 2009). Birkmann and von Teichman (2010) argue that the current dominant approach to disaster management remains focussed in practice on post-disaster response with short-term interventions. Even in a post-disaster context, organisations often provide aid while ignoring traditional mechanisms of coping and thus fail to tackle efficiently people's vulnerability and recovery (Dibben and Chester, 1999; Gaillard et Le Masson, 2007; Le Masson et al., 2009). Relief strategies prioritise a return to 'normalcy' without questioning whether prior living conditions could have contributed to disaster risk (Schipper, 2008). A report commissioned by the Norwegian Agency for Development Cooperation to synthesise lessons learned in the field of

humanitarian response to disasters points out that (i) disaster response fails to link relief, recovery and development, (ii) advocacy for needs assessment is not followed by actual practice, (iii) humanitarian relief undermines rather than enhances local capacities, (iv) there is a lack of effective coordination between the numerous stakeholders involved in humanitarian action and (v) despite awareness and policies advocating vulnerability reduction, examples of good practices remain scarce (Stokke, 2007: 4).

In summary, on the one hand, there seem to be sufficient policies and methods of investigation but a lack of transfer of these into action. On the other hand, numerous evidence-based studies raise the challenge of turning successful initiatives into policies and governmental actions (e.g. Twigg, 2005; UNISDR, 2006; Venton et al., 2007; Mehta, 2009; Chishakwe et al. 2012). NGOs have a role to play in scaling up best practices in order to initiate institutional change and mobilise political commitment to actually implement existing policies (Lewis and Kanji, 2009). So far, the literature emphasises a disconnection between recommendations from research studies, policies and actual practices.

2.2.4 Conclusion

To synthesise, Schipper (2009) argues that *“the adaptation and disaster risk reduction approaches [...] remain idealized versions of the reality, where activities to pursue adaptation to climate change and address disasters continue to be delinked from vulnerability reduction”*. At both political and practical levels, there still is a dominant tendency to reduce DRR to hazard mitigation and post-disaster response which offers little scope to integrate any long term measures to address the future and potential impacts of climate change. Similarly, current adaptation interventions are equally and primarily concerned with reducing the impacts of climate change (Ibid). This may be partly explained by the disjunctures existing within academia including the lack of integration of different disciplines, the lack of acknowledgement of previous conceptual developments and the focus on differences in areas of expertise rather than emphasising common objectives. This section has also pointed out other practical barriers linked with institutional incoherencies and inappropriate funding schemes. Finally, the lack of transfer of NGO policies into action with the example of community-based approaches is an additional illustration of the gap between theory and practice. Acknowledging this gap will inform the analysis undertaken in this thesis to assess the relevance of climate-related interventions in Ladakh.

2.3 The integration of DRR and CCA with gender lenses

DRR and CCA constitute vast fields of research and activities that usually overlap with many other sectors in society such as health, agriculture, education or human rights. While the linkages between DRR and CCA could be explored through a multitude of different angles, this study adopts a gendered perspective in order to narrow down the research to one specific cross-cutting issue. This particular focus is an outcome of initial observations from the research process that relied on a gender-sensitive methodology, explained in the following chapter, and which led me to identify gender as a particular angle to look at the convergence between DRR and CCA. This section presents a conceptualisation of gender and reviews the literature that justifies why gender matters in regard to disasters and climate change. It then introduces the theoretical linkages between gender and the environment before briefly assessing how gender is conceived by development and humanitarian organisations.

2.3.1 Conceptualising gender

Momsen (2010: 2) defines gender as *“the socially acquired notions of masculinity and femininity by which women and men are identified”*. As such, gender is used in contrast to the term ‘sex’ which usually refers to the biological division between male and female. To adopt a gendered-perspective gives consideration to differences between men and women to analyse and understand their experiences in relation to places and to their environment. Defining gender as a societal construct recognises that the diversity of social practices, beliefs, cultural behaviours, historical contexts and political structures all change the meaning of gender from one society to another and over time (McDowell, 1999). Yet, as Momsen (2010) argues, there is a common tendency across the pluralities of societies to point out gender imbalances to the detriment of women. Since the 1970s gender studies, largely inspired by feminist theories, have continuously stressed that men and women face different constraints in their daily lives which lead in many societies to the subordination of women, even though power relations can be experienced and expressed in different ways (Ibid). To give attention to gender issues thus involves focusing on factors causing, and on manifestations of, (in)equalities between men and women in terms of their positions, needs and roles i.e. *“the household tasks and types of employment socially assigned to women and men”* (Ibid: 2). Dankelman (2010: 11) argues that *“gender relations throughout the world entail asymmetry of power between women and men”* which means that gender *“is a social stratifier, and in this sense it is similar to other stratifiers such as race, class, ethnicity, religion, place and age, that in themselves all affect gender roles and meanings”* (Ibid). This underscores that a gendered-perspective is not just

concerned with women as an oppressed homogenous group, but gives equal consideration to differences between men and women themselves according to their social, cultural or geographical contexts. This concurs with the Gender and Development Approach (GAD) that emerged to better address the long term interests and different contexts of women (and men), to challenge structures that had maintained their marginalisation and therefore to address differential power relations between women and men. In this perspective, the objective is not only to document differences and highlight inequalities but to challenge existing male-institutionalised dominations both in Western societies and in the South and eventually achieve gender equality.

2.3.2 Why gender matters? Review of the gender dimensions of disasters and climate change

Adopting a gender perspective thus means exploring how gendered roles and positions influence people's experiences of their environment. This section reviews the gender dimension of vulnerability, capacity and adaptation to highlight that disasters and climate change are not gender-neutral.

2.3.2.1 Gendered vulnerabilities to natural hazards and climate change

Both men and women are affected by hazards and the impacts of environmental change but not necessarily in the same ways. Men and women have different status, roles and activities which affect the availability, nature and strength of their livelihoods and therefore shape their vulnerability facing hazards and environmental changes (Parpart, 1995; Fordham, 1998, 2001, 2012). Disasters thus generate impacts that are gender differentiated, but the design and implementation of conceptual frameworks and projects often ignore differences among individuals such as between women and men (Dankelman, 2002).

Traditionally, a gender-based division of labour has existed in most societies, where one set of roles are allotted to women and another set to men (Pincha, 2008) (see Table 2.2). Women are predominantly assigned responsibilities such as child rearing as well as domestic activities while men are supposed to be the 'breadwinners'. Domestic tasks involve the provision of household energy, water and food in addition to cooking, cleaning and maintaining health and hygiene which are more time consuming in the South than in high income countries (Dankelman and Jansen, 2010). Particularly in rural and remote areas of the South, the majority of households largely depend on wood and animal dung for their energy supply while tending fires may take many hours per day

(Ibid). In the provision of water, the contribution of women and girls is significantly higher than that of men and they are rarely assisted by their male counterparts in segregated communities (Momsen, 2000). This task may be particularly heavy in arid regions where households do not benefit from proximity to a well and even less to running water. The availability of energy, water and food determines the capacity to cook and feed the household and maintain a healthy environment.

Table 2.2. Adapted from Pincha (2008), Roles of men and women.

Roles	Women	Men
Reproductive Role (Typically women)	<ul style="list-style-type: none"> ▪ Biological reproductive work: bearing and breast feeding babies ▪ Social reproductive work: bringing up children, cooking, cleaning, laundering, fetching water/fuel wood, etc ▪ Invisible and unpaid ▪ Favour dependent decision making 	<ul style="list-style-type: none"> ▪ Minimal reproductive work ▪ Involves more mobility ▪ Is optional ▪ Is visible ▪ Holding decision making power
Productive Role (Typically Men)	<ul style="list-style-type: none"> ▪ Livelihood activities ▪ Low paid (relative to men) ▪ Invisible/secondary importance ▪ Nature of work generally based on reproductive role 	<ul style="list-style-type: none"> ▪ Livelihood activities ▪ Highly paid (relative to women) ▪ Visible ▪ Recognized as breadwinners
Community Role	<ul style="list-style-type: none"> ▪ Maintaining kinship relations, religious, activities, social interactions and ceremonies (births/marriages/deaths) etc. ▪ Unpaid work ▪ Nature of work similar to the reproductive work 	<ul style="list-style-type: none"> ▪ Political in nature ▪ Assigns prestige and power ▪ Paid work ▪ Highly visible

Gender roles, which are socially assigned to women or men, are not necessarily static but change according to wider societal processes and contexts (Momsen, 2010). Yet, studies have shown that overall women, particularly those living in rural areas, work longer hours than men but mostly in unpaid labour which is not valued as productive compared to those that generate cash-income or exchange-value (UNIFEM, 2005; Pincha, 2008; Arku and Arku, 2010). In most cases when women increase their paid labour, their male counterparts do not increase their share of the unpaid domestics tasks (Momsen, 2010). For those able to carry the double burden of both reproductive and productive activities, women are also disempowered through being made invisible or being assigned to informal jobs (Ibid). For instance, numerous studies have shown that women involved in subsistence farming do more unpaid work and have less access to paid jobs and incomes than men, making them dependant on men financially and limiting their ability to save money (Enarson et al., 2003; Demetriades and Esplen, 2008). In addition, rural women’s access to land, property rights and

farming technology is often restricted by their status and customs (Agarwal, 1994; Brody et al., 2008). This limits their access to credit and in turn constrains their capacity to diversify into alternative livelihoods (Demetriades and Esplen, 2008).

Because of their distinct roles and daily activities, women and men often face different health and environmental risks (WHO, 2004). Women also face childbirth- and pregnancy-related health limitations (Enarson et al., 2003). In regions where women rely on open fires or stoves for cooking, they are exposed to a higher risk of respiratory diseases due to domestic smoke and indoor air pollution (Leduc et al., 2008). This is especially true in secluded societies where women spend most of their day at home (Dankelman and Jansen, 2010). As fuel collectors, they may carry heavy loads, whose weight often exceeds the maximum 20 kg permissible for women by many countries' regulations (WHO, 2004). As water collectors, they are more exposed to waterborne illnesses and parasites (Denton, 2002) and sometimes walk over long distances. Women are often the last to eat in low-income households because of traditional customs and because men, considered breadwinners, are privileged (as well as children) (Neogy, 2010; Uragushi, 2010). Thereby, women's excessive workload combined with their lack of equal access to food result in nutritional problems and a greater vulnerability to disease (Denton 2002). Moreover, they spend more time taking care of children, the elderly and the sick, exposing them to greater stress, additional health risks and increasing their workload (Leduc et al., 2008).

However, men also face health risks due to their roles or status. The common idea that men are stronger and more resistant sometimes forces them to do more dangerous jobs or work in extreme conditions which impinge on their health (WHO, 2004). In most societies, they are expected to provide economically for the household but a lack of livelihood opportunities may cause them stress and reduce their self-esteem (Demetriades and Esplen 2008). Yet, it has been documented that men and boys are less likely to use health services and seek support, often due to the fear of being seen as weak (Masika, 2002). Pincha (2008) explains that such social constraints and stereotypes often prevent men from expressing their emotions which impact on their mental health. Relying on alcohol and drugs is often a coping strategy developed by men to cope with pressure but significantly affects their physical and mental health, aggravates the household's lack of income and sometimes leads to domestic violence (Ibid).

Women are the primary victims of domestic violence and sexual assault worldwide, a statement documented by numerous evidence-based studies (e.g. Sen, 1998). The emotional and mental consequences of abuse leave women more vulnerable to fear, depression, low confidence and self-

esteem, suicide attempts, miscarriage and the death of young children (Momsen, 2010). This, combined with health risks and lower nutritional status, increases significantly their vulnerability in times of crisis and impedes their ability to cope. A lack of representation in governance as well as the burden of certain religious and traditional customs further impedes the capacity of women to have their concerns acknowledged, to seek protection from their local authorities and to mobilise the justice system (UN, 2010).

This highlights that women are generally more politically marginalised than men. Women have long been excluded from positions of power in public life, both at international and local levels. For instance, they remain a minority in governance and political institutions worldwide (UN, 2000). Women's reproductive roles, reinforced by dominant patriarchal structures, traditional systems and religious beliefs, tend to associate the private sector and family with women's sphere and the public sector and politics with men's sphere (UN, 2000; UNRISD, 2009). Women's access and control over land, natural resources and house property are often dependent on their husbands and other males in the community (Agarwal, 1994; Enarson, 1999). The majority live in patriarchal societies where they have little control over decision-making processes in all aspects of their daily life (e.g. marriage, family planning, education access) particularly in rural areas (Pincha, 2008). In many regions, women suffer from a multitude of discriminations at institutional, religious, cultural, traditional and household levels rendering their status lower than men's (Leduc, 2009). The lack of representation in any form of structures means that women's needs are given low priority or are totally ignored (Pincha, 2008). The lower representation of women in emergency management organisations and professions for instance increases risk for girls and women (Enarson et al., 2003).

Women are considered to be more vulnerable to risks from the variety of factors described earlier and suffer the most from a disaster event (Cannon, 2002; Fordham, 1998, 2012; Neumayer and Plümper, 2007; Mehta, 2009). Women's nutrition status, health condition, access to incomes, basic services and decision-making all determine their survival strategies and means to cope in the aftermath of a disaster. With a heavy workload, limited economic resources and lower levels of education and training, women are found less likely able than men to anticipate and prepare for a major disaster, such as accessing necessary information and self protection (Enarson et al., 2003). Those living in secluded communities where their status does not allow them to go outside the house without their husband or a male family member may have fewer opportunities to secure a social network and rely on social capital. Disasters, but also daily pressures, may impose a greater workload on people depending on the damage, loss of livelihoods or forced migration to emergency housing or slum areas which can exacerbate stress factors and increase violence within households. All of these

outcomes primarily affect women. Evidence-based studies also show that women and girls are more likely to experience harassment, physical and psychological abuse following a disaster (Enarson et al., 2003; Brody et al., 2008). Additionally, women are generally more vulnerable to trafficking especially when communities are forced to relocate to the peripheries of urban areas due to the effects of disaster (Momsen, 2010).

Ongoing environmental degradation worldwide, the occurrence of disasters and the expected impacts of climate change all contribute to worsen the depletion of natural resources and/or change environmental conditions. These, in turn, are likely to alter agriculture patterns in certain regions while making reproductive activities such as the collection of fuel, water, fodder and food longer or harder (Denton, 2002). This impacts negatively on women first as their activities make them interact more with the environment (Dankelman, 2002; Brody et al., 2008). Moreover, because they are marginal in the political sphere, women are also frequently absent from climate change decision-making processes (Buckingham, 2010). This results in their needs and expectations neither being properly addressed nor integrated into environmental policies and development projects (Denton, 2002). Demetriades and Esplen (2008: 25) summarise that *'climate change exacerbates existing inequalities between and among men and women and intensifies gendered experiences of poverty'*. By overlooking differences in status, needs, roles and activities that shape men and women's different vulnerability, resilience and capacity to adapt, there is a risk that gender-neutral policies and projects will not adequately meet the needs of specific gender groups.

2.3.2.2 Gendered capacities and opportunities for adaptation

As suggested previously, the assessment of the vulnerability of certain groups or individuals has to be viewed in perspective with all the other factors that favour the capacity of people to cope with shocks and adapt to changes. Despite the negative aspects depicted earlier on the vulnerability of women, the latter do not constitute a helpless and homogenous group. Fordham (2012: 433) stresses that one has to overcome *"the stereotypical view of women and girls as dependent and subordinate, reinforced by media images of them as weak, passive and in need of rescue"*. A multitude of mechanisms and resources are developed and used by individuals to strengthen their capacities and develop adaptation strategies. In the same way that livelihoods reflect the marginalisation of people and therefore their vulnerability to hazards and the impacts of climate change, they also reflect assets and opportunities that contribute to increase the capacity and resilience of men and women.

First of all, despite false preconceptions about men as the main providers of daily sustenance, women have an active role in food production in many societies (Dankelman and Jansen, 2010). Rural women are estimated to produce more than 55% of all food grown in developing countries (UN, 1997). Sometimes, the construction of gender division of labour assigns men with certain types of crops such as production of cash crops whereas women are more likely involved in producing subsistence food crops, vegetables and fruits (Dankelman and Jansen, 2010). Depending on the context, women might be in charge of animal husbandry or, in the contrary, might not be allowed to look after livestock. Nevertheless, women play an important role in biodiversity management through food collection and the use of natural products for household sustenance or health care (Ibid). Therefore, rural women and men each own a deep but different knowledge of wild and domesticated plants and animals as well as their varieties of use. With the depletion and degradation of natural resources, this local knowledge is crucial because it gives local people the ability to adjust their activities and make the most of local products. Those adjustments are likely to be gender-differentiated.

Secondly, the literature on resilience suggests that the maintenance or reproduction of social relationships and cultural characteristics of a community in times of crisis also determines the ability of local people to cope with changes (Dovers and Handmer, 1992). Women usually have a greater role in social management by maintaining kinship linkages, having an active position in the neighbourhood and carrying out most religious, ceremonial and social requirements in the community which keeps languages and cultural traditions alive (Momsen, 2010). This role potentially enhances their role as communicators, their social status and their social capital that may help in times of crisis. Other stereotyped gender divisions of work mean that men may not have basic survival skills such as cooking and taking care of children which impede their ability to cope if female members of the household do not survive a disaster (Pincha, 2008). Additionally, gender stereotypes of males as breadwinners put boys under pressure to drop out of school and work to contribute to the family income (Ibid).

Thirdly, when women benefit from one particular asset, this can impact positively on other livelihoods not only for themselves but for the rest of their families. For instance, in some societies women have higher status and a more valued economic role than in others (e.g. Panda and Agarwal, 2005). Studies have demonstrated that access to basic services and nutritional status of women and children are much better when women have control over the household's incomes (Pincha, 2008). They typically spend the money on the family's basic needs whereas studies have shown that men often use a significant part of their incomes on personal uses such as tobacco, alcohol and gambling

(Agarwal, 1994; Pincha, 2008). Additionally, Panda and Agarwal (2005) have found that in Kerala, India, women who had better access to property (land or a house) were at a significantly lower risk of marital violence than those who did not own any property. Access to education may also help women to gain control over their lives (Dankelman and Davidson, 1995). Momsen (2010) explains that mothers who are literate get married later and have the ability to raise healthier better-fed children who are more likely to attend school. Better access to education may also allow women to develop new skills and gain information to help them anticipate a disaster and adapt to new challenges such as climate change (Leduc 2008). However, access to education is both a prerequisite and a consequence of the emancipation of women.

Overall, women are found to be disproportionately affected when disaster strikes, which is both the cause and the result of their lesser control over means and strategies to cope in times of crisis. However, disasters offer the opportunity for social transformation (Gaillard, 2007): the occurrence of a calamity can highlight the intrinsic knowledge, skills and other capacities that women assemble to help them cope. For instance, following the floods in 2007 in Jakarta, Indonesia, women inhabiting informal urban settlements organised an emergency kitchen to cook and distribute meals to other residents affected by the floods (Le Masson et al., 2009). By working to change both institutional practices and ideological attitudes, women worldwide increasingly challenge the dominant *“patriarchal military-based disaster response and management systems”* (Fordham, 2012: 433). Extensive evidence-based research demonstrates the success of including women in development, disaster risk preparedness and recovery planning (e.g. Enarson et al., 2003; Mehta, 2007; Arku and Arku, 2010; Leite, 2010; Nawaz et al., 2010). Likewise, studies increasingly stress the necessity to integrate women’s specific experiences and needs in order for adaptation to be effective and relevant (e.g. Mitchell et al., 2007; ICIMOD, 2011; Bee, 2013).

2.3.3 Linking gender with environmental issues

The attention paid to gender in this study relates to almost three decades of research that have explored the interrelationships between gender, environment and sustainable development and the gendered impacts of environmental policies (e.g. Shiva, 1989; Harcourt, 1994; Rocheleau et al., 1996; Sachs, 1997; Buckingham, 2000). While, at first, development policies and projects were concerned to make women more ‘visible’ within economic development, productive activities and decision making processes, alternative approaches progressively moved toward challenging the mainstream economic development that has created social inequalities as well as environmental imbalances. The literature on development and environment has repeatedly documented the close links between

women's roles and their environmental surroundings and the disproportionate and detrimental impacts of environmental degradation on women's activities and lives (Buckingham, 2000). Women, Environment and Development approaches (WED), that emerged in the mid-70s, drew from the idea that the dominant development model based on economic growth is not sustainable and generates detrimental effects on both the environment and on marginalised groups including women (Shiva, 1989; Braidotti et al. 1994; Harcourt, 1994). Movements that link environmentalism and feminism, such as ecofeminism, view both women and the environment as vulnerable to male domination (e.g. Plumwood, 1986; Merchant, 1992; Warren, 1994). Other authors (e.g. Shiva, 1989; Mies and Shiva, 1993) also highlight political structures such as colonialism which have further marginalised women in the global South. They argue that the Western dominant development model based on economic growth, very much male-oriented, has caused major social and environmental problems and diminished the roles and the knowledge of women particularly in the South. Ecofeminist ideas emerged in a context of rising scientific and popular concerns with environmental protection and sustainable development. They became widespread in the 1980s, when agencies and NGOs promoted the image of women as the primary users and managers of the local environment on whom development projects should focus their action (Leach, 2003). However, with the influence of GAD, links between environmental damage, unequal human development and gender inequalities have been progressively researched with a gender perspective on environment rather than a women-only perspective. The multiplication of research and activism of different feminist and gender movements thus enabled the incorporation of gender issues within certain policy areas both at local and international levels to address social and economic inequalities as well as environmental issues (Buckingham, 2004).

Since the 1970s, several United Nations World Conferences on Women repeatedly highlighted women's lower status, more limited livelihoods opportunities, unequal access to education, employment and decision making as well as their vulnerability to domestic violence, and calling for development policies that address women's greater marginalisation (e.g. Nairobi Forward-looking Strategies for the Advancement of Women in 1985). Linkages between gender and the environment entered political negotiations later in the 1990s helped by the advocacy work of the Women's Environment and Development Organisation (WEDO), a network grouping women's organisations from around the world. In 1991, the World Women's Congress for a Healthy Planet was held in Miami, with the objectives to (i) produce a Women's Action Agenda, (ii) ensure that all governmental and non-governmental delegations to the United Nations Conference on Environment and Development (UNCED) were gender-balanced and (iii) build an international network of women to raise their voice on all issues pertaining to environment and development (IISD, 1996). Based on

these lobbying efforts, the United Nations, gathered at the Earth Summit in Rio in 1992, called for the integration of women and gender in environmental decision-making at all governmental levels (Buckingham, 2010). The resulting official document, Agenda 21, includes the Women's Action Agenda 21 with recommendations covering different issues from governance, poverty, land rights, reproductive health to environmental ethics, energy or education, in order to achieve sustainable development from a gender perspective. In 1995, the Women World Conference held in Beijing, with the United Nations recognised that:

Eradication of poverty based on sustained economic growth, social development, environmental protection and social justice requires the involvement of women in economic and social development, equal opportunities and the full and equal participation of women and men as agents and beneficiaries of people-centred sustainable development (UN, 1995).

The resulting Beijing Declaration advocates the design and implementation of effective gender-sensitive policies and programmes, with the full participation of women at all levels, which will foster their empowerment. The United Nations thus approved a framework for governments to promote the human and economic rights of women by considering the reformulation of legal, political, economic, and social structures (Bowles-Adarkwa and Kennedy, 1997). Yet, with no significant outcomes of this framework for the improvement of women's status in the following years (UN, 2000), the UN designated the empowerment of women and the promotion of gender equality as one of the eight internationally agreed Millennium Development Goals (MDGs) to be achieved by 2015. From the 1990s, gender mainstreaming thus became a key concept linked with human rights and development which is now embedded in all official conventions and agreements of the UN and international agencies (UN, 2002; Buckingham, 2004; UNEP, 2005). As defined by the coordinating body for the social and economic policies of the United Nations (ECOSOC, 1997) gender mainstreaming is:

[...] a strategy for making women's as well as men's concerns and experiences an integral dimension of the design, implementation, monitoring and evaluation of policies and programmes in all political, economic and societal spheres so that women and men benefit equally and inequality is not perpetuated.

Through gender mainstreaming, the objective is to integrate gender concerns within policies and projects in order to overcome issues of marginalisation, invisibility and under-representation both in people's daily lives and within institutions dependent on and influencing gender inequities (Dankelman, 2010). This entails giving consideration to gender in both DRR and climate change sectors. However, despite the evolution of feminist environmentalism for the last 40 years, the

broader influence of GAD perspectives and the move towards gender mainstreaming in policies and academia, Leach (2003) notes a lack of political acknowledgement of relational perspectives on gender and environment in existing structures and development projects.

Gender has only been slowly incorporated in DRR policies, mainly by the United Nation Development Programme (UNDP) and the UNISDR (2008a). Recognised linkages between gender and climate change are even more recent within international climate change negotiations. The Global Gender and Climate Alliance (GGCA), created in 2007 at the COP in Bali challenges the male-dominated political debate (Buckingham, 2010) and aims to ensure the implementation of UN mandates on gender equality and that UN financing mechanisms on mitigation and adaptation address the needs of poor women and men equitably (GGCA, 2008). In 2008, an international network of women's organisations called 'GenderCC – Women For Climate Justice' was also set up to integrate gender justice in climate change policy at local, national and international levels (GenderCC, 2009). More recently in 2012, the UNFCCC Parties agreed in Doha (COP18) to strive for gender balance in Parties' delegations, improve the participation of women in UNFCCC negotiations and promote gender-sensitive climate policies (UNFCCC, 2012a). Dankelman (2010) stresses that the need to mainstream gender within the environmental sector has been often reluctantly recognised which slows down the formulation of gender-sensitive policies and practices particularly in the field of climate change. These are some of the challenges that have begun to be addressed in the rising research on gender and climate change (e.g. Masika, 2002; UNISDR, 2008; UNDP, 2009, 2010; Christensen et al., 2009; Dankelman, 2010; Nelleman et al., 2011; ICIMOD, 2011).

Overall, scholars from the development, disaster and climate change literatures all stress that gender remains a separate discipline or field of policy that is not mainstreamed as a cross-cutting issue within other areas. Momsen (2010: 251) argues that although the MDG 3 addresses gender equality, *"The gender blindness of most of the MDGs and the gender dynamics that cut across the goals are ignored in policy dialogues"*. Fordham (2012) highlights difficulties faced by disaster managers to foster gender as a cross-cutting theme and ensure that it is treated seriously. Buckingham (2010) also stresses how industries, governmental bodies and international agencies with a say in climate change issues are predominantly male. Vainio-Matilla (2011) ultimately advances that *"Since development is about the power to make decisions over the access to and control over the use of resources, anything that challenges how power is currently allocated, such as a suggestion that it may be necessary to re-allocate power, will cause conflict. Gender blindness is a way of avoiding this conflict"* (Ibid: 11).

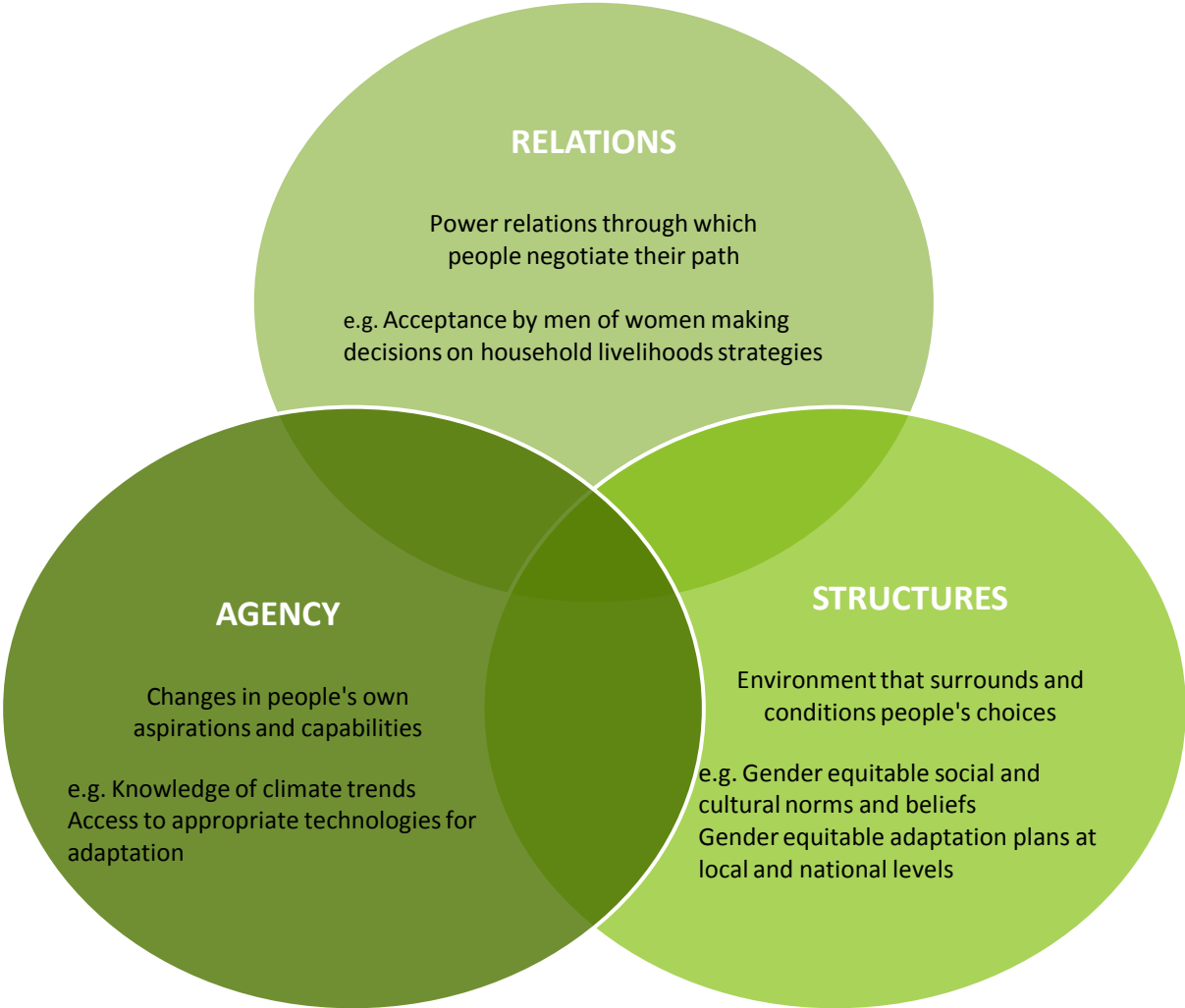
2.3.4 Gender in humanitarian and development fields

Drawing from the development sector that has progressively put the emphasis on participation and empowerment of marginalised groups, such as women (Lewis and Kanji, 2009), gender has been slowly but increasingly addressed by NGOs working in DRR and CCA and sometimes incorporated into guidelines and policies (e.g. WEDO, 2009; OXFAM, 2009; CARE, 2010a). This documentation acknowledges that both men and women have different social and economic status, roles, problems and needs. It recognises that gender groups have specific knowledge of their environment and diversified skills in managing natural resources which all shape the coping and adaptation strategies of their communities to the challenges brought by hazards and environmental change. By failing to acknowledge these in vulnerability and capacity assessments, there is a risk of NGOs designing and implementing projects which do not build upon the capacities of communities and further marginalise those who suffer from a lack of access to decision-making or who are discriminated against. By ignoring inequalities in social status, wealth or power, the implementation of DRR measures and adaptation policies and projects are also more likely to address the wrong causes of problems and reinforce inequalities between dominant and minority groups (Masika, 2002). Therefore, the majority of NGO policies that address gender promote community-based and participatory projects which encourage the recognition of differential contexts and needs between and within communities and the empowerment of the most marginalised groups (e.g. Mitchell et al., 2007). For instance, the NGO CARE built a women's empowerment framework and applied it to CCA (see Figure 2.6). It considers that, in order to achieve the sustainable empowerment of women, strategies must simultaneously address *"the combined effect of changes in her own aspirations and capabilities, the environment that surrounds and conditions her choices, and the power relations through which she negotiates her path"* (CARE, 2010: 4).

While gender awareness grew mostly among NGOs in the development and humanitarian fields it is only recently that it began to be included within the DRR and CCA practices with ambivalent outcomes. According to Fordham (1998, 1999, 2012), NGOs' strategies so far do not systematically separate needs and vulnerabilities of women and men; they assume male-headed households, underestimate or overlook people's skills, knowledge and capacities and do not include beneficiaries' voices in the design of DRR projects. The author further stresses that *"While gender mainstreaming has become a familiar exhortation, it is clear that it too often fails in practice"* (Fordham, 2012: 435). This is especially the case among disaster managers operating from within the dominant paradigm who remain focussed on gender-neutral natural hazards and their impacts (Ibid: 426). This concurs

with Leduc’s (2009) view that most projects in the climate change sector fail to take into account gender differences in order to be more effective and the majority remain gender-blind (Leduc, 2009).

Figure 2.6. Women’s Empowerment at CARE (adapted from CARE, 2010).



This accentuates the analysis provided earlier regarding the gap between progress made in the formulation of policies in DRR and CCA and what is being implemented in reality. A divergence already exists between how disasters and climate change should be tackled in theory, e.g. the recognition of the root causes, the enhancement of people’s capacities and the sustainable reduction of vulnerability, and actual practices that overlook these areas of action. The same divergence can be observed from the review of the literature on gender where the necessity to conduct, to design and to implement gender sensitive research, policies and projects is not automatically followed up in practice.

2.4 Conclusion and gap

To conclude, there is a significant body of research that documents how DRR and CCA overlap in terms of objectives, approaches and methods in both policy and in practice. Several reviews have highlighted synergies to better integrate efforts from both sectors but also the challenges that limit practical convergence. The Climate and Disaster Governance (CDG) project, run by the NGO Christian Aid and the Institute of Development Studies (IDS), stresses that the scope to link frameworks, processes and institutions from both fields remain under-researched (CDG, 2011). Similarly, Schipper (2009: 28) underscores that *“further research is necessary to understand fully the extent of the divide between adaptation and disaster risk reduction, and to get a more complete picture of the most relevant types of activities that can link the two”*. Schipper (2009) particularly asks what benefits a closer synergy between the two sectors would actually bring and whether any examples have been documented to describe projects where DRR and CCA have been successfully integrated. Drawing from these questions and from the literature review provided in this Chapter, this thesis seeks to generate empirical evidence to assess the relevance of current policies and projects to tackle disaster risk and climate change in relation to local communities’ realities. By comparing the theory and practices, this research explores the local dimension of the (lack of) integration of DRR and CCA in the case of Ladakh through using the particular angle of gender. The focus on gender as a cross-cutting theme serves as a basis to explore relevant theories and activities that can link different sectors together and/or reasons that further explain why their integration so far remains limited.



Chapter 3

3

METHODOLOGY

As set out in the literature review, this study engages with concepts of disaster risk, vulnerability, capacity, resilience, gender and adaptation to climate change. This chapter outlines further the underpinning theoretical and epistemological framework and the methodology used to address the following research objectives:

- I. To draw a holistic analysis of the way Ladakhi communities experience climate change and natural hazards in relation to their everyday risks, using DRR frameworks and a gender perspective.
- II. To explore current approaches and practices to deal with climate change and natural hazards; whether they are integrated and whether they address considerations of gender at the grassroots level.
- III. To identify and explain any disjunctures between approaches inscribed in climate-related interventions, DRR strategies and beneficiaries' realities.

Overall, this study aims at examining the relevance of climate change-related interventions to beneficiaries' local realities and whether the integration of the fields of DRR, CCA and gender, advocated by academics and policy-makers, is evident in practice.

This chapter respectively explains the theoretical underpinning, the reasons for choosing Ladakh as a case study, methods and techniques of research used to address the objectives and finally the organisation of the analysis of the results undertaken in the following chapters. Above all, this chapter aims to justify how the research was conducted in regard to key concepts raised in the literature review such as notions of gender, inclusion, participation and local awareness.

3.1 Theoretical and epistemological underpinning

3.1.1 Interdisciplinarity and political ecology

This study adopts an approach which recognises disasters as resulting from the occurrence of hazards but which especially highlights the socio-economic and political processes that determine

the vulnerability of a particular ecosystem, community, household or individual, or in other words the reasons why the hazard generates a disaster. Likewise, it views climate change as both a natural and human-induced phenomenon which affects societies in different ways because of the combination of physical and societal processes which influence the abilities of individuals to protect themselves and adapt. This suggests two elements that shape the theoretical framework of this research.

The first element is the need for an interdisciplinary approach. On the one hand, hazards have traditionally been researched in 'hard' sciences including physics, biology and physical geography in order to measure, quantify and predict hazardous phenomena. Likewise, information on climate change impacts in mountain areas, in particular, is widely provided by studies in the fields of climatology, hydrology, glaciology and other 'natural' sciences which concentrate on scientific and empirically verifiable facts. On the other hand, research on the 'human' dimension of disasters relies more on social sciences. The combination of disciplines such as human geography, anthropology, sociology and history has proven useful when trying to understand the root causes of vulnerability and the wider contexts shaping these (Wisner et al., 1991; Mercer et al., 2007; Schipper, 2004). This study relies on methods of research inspired by anthropology, sociology and human geography but it equally acknowledges and draws from geographical, hydrological and climatological studies to explore the predicted impacts of climate change. It therefore adopts an interdisciplinary perspective to combine different knowledge and fields of expertise.

The second element is that this study draws widely on theories of political ecology to research human-environment relations and the links with development and social change. Political ecology is defined as an approach to *'the complex metabolism between nature and society'* (Watts, 2009: 545). It is rooted in cultural and human ecology (Escobar, 1999) but encompasses the political dimension of environmental concerns emerging in the 1970s which coincides with the pioneer work of the radical approach to disasters in the same period. Escobar (1999: 2) explains that political ecology aims at understanding and participating *'in the ensemble of forces linking social change, environment and development'*. Initially associated with peasant and development studies in the global South (see Blaikie, 1985; Blaikie and Brookfield, 1987; Basset, 1988), political ecology has become 'a key framework in geography for studying human environment relations' (Neuman, 2005; 2009), hazard vulnerability (e.g. Hewitt, 1983a; Collins, 2008) and other disciplines (see Escobar, 1999:2).

Drawing on theories of political ecology, this study considers environmental processes, such as climate change, as products of *'scientifically recognised fact'* and of *'social construction'* (Blaikie,

1995: 208). Although this approach recognises the existence of a physical reality independent from human consciousness, it considers that we cannot help but see and interpret our environment through our own lenses (Ibid). For pioneer political ecologist Blaikie (1995: 203):

[...] our views on the environment and environmental issues and problems, either global or local, are identified, interpreted and given meaning by us as individuals. In other words, we are constructing our landscape or environment in a social manner.

This study thus places the emphasis on the human experience of disaster and climate change. By giving attention and relying partly on people's own accounts and interpretations of their daily constraints and experience of climate change, the methodology and analysis follow a hermeneutical approach, i.e. *"the study of interpretation and meaning"* (Barnes, 2009: 328), which recognises interpretation as a means of understanding (Gadamer, 1975). Such an interpretation supposes a dialogue between the researcher and those being researched to enable the former to gain insights into the experience and perspectives of the latter (Akerkar, 2011). Moreover, it is acknowledged that this study results from the subjective interpretation by the researcher of the case study based on her own direct experience and positionality (Blaikie, 1995; Valentine, 2005). Although this raises questions about findings (how do we know that what we observe and interpret is actually the reality, assuming that there is one?), anthropologists Géraud et al. (2007) consider that we should recognise our subjectivity, acknowledge our own cultural background and perspective and accept their constraints on our observations and interpretations. In my situation, I recognise that my positionality as a white, female, formally educated French citizen influences my interpretation of the findings. However, the involvement of other persons in the research process (research assistants, local interpreters, supervisors, interviewees, etc.) has undoubtedly provided an interpretation based on multiple views, an approach supported by Blaikie (1995) (further discussed in section 3.4.2).

Drawing on hermeneutics does not imply, however, that this approach is ontologically individualistic and that it only focuses on human agency without taking into consideration influences from social, political and economic structures shaping societies. Inspired by determinist approaches, this thesis also acknowledges the way societal structures influence the behaviour of individuals (Jones, 1993). Even if people might be free to make choices and act, their thoughts and actions might be determined or limited by power structures in their society. For instance, for feminist scholars, society has been traditionally patriarchal and the historical dominance of men over women influences their thoughts and actions (Graham, 2005). The point here is not to debate what one means by 'free' but to emphasise the influence of wider processes on both people's perceptions and behaviours. This study, grounded in political ecology, thus considers that external structures, whether political,

economic, ecological or social in nature, are fundamental determinants of human-environment interactions and influence the subjective accounts of research participants.

As it also recognises that individuals' actions change these structures, physically or socially (Giddens, 1982), this research relies on the interconnection between both structure and agency even though hermeneutic and determinist approaches could be seen as incompatible. For instance, by giving attention to concepts of vulnerability and capacity in relation to natural hazards and climate change, the analysis aims to examine people's abilities to face a crisis and/or cope with changes through the combination of individuals' own opinions, the researcher's observations and interpretation as well as the acknowledgment of global structures which determine the root causes of people's vulnerabilities and capacities. By relying on data collected through fieldwork, I am aware of the diversity of voices as well as I appreciate the economic and social structures that shape people's behaviours and it is this combination that helps facilitate the understanding of local communities' experience of disasters and climate change.

Finally, adopting a political ecology perspective implies understanding the concept of scale and its role in human-environment interactions (see Neumann, 2009 for a discussion). Blaikie and Brookfield (1987:17) initially underlined the necessity to look at '*the contribution of different geographical scales and hierarchies of socioeconomic organizations (e.g., person, household, village, region, state, world)*'. When taking into consideration the diversity of stakeholders' experiences and interpretations of a particular environment, this involves the combination of multiple discourses at local, regional, national and international levels (Blaikie, 1995). Moreover, the literature review underlined the spatial and temporal dimensions of scale when addressing climate change as its impacts can be viewed equally at a global level or in specific geographical areas as well as in the present or being predicted in the future.

3.1.2 Addressing gender and the environment: feminist political ecology

While numerous disciplines and perspectives have influenced the development of political ecology (Escobar, 1999), the feminist perspective on this approach particularly inspires the gender focus adopted in this research. By giving attention to the contribution of feminists to social research, the epistemological approach of this study draws on the critique of traditional, positivist and masculinist ways of doing research, a rejection of exploitative power hierarchies between researchers and those being researched (Edwards and Mauthner, 2002) and a willingness to make visible oppressed and silenced groups. Feminist research challenges the objectivity of knowledge generated by male-

dominated academics which tend to ignore and marginalise women's perspectives and experiences (Harding, 1991).

In the geography discipline, the Women and Geography Study Group of the IBG (1984: 23) asks: "*Why should geographers be concerned about the gender structure of society?*" There is a diversity of feminist perspectives in geography, but all share a critical approach '[...] *not only of gender oppression and various manifestations of heteronormativity in society, but of the myriad ways that these are reproduced in geographical knowledge*' (Pratt, 2009: 245). They all aim to analyse and understand the reasons why women remain in a subordinate position (Women and Geography Study Group, 1984). Rocheleau (1995: 459) explains that, according to feminist post-structuralists, knowledge can result from the coalition of shared affinities and experiences of women. In other terms, feminism enables researchers to advance generalisations that are closer to the truth about women (Gillies and Alldred, 2002) because it gives consideration to social patterns, structures and gender roles that help to "*analyse the spatial behaviour of women and men [and] of institutions both dependent on and influencing on that behaviour*" (Women and Geography Study Group, 1984: 23). However, feminist studies have also been criticised for the Western-centrism of scholars (e.g. Collins, 1990) who historically treated all women identically and failed to grasp differences of perspectives, structures and contexts between women. The feminist academic and epistemological debate thus progressively included the consideration of notions of 'race', 'gender' and other socially constructed processes that shape people's identity and experiences of their environment and development outcomes.

A feminist political ecology perspective recognises and emphasises the diversity of women's identities which generate multiple views and interpretations. It not only acknowledges gender differences of interpretations between researchers, it also considers women who are being researched as a heterogeneous group. Along with other theoretical positions such as feminist environmentalism (Agarwal, 1998) or gender, environment and development (Rosser, 1991; Braidotti et al., 1994; Leach, 1992), feminist political ecologists bring attention to gender differences which shape human-environment relationships. This draws from the extensive literature on ecofeminism that views both women and the environment as vulnerable to male domination (e.g. Plumwood, 1986; Merchant, 1992; Mies and Shiva, 1993; Warren, 1994). However, the diffusion of images and clichés of women as fixers of environmental degradation and protectors of forests that are still suiting donors' preoccupations and interests have been criticised for providing an essentialist discourse of women's natural link with the environment (Leach, 2003). Arguments against ecofeminism also emphasised that it does not take into consideration other factors of dominance

such as patriarchy as well as social, economic and political structures that shape gender and development processes (Jackson, 1993; Braidotti, et al., 1993; Agarwal, 1992, 1994; Rao, 1991).

Feminist political ecology aims to overcome these limits by providing a theoretical framework that recognises differences of age, class, race and caste as well as differences in labour, property ownership and power as determinant factors shaping gender-environment relationships. More than that, Rocheleau et al. (1996: 287) stress that feminist political ecology builds on the interconnection of different hierarchies and identities and *“the pluralities of meanings in relation to the multiplicity of sites of environmental struggle and change”*. By emphasising linkages between access to and control of resources and pressures on women in terms of time, work, income, health status, support networks and social capital, feminist political ecologists embed human-environment interactions within gender considerations and take into account the influence of dynamic social and political structures at various scales from local to global levels (Leach, 2003). Feminist political ecology thus provides a critical framework *“to highlight the importance of gendered knowledges, rights and politics in the analysis of environmental issues and ecologically based political struggles”* (GESEC, 2011: 43). As such, it appears as a useful angle of approach to combine critical theory, empirical fieldwork and qualitative analysis (Rocheleau, 1995: 459) to research the gender dimension of environmental degradation (e.g. Nightingale, 2003) and gendered-implications of climate change (e.g. Di Chiro, 2009; Seager, 2009; Bee, 2013).

3.2 The methodology: a qualitative and fieldwork-based approach

3.2.1 Why relying on a case study?

In order to address each objective, the research process adopts a qualitative methodology and relies extensively on empirical data from a case study. Whereas hazard-centred studies generally use quantitative methods of data collection which enable researchers to spatially and temporally quantify hazards, and modelling to homogeneously measure the vulnerability of societies, a feminist political ecology perspective combined with the vulnerability approach to disaster and climate change call for a focus on the reasons that render a specific community at risk and that lie within social, economic, historical, cultural and political factors that shape society. A qualitative methodology is considered more suitable to explore such reasons because it provides the scope to acknowledge differences between and among contexts, places and communities. Numerous authors have thus associated qualitative data collection and analysis with disaster and/or feminist research in particular when it is based on fieldwork (e.g. Rocheleau et al., 1996; Stallings, 2002). It is

acknowledged however, that a qualitative approach implies a scope of findings which cannot be generalised. The objective here is not to be representative but to use findings in order to draw up statements and recommendations that emerge from a particular example.

Furthermore, relying on a case study aims at collecting insights from a particular area experiencing the impacts of climate change, and grounds the data within accounts of those who experience various hazards and challenges in their daily life. The literature review stressed the importance of relying on local knowledge and on people's own experiences of hazards and climatic variations to understand the implications of climate change for local communities (Mercer et al., 2007; Kelman et al., 2009). Likewise, the study aims at evaluating policies and projects applied and implemented in the same area of study in order to compare interventions and approaches being used in the climate change sector with opinions and priorities of those benefiting from or affected by such interventions. Ultimately, the purpose of using a case study relates the main goal of this research, i.e. to examine the relevance of climate change related interventions to beneficiaries' gender-disaggregated realities and the integration of DRR and CCA in practice based on findings from a current 'real' context. Yin (2009: 4) explains that "*the case study method allows investigators to retain the holistic and meaningful characteristics of real-life events*". In other words, the empirical evidence from the case study of climate-related and DRR interventions in Ladakh aims to provide a contextual depth of social, cultural and spatial insights to apply the vulnerability paradigm to disasters. This concurs with Yin (2009)'s approach that the case study provides an 'analytical generalisability' whereby findings are generalisable and expanded to theoretical propositions rather than to populations.

3.2.2 Selection and development of the Ladakh case study

The region of Ladakh, located in the West Himalayan range in Northwest India, hosts high altitude and remote rural communities who rely on limited natural resources. Being a cold desert region with high relief that blocks monsoon clouds, the area experiences little rainfall even in winter. The majority of Ladakhis are subsistence farmers relying mainly on glacial melt water for irrigation and domestic consumption. The isolated arid environment, in addition to the reliance on glaciers, makes the area particularly sensitive to environmental and climatic change. Additionally, the region is undergoing a rapid transition from subsistence farming to a market-based economy due to the integration of Ladakh into India and the growing influx of tourism (Crook, 1980; Michaud, 1991, 1996). Such a transition accentuates the pressure on natural resources, particularly water. Given this context, Ladakh attracts numerous development projects but also an increasing number of interventions from local, national and international NGOs to address climate change issues.

An initial visit in Ladakh was undertaken between September and October 2010. At this stage, the main objective of the research was primarily oriented towards studying the gendered adaptation strategies of Ladakhi communities to the impacts of climate change in order to better understand and inform adaptation projects. This was highly influenced by the literature on gender and climate change which points out the necessity to go beyond documenting the impacts of climate change to explore local adaptation strategies developed by men and women in order to anchor the CCA sector on local communities' experiences and accounts (Dankelman, 2010). Informal discussions and meetings took place with a few stakeholders involved in the development and CCA sectors while most of the time was dedicated to familiarising myself with the context and the region. This included visiting villages and some of the communities affected by the floods two months previously, collecting documentation, building up contacts among organisations and local inhabitants, participating in household and agricultural activities with my hosting family and overall talking with people about their daily lives and local news. This first visit confirmed that Ladakh offered a suitable context to explore the impacts of climate change and NGOs' strategies of interventions to tackle them. However, given the societal changes experienced by inhabitants over half a century, it also became apparent that climate change was just an additional driver of change and that Ladakhi people primarily cope with other daily economic, social, political and environmental pressures first. Such social changes, which have been documented in studies on Ladakh since the 1980s, were recurrent in discussions with people. Additionally and when informally talking with inhabitants, many were unaware of climate change as a concept and as a phenomenon. As a consequence, interviews that focussed on people's adaptation to climate change seemed inadequate and involved a risk that respondents felt ashamed of not knowing or having an opinion on the major topic of my research. Nonetheless, there are projects implemented in Ladakh that aim to tackle climate change both through mitigation and adaptation. I developed a strong interest in exploring this apparent disjuncture between projects and people's realities, needs and awareness in the context of climate change.

The research questions were thus reoriented towards this observation. Moreover, instead of considering climate change as the primary focus of questions with interviewees, I decided to let people express what their concerns were in their daily life and how they cope with them in order to better understand how climate change fitted into their context. On the one hand, this aimed to explore people's views on climate change compared with other pressures but, on the other hand, it was also a means to examine people's own strategies to adapt to various changes and not just those resulting from climatic variations. Therefore, Ladakh provided a suitable case study to explore the

perceptions and understanding of local communities of climate change and its importance to their lives when compared to other daily developmental issues such as livelihoods, resource access, education and societal change. It also offered the opportunity to confront people's priorities with the focus of policy and interventions of mitigation and adaptation to climate change undertaken by NGOs and local authorities.

3.3 The research team: a gender-focused strategy

Researchers conducting fieldwork in social research have long been confronted with ethical dilemmas regarding their positionality and their legitimacy to speak for people they interact with. Especially in the context of the global South, both male and female academics have to deal with issues of power, domination or exploitation (England, 1994; Scheyvens and Storey, 2003). As I was designing the methodology for this research, my readings on ethics in doing cross-cultural research with attention to gender raised several questions: Are female researchers more legitimate just because of their gender position? What about conducting fieldwork when a female researcher interacts with male participants? Is it relevant to have western male researchers studying women living in the global South? While I weighed the various pros and cons of my positionality compared with the context of the case study, I particularly kept in mind that a gender analysis, as defined by Vainio-Matilla (2001), is about both women and men and therefore decided to rely on a gender-balanced team for the collection of data. This meant that I would rely on a male counterpart who would conduct interviews with male respondents in each site of study. In doing so I relied on the opportunity I had to be accompanied in the field by my partner, Krishnan. Several studies document the dimension of 'accompanied fieldwork', its drawbacks and its advantages (e.g. Scheyvens and Nowak, 2003). The following section is based on a book chapter (Le Masson, 2013), where I analyse the ethical dilemmas and implications of conducting fieldwork as a couple and as part of a gender balanced team as well as the outcomes of a gender sensitive approach for the interactions between both male and female researchers and participants.

As conducting almost half of the interviews appeared a major responsibility for a research assistant, the choice to rely on Krishnan was motivated by several factors both on professional and personal grounds. Firstly, with the same academic background and qualification in disaster management, we shared knowledge and a similar intellectual approach to sustainable development and the radical approach to DRR which grounds my research. This was paramount when conducting semi-structured interviews separately because this meant Krishnan understood exactly my research questions which

enabled him to ask questions and probe answers with the same approach as my own, but also to bring his own perspective.

Secondly, I realised that his presence during the initial field visit proved extremely valuable to approach people particularly men. As a woman, I was automatically spending more time with the household's and the neighbourhood's female members because, for instance, I had access to the kitchen and I was participating in daily activities where men were seldom present. In contrast, when visiting houses or simply talking with people outside the house, men tended to talk more to Krishnan who is also half-Indian. His physical appearance, his name and his basic knowledge of Hindi was a recurrent means of engaging conversation with people and introducing ourselves as partners both in private life and when doing research. Moreover, being and working as a couple provided me not only with better access to certain categories of respondents, it also proved to be a useful inclusive approach. For instance, when meeting up with a willing participant, we usually asked his female or male counterpart in his/her household whether she/he would like to be also interviewed. In that way, we were sure to respect the position of the family head (usually a man) by requesting his participation but we also wanted to show that we valued everybody's opinion by involving another member (usually a woman). When both interviews were conducted simultaneously, this approach also enabled us to guarantee that both participants' answers would not be greatly influenced or restrained by the presence of their kin. Likewise, working as a team proved useful when conducting interviews within organisations. For instance, on three occasions Krishnan interviewed the director or head managers (usually men) while I interviewed other female members of the staff in order to collect and compare various accounts of people working in the same organisation especially regarding gender themes. However, I did not consider this strategy as a prerequisite and interviews were organised in a flexible way, according to the context of the organisations, the availability of the staff and their willingness to participate.

Thirdly, relying on Krishnan was the only way to conduct separate interviews helped by a research assistant I could trust but also afford. As we were living together with our hosting family, we also had the opportunities to participate in various agricultural activities and share our meals and leisure time with the household members which meant that we both familiarised ourselves with the local context at the same time. We thus had time to reflect on our observations and share our points of view which provided valuable insights for the analysis of data.

The research team was also comprised of two other research assistants in order to overcome the language barrier. Unable to speak either Hindi or Ladakhi beyond a basic conversational level, I had

to rely on translators despite problematic issues associated with using translation. Although translators are supposed to preserve the meaning of participants' answers, they still have to express such meaning and make it understood in a new linguistic world which implies another layer of interpretation (Gadamer, 1975 cited in Akerkar, 2011). Moreover, with relying on translators or 'interpreters', there is a risk of them processing the information first. For instance, they may translate only some elements and ignore others which they judge irrelevant or embarrassing (Devereux and Hoddinott, 1992). Therefore, when I engaged interpreters, we took time to discuss what their role to facilitate the research process was. In order to maintain the gender separation of interviewees, two interpreters, one male, one female, were recruited, both recent graduates from university, both living in Leh, both speaking English fluently and above all, both interested in the topic of the research and understanding my approach. Issues of confidentiality, neutrality, integrity and the risk of harming participants were explained to them. It was not expected that they should translate interviewees' answers literally. Instead, I privileged a more flexible translation process where interpreters could help interviewees to understand the questions better or help Krishnan and me to grasp interviewees' answers better (see Figure 3.1).

Figure 3.1 Interviews conducted by Krishnan (left) and his translator Angchuk (middle) with a local villager (right) (Le Masson, 2011)



For instance, numerous participants used proverbs to illustrate their opinions but it would have been difficult to understand their meaning without the help of our interpreters which required them to bring their own perspective. In doing so, I relied a lot on the understanding of my interpreters of the research topic. Eventually, and helped by the number of interviews we conducted, they were both very familiar with the kind of data I was interested to collect and proved extremely helpful in facilitating discussions. They also usually brought their own perspective in reflecting on an interview we had just conducted which helped the combination of different views and interpretations for the analysis of the data as mentioned previously in section 3.1.1.

3.4 Methods of data collection

Four techniques of data collection were chosen to address the objectives of this research: document analysis, participant observation, semi-structured interviews and focus group discussions. The diversity of these qualitative techniques accentuates the interdisciplinary approach adopted for this study and aims at bringing flexibility and triangulating the data, an approach that has become standard in studies on disaster and climate change (e.g. Mercer et al., 2009; Warrick, 2009). This allows the combination of perspectives of a wide range of stakeholders, including locals, NGO staff, government officials and scientists, who all have a role to play in reducing the risk of disaster (Gaillard and Mercer, 2013). Combining techniques also permits the gathering of the particular viewpoint of each stakeholder (through document analysis, participant observation and semi-structured interviews) and provides room for dialogue between some of these stakeholders (through focus group discussions). Finally, the design of primary data collection, especially for conducting interviews, was led by the research questions (see Table 3.1).

Table 3.1. Research objectives, questions and methods shaping the thesis

OBJECTIVES	METHODS	CHAPTERS	
Objective I. To produce a holistic analysis of the way Ladakhi communities experience climate change and natural hazards in relation to their everyday risks, using DRR frameworks and a gender perspective.			
Research questions	1. What are the structural factors shaping the development of mountainous communities in the South, and specifically Ladakh?	Literature review	Chapter 4
	2. What are the vulnerabilities and capacities of men and women to climate change in Ladakh, in relation to their broader marginalisation and the role of gender in shaping these vulnerabilities?	Document analysis, participant observation, semi-structured interviews, FGD	Chapter 5
	3. How do Ladakhi men and women perceive and explain climate change in relation to their everyday risks and which solutions do they identify to tackle the impacts of climate change and natural hazards?	Participant observation, semi-structured interviews, FGD	Chapter 6
Objective II. To explore current approaches and practices to deal with climate change and natural hazards at the grassroots level.			
Research questions	4. What national policies inform DRR and climate related interventions in Ladakh and how do they conceive gender?	Document analysis, Semi-structured interviews,	Chapter 7
	5. How does the NGO sector in Ladakh address climate change, disaster risk and gender?		
	6. Are the DRR and CCA sectors integrated in practice in the case of Ladakh?		
Objective III. To identify and explain any disjunctures between approaches inscribed in climate-related interventions, DRR strategies and beneficiaries' realities.			
Research questions	7. To what extent do interventions in Ladakh address vulnerability, gender inequality and local communities' opinions and priorities when implementing local projects?	Literature review, Semi-structured interviews, FGD	Chapter 8
	8. What are the limits constraining the effectiveness and relevance of interventions to address environmental shocks and trends and what recommendations can stem from these?		

The collection of data was also influenced by the reality in the field in terms of constraints and opportunities linked, for instance, with my positionality or the timing (see Table 3.2).

Table 3.2 Timeline summarising the distincts periods of fieldwork

Activities	Year 2010						Year 2011								
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Pilot fieldvisit	■														
Fieldwork								■	■	■			■	■	■
Setting up/Report writing				■	■	■	■					■	■		

Before presenting the chosen research methods to collect data in the next sections, I will address the potential criticism of using a traditional qualitative approach instead of alternative participatory methodologies. Such methods recognise the ability of participants to take an active role in controlling and directing the project itself. Ideas of participation also involve a more reciprocal relationship between researchers and participants (Kesby et al., 2005). Numerous studies have demonstrated the relevance of using participatory action research in the field of DRR and CCA in order to identify strategies to enhance people’s capacities especially those of the most marginalised groups (Wisner et al., 1991; Mercer et al., 2008, 2010; Maceda et al., 2009; Cadag and Gaillard, 2012). However, participatory methodologies have also been criticised for maintaining relationships of dominance and exclusion (Cooke and Kothari, 2001) or questioned regarding the competence of popular participation (Krimerman, 2001). Moreover, to what extent can participatory research fully reflect participant views and understanding when it has been initiated by an outsider (Chambers, 2007)?

For this research, I decided to use a classic qualitative methodology but strongly inspired by the philosophical considerations of participatory approaches which value the opinions and experiences of those being researched. The research questions were reformulated based on observations and discussions with people and local organisations in Ladakh after the initial field visit which suggests that the design of the study has been closely linked with the involvement of participants throughout the research process. Moreover, by partially adopting participative techniques in the collection but also in the analysis of data, the objective was to produce knowledge that relies on local people’s voices and that links the researcher’s own interpretation with the points of view of participants (Kesby et al., 2005). The following section explains in more details methods of data collection and how they enabled to help answer the research questions.

3.4.1 Document analysis

Document analysis was used because it provides secondary data that helps a geographical understanding of the processes of change in the case study by encompassing geographical, historical and socioeconomic contexts (Clark, 2005). Firstly, it helped with analysing the way Ladakhi communities experience climate change and natural hazards in relation to their everyday risks as part of research objective I. For instance, I used secondary data available on the website of the Census of India from the India Ministry of Home Affairs to obtain information and statistics regarding demographic trends and livelihoods at the district, state and country levels. Surveys conducted by the TATA Institute of Social Sciences in partnership with the Ladakh Autonomous Hill Development Council in Leh (LAHDC) also provided the main secondary data used to draw up the portrait of the various sites of study and to triangulate the primary data. Thanks to those documents it was sometimes possible to use quantitative data and build comparative diagrams to support qualitative information. Additionally, editions of one of the local newspapers published between 1996 and 2006 were scanned to find information on possible previous natural hazards and on the socioeconomic and political characteristics of the Ladakhi society during this 10 year period. Climate data in the form of maps and scientific databases is scarce for Ladakh and difficult to access as most remain the property of the Indian Army. However, one survey conducted by the French NGO, GERES (Groupe Energies Renouvelables, Environnement et Solidarités), on the impacts of climate change in Ladakh includes scientific data provided by the Air Force. Their report serves as a basis when exploring the impacts of climate change specifically in Ladakh and is sometimes supported by evidence from peer-reviewed scientific articles. Overall, document analysis helped assessing structural factors shaping the development of mountainous communities in the South (research question 1) and Ladakhi communities' vulnerabilities and capacities to natural hazards and climate change (research question 2).

Secondly, document analysis involved the analysis of institutions' and organisations' websites, printed brochures and reports gathered during the fieldwork to examine policies and projects being applied and implemented in Ladakh in the sectors of development, DRR and CCA (research questions 4 and 5). Moreover, articles in peer-reviewed and non-peer-reviewed journals available on the internet in addition to web pages of Indian ministries and institutions were also scanned to examine current climate change related policies and interventions.

3.4.2 Participant observation

Inspired by ethnographic research initially theorised by Malinowski (Géraud et al., 2007), participant observation was used on a daily basis to collect data. By providing information on people's behaviours, activities and power relations without resorting to explicit questions (and because some behaviours or relationships cannot be told or explained to researchers for various reasons), participant observation constituted a useful and necessary tool to conduct research without interfering too much in people's lives. Non-verbal behaviour (e.g. body movements or facial expressions), linguistic or extralinguistic behaviour (e.g. loudness, tendency to interrupt), all constitute potential data that can help to comprehend people's behaviours and relationships in a community (Fordham, 2009). According to Burgess (1995), being a participant observer enables one to visualise people's daily lives but also to interpret the meanings and experiences of social actors. Watching, recording impressions in field notes, taking photographs, filming or drawings are all form of material evidence that result from participant observation (Cook, 2005) and that were collected during the fieldwork.

Participant observation was combined with immersion within the local communities during various periods in order to better comprehend the local context and understand social processes (Géraud et al. 2007). Hammersley and Atkinson (1983) argue that in order to study social processes one needs to be part of them. Following the initial field visit between September and October 2010, I stayed at the same family's home between April and June 2011 and returned again between September and November 2011. The time spent with this family enabled me to integrate myself in the daily routine of the household and to participate in all kind of activities. I was regularly helping with cooking, washing the dishes, harvesting crops, sifting and washing grains (see Figure 3.2) and carrying manure with donkeys. Such activities mostly involved women. I also frequently took part in the family's leisure activities, watching TV, knitting, visiting monasteries or relatives and talking. I also had the privilege to be invited to social events, a wedding party and a family gathering to celebrate the birth of a child. My participation in daily activities and such occasions gave me insight into people's ways of living and thinking despite the relative short period of time that I spent in Ladakh. It helped me to visualise their daily issues, important events, attitudes that they value and relationships within the household. At the same time, this was an opportunity to generate knowledge and data without necessarily disturbing people and also enabling them to know me better. As a consequence, participant observation helped to address most of my research questions by providing information on activities and relationships that shape people's vulnerabilities and capacities, gender roles and

other parameters that cannot be addressed through pre-designed questionnaires or that go beyond people's opinions and perceptions. This is consistent with the vulnerability paradigm whereby the diversity of people's contexts and views has to be addressed through flexible and context sensitive methods of data collection (Wisner et al., 2012). The capacities that people develop to deal with hazards, and factors that marginalise certain groups, are sometimes difficult to point out only through people's accounts which make participant observation particularly relevant, helpful and less intrusive.

Figure 3.2 Conducting research by getting involved in daily activities (Nair, 2011)



Participant observation was also used to gain insights into organisations and their functioning. For instance, when visiting the organisations and requesting interviews I observed whether the staff were easily approachable and who I could talk to. I also accompanied field workers of both local and foreign organisations on two different occasions when they visited areas where they had implemented projects. I observed the way they approached villagers; how they monitored the impacts of their projects; whether they took people's opinions into consideration and I looked at any signs of visible power relations between NGO practitioners and beneficiaries. I also observed the presence and role of female members of staff; whether they occupied important positions or not and

their key areas of activities. The objective was to visualise any potential disjuncture between what people say and what people actually do in terms of gender equality and in the way they design and implement their projects.

However, the reliance on participant observation as a more ethnographic form of data collection also entails challenges around the researcher's positionality and legitimacy of her interpretation of others' lives, an ethical dilemma summarised by Brockington and Sullivan (2003). The process of translating observation into written text, in particular, raises questions regarding the socially produced description of a phenomenon as empirical facts (Ibid). In this thesis, I acknowledge the influence of my positionality and relationship with those I researched when 'rewording' my observations, firstly in my diary and subsequently when using information from my diary in the writing of the thesis. However, the recognition of potential bias does not prevent me from relying on my own observation to interpret data as a way of creating alternative perspectives on real life events. As emphasised by Brockington and Sullivan (2003: 67), to remain quiet because our legitimacy to speak for others is questioned may mean leaving "*other groups and individuals who can somehow claim more powerful or legitimate mandates [to] take over the task*".

3.4.3 Semi-structured interviews

Inspired by humanistic and interpretative approaches, semi-structured interviews were a major method of collecting data to address the research objectives and constituted, along with participant observation, the focus of the fieldwork between April and June 2011. In addition to the fact that qualitative data collection appears appropriate and flexible in line with the approach of this study, semi-structured interviews enable closer and more sustained relationships with participants than structured questionnaires through more in-depth discussions and show a greater valuing of people's opinions (Sarantakos, 2005). This proves particularly important when it involves an interaction with people who have been affected by a disaster, because direct questions often mobilise harmful memories. A qualitative approach simply allows more time to be spent with participants and to build reciprocal relationships between researcher and participants (Kesby et al., 2005).

3.4.3.1 Interviews with villagers and households

Semi-structured interviewing conducted with villagers constituted the primary method to examine local communities' experiences of climate change in relation to their everyday risks (research

questions 2 and 3) and their views of development, DRR and climate-related projects conducted in Ladakh (research questions 4, 5, 7). This method of research is common in studies focussing on people's vulnerabilities and capacities, as it enables researchers to take into consideration traditional and local knowledge as well as people's experiences and contexts in facing hazards (Stallings, 2006). Being semi-structured, interviews allow room for questions that could not be anticipated before and for spontaneous discussion with respondents (Silverman, 1997).

The interviews were framed by structured open-ended questions organised in several sections (see Appendix A) and inspired by the CVCA framework developed by CARE (2009), as mentioned previously in section 2.2.3.1. The initial field visit revealed that climate change did not seem to rank high amongst locals' priorities and concerns. Moreover, many people appeared relatively unaware of the concept of climate change. Therefore questions could not be directly and explicitly linked with climatic events and processes, to avoid putting participants off and making them feel ignorant. A pilot test of five interviews validated the choice not to make climate change the primary focus of the interview as two out of five respondents did not know what we meant by this term, even when explained with examples or using different terminologies. It also confirmed the relevance of conducting separate interviews in order to include various members of the household and give credit to various points of view. As part of a gender sensitive methodology, interviews were designed to address differences between men and women and give them equal opportunities to express their voices and reflect on their experiences.

The first section included questions on interviewees' daily activities and roles within their households and communities compared with those of other members. This aimed at capturing people's livelihoods in the broad sense of the term (their economic, social, natural, physical and political resources) in order to help address research question 2. While this provided participants with simple questions that showed participants our interest in their activities and status, the format of questions was aimed at making people feel comfortable and enjoy the interview process. For instance, inspired by the Daily Activity Clock (Pincha, 2008) participants were asked to explain how their day is generally organised and the activities that they or the other household members do at particular moments of the day. This ultimately helped to provide a comparative profile of men's and women's daily activities and differences in their workloads. Another set of questions focussed on resources which participants had control over in order to determine physical and natural resources owned by the household but also to understand differences of decision-making power between men and women. This involved a visual diagramming technique (see Figure 3.3) inspired by engendering

participatory methodologies of data collection that do not require participants to be literate (the Resource Use and Control tool, from Pincha, 2008). Although, such tools are used in group activities, I found them relevant when used at the beginning of a face-to-face interview as they enabled less eloquent participants to express themselves, they often mobilised participants' interest and enthusiasm and they transferred attention to diagrams and activities rather than the researcher (Kesby et al., 2005). Above all, this provided the opportunity to generate awareness of gender differences as illustrated by the interview conducted with Thupstan who looking at the resulting picture (below) exclaimed: "She [his mother] does a lot of work, I never realized!"

Figure 3.3. Participative activity during the interview inspired by the Use and Control tool. (Nair, 2010)



The second section of the interview focussed on determining people's main sources of worry in their daily lives. We asked them which problems and challenges they currently face and which potential risks they could be confronted with. When interviewing the elderly we tried to compare their current challenges with the ones they used to face. We would ask them the factors that make hazards potentially damaging for themselves, for their household or for their community and the factors that make them able or less able to cope. If participants raised problems linked with the climatic

variations we would then ask further questions regarding their observations, potential impacts on their environment and activities, which strategies were adopted and what solutions should be implemented.

Such data are crucial to understanding the vulnerability of local communities and strategies that they adopt as a consequence. Researchers may have an idea of the most dangerous hazards that are likely to strike and affect the community but local inhabitants' points of view may be completely different. Such findings help prioritise challenges that local people have identified themselves and serve as a basis for assessing interventions from local authorities and NGOs. This approach aims at addressing criticisms in the literature of DRR whereby intrinsic capabilities of local communities to face natural hazards are often underestimated and local knowledge overlooked or ignored (Le Masson et al., 2009; Wisner et al., 2012). This study, inspired by participatory alternative research techniques, integrates indigenous and traditional knowledge, needs and challenges along with scientific perspectives on climate change vulnerability and adaptation.

The third section of the interview explored people's knowledge and opinions about NGOs working in Ladakh as well as projects and initiatives conducted by the local authorities or the central government. Although the interview followed the structure of these three sections, it usually evolved toward a more open unstructured conversation, varying according to participants' interests and experiences. The objective was to begin with concrete, easy-to answer questions (e.g. regarding the characteristics of their household or their daily activities) to make interviewees feel comfortable before asking more opinion-based questions which require enough trust between the researcher and respondents. Overall, interviews aimed to allow participants to describe and explain their lives in their own words (Valentine, 2005) and focus the discussion on their own particular context.

The selection of participants among villagers

Three sites of study were selected: one peri-urban area in Leh, the capital of Ladakh; one village, Saboo, located 15 km from Leh and another, Phuktse, situated about 100 kilometres from the capital at an altitude of 4,000 metres where a few households do not have road access. The objective was to bring a geographical dimension and consider the geographical location as a potential factor influencing inhabitants' vulnerabilities as well as their views on the daily pressures they face including climate change. Saboo and Phuktse were also chosen because of the artificial glaciers that have been constructed in each village. It therefore provided the opportunity to explore inhabitants'

perspectives regarding such strategies of water conservation and overall their views on climate change-related or unrelated problems. In each site, and following a gender sensitive approach, the objective was to select an equal number of participants from both sexes. Traditional configurations of roles at home, at the workplace and within the community leave some people, especially women, with multiple responsibilities and less time for active participation in a research study. In identifying participants, extra care was taken to select the widest range of people possible in terms of gender, age, and occupation.

In the peri-urban context of upper Leh, 30 interviews were conducted (15 with men and 15 with women). Most respondents were selected from among our contacts and new acquaintances in the neighbourhood or through our interpreters' relatives. By using such non-probability sampling, usually associated with a qualitative methodology (Sarantakos, 2005), we were interviewing people who either knew us a little, or could ask our hosting family or our interpreters more information before accepting to participate in the research. Respondents were also recommended by those already interviewed and we were often invited by people who had heard about the research and who wanted to be interviewed as their neighbours had been. Although data collected through non-probable convenience or snowball sampling limits the generalisability of findings (Sarantakos, 2005), it still enabled me to obtain inhabitants' perspectives on various topics in order to formulate hypotheses and respond to the research questions. Above all, the use of non-probability sampling was a consequence of the methodology which emphasises inclusiveness, participation, flexibility and awareness of the local context (for instance, relatives of those who were interviewed who showed a willingness to participate would have been put off if I had adopted a probability sampling).

In Saboo, 16 men and 15 women were interviewed. The selection of participants was also facilitated by local contacts, particularly by the mother of my hosting family who comes from this village. As I was still based in Leh, I often accompanied her during her leisure time to visit her relatives or for social gatherings and was thus progressively introduced to the neighbourhood. Many times, she explained herself the purpose of my research and the process involved, based on her own experience of the interview, in order to encourage her acquaintances to participate. This approach was also used by Hay (1997) when conducting interviews in Ladakh. Although I was not living among the community and neither were my interpreters, it was easy to find numerous willing participants, either thanks to our contacts' recommendations or even simply when wandering around the village and spontaneously engaging conversation with inhabitants. A few participants were selected for the

reason that they had benefitted from NGOs' projects and because, in order to address the research questions, interviews needed to highlight accounts from both beneficiaries and non-beneficiaries.

In Phuktse, the fieldwork took a different approach because of the village's geographical location, the timing and necessary logistics. Staying consistent with the methodology involved remaining a research team comprised of four persons who would have to stay in the village in order to save time and reduce the cost of transportation. However, our interpreters could not be away from their families in Leh for extended periods of time for various familial and professional reasons. Moreover, we could not impose four additional persons to the family who accepted to accommodate us in Phuktse for too long either. Although, we brought with us the necessary amount of food to feed the team and the whole household for a couple of weeks, women still had to walk down the river to fetch more water than usual, they had to consume more fuel for the cooking and use more milk and butter for sweet and butter tea. Therefore, it had to be a balance between the collection of a sufficient amount of data, the timing constraints of our interpreters and the number of days acceptable for our hosts to accommodate us. We thus stayed one week and conducted 14 interviews with men and 14 with women. Not having strong contacts in the village did not prevent us from easily finding willing participants. The approach was simply much more spontaneous. We began to reach households located upstream at the highest and furthest point of the village which involved several hours' walk. We would simply meet with people on the way or outside their houses and our interpreters would engage them in conversation. They would introduce us, explain the purpose of our visit and request people's participation, which was always spontaneously granted.

The interview process with villagers

In total, 89 interviews were conducted with villagers in the three sites of study (45 men and 44 women) between April and June 2011. Participants were usually interviewed in their homes, garden or field while a few interviews in Leh took place at the shops of male respondents. When a man and a woman from the same household were willing to participate, my interpreter and I would usually sit in the kitchen with the woman while Krishnan and his interpreter would interview the man outside or in the guest room. Before beginning each interview, our interpreters explained again the purpose of the research, the reason for choosing them as participants and what was expected from them; they would stress that information collected about them will be kept confidential and clarify their right to withdraw from the research process at any time. Above all, they would make sure that people understood that we were not affiliated to any organisations and therefore that their

participation in the interview would not provide them with any benefits. This was particularly important in Phuktse where most foreigners visiting the village seemed to belong to associations implementing development projects. All this information was provided orally in Ladakhi by our interpreters or in English by us where participants spoke and understood English well. They gave their consent orally as the provision of a written information sheet or consent form at the beginning of an interview seemed disconnected from the local context. This could make people feel uncomfortable, ashamed or stigmatized if they were illiterate, which is the case for 28% of men and 50% of women in Ladakh (Census of India, 2001). Participants were also encouraged to ask questions before, during and after the interviews. A few did so after we had finished our questions and often they would ask about our lives back in Europe. The interviews' duration varied between thirty minutes and two hours according to respondents' activities and interests and the time of day. Most interviews involved the researcher, the interpreter and the respondent. The relevance of conducting women-only interviews was stressed when, on some occasions, the respondent would ask my interpreter to look after her baby while she would prepare tea and replying to my questions all at the same time. It also happened that neighbours or other members of the household sat, listened to and sometimes joined in the discussion. This means that privacy could not always be guaranteed with interviewees and this may have influenced some answers. However, the research process was supposed to be flexible and take into consideration local realities (requesting for instance that visitors leave the room would have been simply impolite and culturally shocking). Moreover, I did not consider this a problem because the gender balance was respected most of the time (for instance, only women would attend the female interview and only men the male one) which still provided respondents with an audience that encouraged them to freely and frankly express their views on gender issues. Having extra people listening to the interview can also be a means to triangulate the information provided by respondents and enhance accounts' authenticity. However, I acknowledge the fact that it might have equally made them reluctant to reveal particular opinions or memories in front of their neighbours and relatives which may have biased some of the answers.

Finally, interviews conducted with people who were affected by the 2010 floods or with families who had experienced a personal trauma raised ethical issues. In accordance with Brunel University ethical standards, extra care was taken to ask questions in an appropriate way and stop the interview process when it caused distress to participants. Although some questions were carefully formulated or even removed if the context was inappropriate, a few interviewees showed unexpected but visible emotion when answering a particular question. When this happened, although I offered to stop the interview while my interpreter helped providing comforting words and gestures, the participants

themselves requested that the interview continued. In those circumstances, I would modify the interview structure and carry on with questions that were not linked with the cause of their distress.

3.4.3.2 Interviews with organisations and key informants

Semi-structured interviews were also conducted with key informants and representatives of organisations involved in the development, DRR and CC sectors to address research questions 5, 6, 7 and 8. This seemed to be the most appropriate technique to explore further what emerged from the document analysis or from participant observation and to develop key points specifically related to my research questions. Table 3.3 summarises key informants who were interviewed.

Table 3.1. Summary of interviews conducted with organisations and key informants

Organisation	Number of interviewees
Formal interviews with Non Governmental Organisations working in Ladakh	23
Formal interviews with local political leaders and key villagers	4
Informal interviews with local organisations	2
Informal interviews with hosting families, their relatives and neighbours in Leh, Saboo and Phuktse	>5
Total	>34

Interviews with organisations, mainly NGOs, aimed at further examining how projects in Ladakh are designed (see Appendix B). Ultimately, the objective was to highlight any gaps between the documentation, organisation’s discourse compared to their practices in the field and triangulate the data with accounts of households and various key informants. Interviews with the representatives of organisations usually took place at their office but a few participants and key informants were also interviewed at their home or on the site of projects (for instance in a relocation area or near an artificial glacier).

3.4.4 *Focus group discussions*

Focus group discussions (FGD) were used to complete the collection of primary data to address Objective I, but also as a way to involve participants in the analysis of the results. Two forms of FGDs were conducted (see Table 3.4).

Table 3.2 Summary of focus group discussions being conducted

FGD	Village	Number of participants			Context
		Men	Women	Total	
Informal	Saboo	-	5	5	Neighbours gathered in a garden
Informal	Igoo ¹	10	-	10	A group of men sitting by the side of the road
Informal	Phuktse	-	4	4	Neighbours watering the field
Formal	Leh	6	6	12	Neighbours gathered at the host family
Formal	Leh	-	4	4	A group of friends invited to the host family
Formal	Saboo	5	5	10	Neighbours gathered at one acquaintance's house
Informal	Phuktse	2	3	5	A group of labourers repairing a canal

The first form, namely informal discussions, was spontaneously organised with inhabitants during the first phase of the fieldwork. Usually, this would happen when walking around a village and meeting with a group of people sitting outside or working in the fields and wondering who we were and what we were doing. We would engage in a conversation, explaining the research and this would spontaneously lead people to express their opinions about the topic and answer our questions. In one instance, such a discussion was conducted in Saboo with a group of five women and eventually led to a semi-structured interview in which they all participated together. At that time, I found this flexibility useful, even necessary because this seemed a more inclusive way of conducting research by adjusting my organisation and methodology around inhabitants' activities and timing instead of the reverse. We also initiated such informal group or individual discussions when visiting villages affected by the floods to capture people's opinions about relief and NGO projects from various places rather than just the three sites of study.

The second type of FGD was formally organised during the second phase of the fieldwork from September to November 2011 and involved people who had been interviewed along with people who had not. Firstly, this was a means to 'go back' to the sites of study. By bringing together some of the previous participants, giving them updates of the progress of the study and providing them with a new opportunity to ask any questions about the research, the FGD aimed at building a continuity between the fieldwork and the outcomes of the research. It was also an opportunity to express my gratitude to people who had given their time and provided their accounts. In Leh and Saboo, FDGs were organised with my host family in the form of a friendly social gathering with the provision of food and beverages. In Phuktse, a formal FGD could not be organised for logistical reasons and time constraints of interpreters. However, I returned to most households that participated in the

¹ Village located approximately 80 kms from Leh on the same road leading to Phuktse

interviews to ask for their news, gave them updates about the research and offered pictures taken during the previous fieldwork as a modest sign of my gratitude for their participation.

Secondly, the objective was to provide people with the opportunity to reflect on their participation in the research, be actively involved in the discussion of the findings and express their opinions regarding both the methodology and the topic. FGDs were thus used to triangulate data collected through participant observation and interviews. For instance, I extrapolated a list of 25 of the main challenges or hazards identified by interviewees which I presented to groups of participants in the form of drawings (see Figure 3.4).

Figure 3.4. Activity with a group of women participants who were asked to discuss and rank pictures representing their main challenges (Le Masson, 2011)



Participants were then asked to rank those challenges from the most serious ones to the least important. This aimed to provide people with a space to agree or disagree with my initial interpretation of what constitute their main challenges. Although they were all gathered in the same room, men and women were asked to look at themes that emerged from the interviews separately

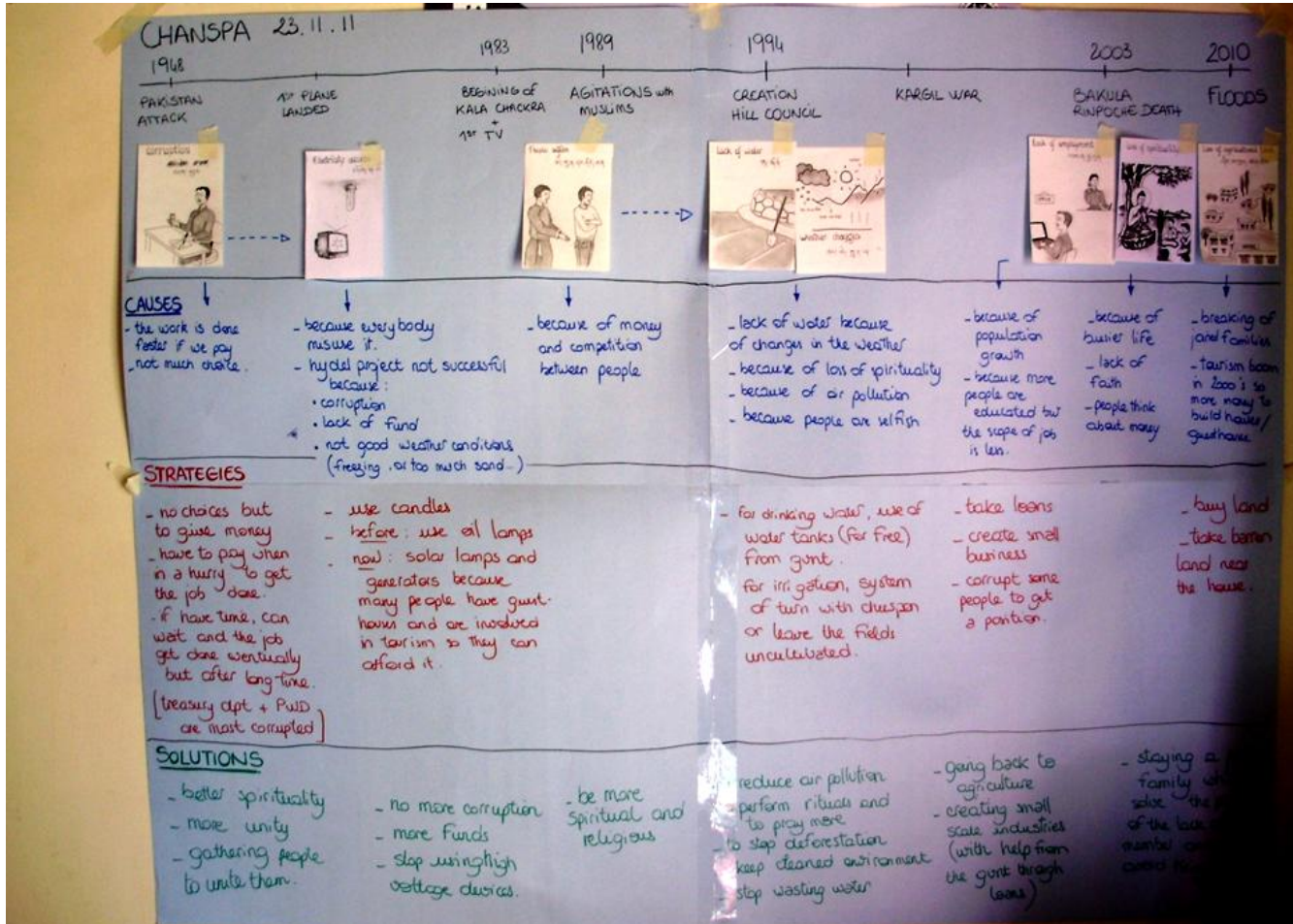
before comparing their opinions together (see details in Chapter 7). The objective was for participants to discuss the findings, debate differences between men's and women's opinions and therefore be actively involved in the early stage of data analysis and the formulation of potential recommendations for the research itself but also to be forwarded to policy makers and practitioners. Thereby, this qualitative tool became quite participative. Group discussions and interactions allow participants to produce knowledge through sharing and building up of experiences which value people's particular contexts (Chambers, 1995, 2007). Moreover, they allow the researcher to collect data which is more than 'innate' knowledge usually provided by interviews. This contributes to creating a more critical and action-oriented study as used by many advocates of the radical approach to disasters (e.g. Wisner, 2006, Mercer et al., 2008, 2010; Delica-Willison and Gaillard, 2012) and humanitarian practitioners such as the IFRC (2007).

Thirdly, formal FGDs were aimed at completing the collection of primary data to address Objective II. Participants were asked to discuss major events that occurred in their region and in their lives to draw a timeline (see Figure 3.5). They were then asked to locate on this timeline the main challenges that they had previously ranked in order to re-contextualise these constraints and try to identify when climate change became problematic compared to their other daily issues. They were also asked to discuss the causes of challenges they identified, their own strategies to cope with them and what should be done by their government and by NGOs to solve the problem. The resulting discussion enabled me to gather together their views on development, DRR and CCA-related projects in their community compared with their priorities, and visualise how opinions differed by social grouping (between men and women and between those who had benefitted from a formal education and those who had not). This was crucial as many interviewees seemed unaware of any projects and therefore did not express any opinions on interventions implemented in Ladakh. The FGDs were aimed at verifying this observation by exploring in more depth the extent to which people knew about development and climate change efforts when talking with their relatives, neighbours and friends. Ultimately, these accounts can be put into perspective with data gathered through interviews with organisations and key informants in order to compare interventions and relate them to people's realities.

Throughout the debate, I was writing on the visual support instead of offering participants to take over this task, as expected when conducting participative activities. Although I acknowledge that this implies an issue of power of the researcher over respondents, I voluntarily did the writing because I could better frame and engage discussions with participants and because this was my only means to

catch up with and clarify what people were saying as discussions were being held in Ladakhi before being translated by my interpreter.

Figure 3.5. Visual support during one of the focus group discussions (Le Masson, 2011)



Overall, I relied a lot on the help of my host family to organise the formal FGD. Although I was facilitating the discussion assisted by one translator, the process of gathering participants at a convenient time and place to ensure the FGD happened in the first place was almost entirely undertaken by my landlady. People in both communities in upper Leh or Saboo could easily associate me with her because I was living at her home for several months and they usually saw us walking, working or visiting relatives together. It means they could ask her (or my translator) about the topic of the discussion, whether they should agree to participate or not and enabled them to refuse to participate without feeling embarrassed. The two discussions in Leh took place at the house I was living in whereas the one in Saboo was hosted by my hosting family's relatives whom I was acquainted with. In both cases, my landlady played a crucial role to welcome participants in a culturally appropriate manner (e.g. serving them butter tea and making sure they always had

something to eat or to drink during the discussion) and therefore to create a friendly and familiar atmosphere where the discussion could take place. One point of feedback that participants gave was that the discussion had provided them with an opportunity to talk about unusual topics such as climate change with people they may not normally discuss with. The fact that they seemed comfortable, willing to express their opinion and enthusiastic to participate in the discussions and activities also suggests to me that the experience was as positive for the majority of participants as it was for me. However, drawing from this experience, I critically reflect on the organisation of formal FGD as a method that can be universally applied in social research especially in the global South. In my case, I do not think it is a research technique that I could have easily and successfully used had I not benefitted from the help of my host family. It requires a key intermediary whom participants know and trust in order to simply deal with the logistics and prevent the discussion from being too much of an imposition on people. However, using this technique in a more informal way (e.g. when meeting people already gathered in a group during their work or leisure time) proved a useful approach to gather relevant data and adapt to people’s routines.

3.5 Data analysis

The analysis is organised in three parts. The first part addresses the first research objective (Table 3.5) and is presented in chapters 4, 5 and 6.

Table 3.3. Objective I and related research questions

Objective I. To produce a holistic analysis of the way ladakhi communities experience climate change and natural hazards in relation to their everyday risks using DRR frameworks and a gender perspective.			
Research questions	1.	What are the structural factors shaping the development of mountainous communities in the South specifically Ladakh?	Literature review Chapter 4
	2.	What are the vulnerabilities and capacities of men and women to climate change in Ladakh, in relation to their broader marginalisation and the role of gender in shaping these vulnerabilities?	Document analysis PO Interviews FGD Chapter 5
	3.	How do Ladakhi men and women perceive and explain climate change compared to their everyday risks and which solutions do they identify to tackle the impacts of climate change and natural hazards?	PO Interviews FGD Chapter 6

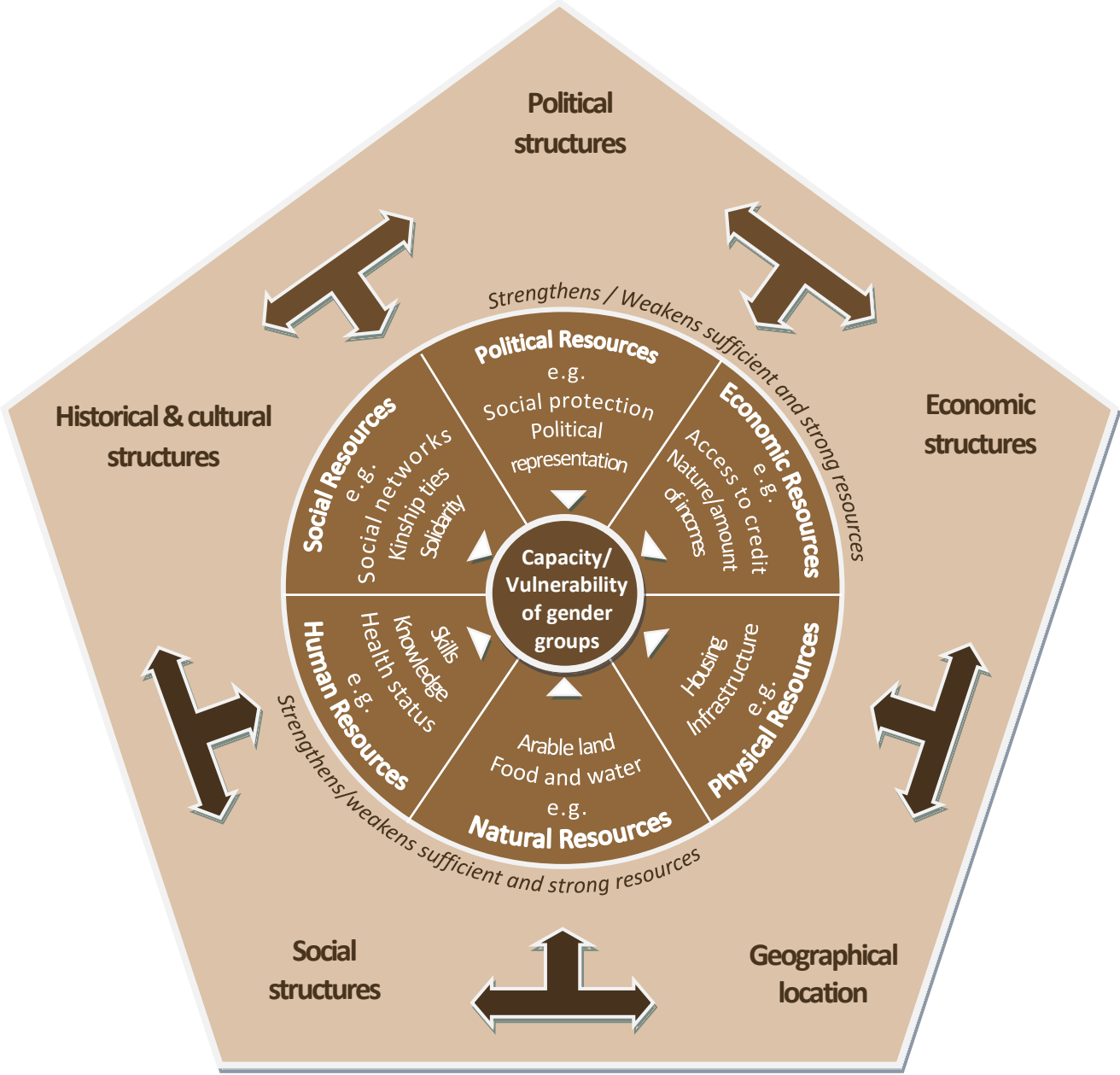
As suggested by the literature review, a vulnerability approach to disasters implies acknowledging hazards that threaten the functioning and well-being of societies, but more especially studying social

processes leading to people's vulnerabilities and the reasons why these transform hazards and climate-related environmental changes into disasters. Therefore, the analysis begins in Chapter 4 with the presentation of the case study through a critical review of social processes shaping the development of mountain regions, including hazards related but not limited to climate change occurring in Ladakh. The objective is to re-contextualise climate change as one driver of hazards and change among others but above all to review the environmental, social-economic, cultural and political structures which create challenges for local mountain communities. In light of theories of political ecology, this will help understand how structural factors, often external to the local level, determine the abilities or inabilities of communities and individuals to face, cope with, recover from and adapt to shocks and changes.

By examining how climate change relates to other structures, Chapter 4 supports the analysis and the understanding of the vulnerability and capacity assessment in the face of environmental shocks and trends. Such an assessment, presented in Chapter 5, forms the second part of the answer to Objective I and relies on data gathered through document analysis, participant observation, interviews and FGD. In light of the theoretical framework, the assessment supposes that vulnerability and capacity are reflected in people's access to resources or in other words people's livelihoods determine their vulnerabilities and capacities (Gaillard, 2010; Wisner et al., 2012). Information that described respondents' resources was thus extracted from interviews and FGD transcripts and grouped into different themes. These included 'gender differences', 'livelihoods', 'main concerns', 'positive changes', 'strategies' or 'marginalisation' and sub-themes such as 'differences in men and women's workload' or 'concerns related to water'. Some of these themes were discussed with participants of FGD and correlated with observations. Others were created as I read through the transcripts. The Sustainable Livelihoods Framework (see Figure 2.3 in Chapter 2) provided a model to categorise these themes into different resources and build a profile of communities' and households' livelihoods. Categories include natural, physical, economic, human, social and political resources. I added the last category 'political resources' because the literature emphasised the importance of looking at people's access to decision-making and political representation that shape their vulnerability or capacity. The assessment then relies on DRR frameworks, namely the revised versions of the Pressure and Release model (PAR), the triangle of vulnerability and the circle of capacities (Wisner et al., 2012, see Figures 2.1, 2.2 and 2.4 in Chapter 2) in order to analyse how people's resources determine their vulnerabilities and capacities to hazards and climate change. As Twigg (2001: 6) underlines, the holistic approach of the PAR model is valuable to assess vulnerability to disaster and because it "*places livelihoods strategies at the centre of coping strategies for all kinds*

of disaster". The assessment follows this holistic perspective and uses gender as an angle of approach. I thus offer a new framework that combines the three DRR conceptual frameworks and the categories of resources identified earlier to help interpret the vulnerability and capacities of Ladakhi communities through gender lenses (Figure 3.6).

Figure 3.6. The influence of structures on resource access to analyse vulnerability and capacity of gender groups



The five tips of the hexagon represent the drivers of change and wider structures shaping the development of mountain communities described in Chapter 4. I interpret these as the ‘root causes’

of vulnerability labelled in the PAR model. Such structures determine people's marginalisation and therefore the un/availability of and (lack of) access to resources represented in the bigger circle. The literature review also highlighted that in the face of natural hazards and other climate-related environmental changes, communities' and individuals' resources define people's hindrances or abilities to protect themselves, cope and recover from external shocks as well as daily pressures. The nature, strength and diversity of resources are thus fundamental factors that help us understand their vulnerabilities and capacities (Gaillard et al., 2009). While Chapter 4 reviews the structures, Chapter 5 narrows down to identify and analyse different resources owned by Ladakhi communities in order to interpret and explain their vulnerability and capacities. This holistic approach considers that factors of marginalisation and resources are all interconnected.

Chapter 6 draws from this assessment to analyse the way climate change relates as an issue for communities in Ladakh compared to other everyday risks. It focuses on gender disaggregated opinions and on people's interpretation of climate change, hazards and/or environmental changes that interviewees might or might not have observed. As for chapter 5, pseudonyms are used to distinguish people's answers and preserve their anonymity while using quotations. This chapter completes the analysis of local communities' experiences of climate change that serves as a basis to examine whether climate-related interventions, development projects and DRR strategies appear in harmony with communities' realities, opinions and priorities.

Following from this, the second part of the analysis explores current approaches and practices to deal with climate change and natural hazards at the grassroots level, which is the second research objective (see Table 3.6). Chapter 7 aims at (i) critically reviewing policies that inform DRR and climate related interventions in Ladakh and how they conceive gender, (ii) analysing how the NGO sector in Ladakh addresses climate change, DRR and gender and (iii) examining whether the DRR and CCA sectors are integrated in practice in the case of Ladakh. The analysis particularly seeks to explore whether climate change interventions in Ladakh replicate an approach that is hazard-oriented or whether they take into consideration communities' vulnerabilities and whether policy makers and practitioners in Ladakh acknowledge gender and implement gender-sensitive development projects to tackle climate change or disaster risk.

Table 3.4. Objective II and related research questions

Objective II. To explore current approaches and practices to deal with climate change and natural hazards at the grassroots level.			
Research questions	4.	What national policies inform DRR and climate related interventions in Ladakh and how do they conceive gender?	
	5.	How does the NGO sector in Ladakh address climate change, disaster risk and gender?	Document analysis, Interviews
	6.	Are the DRR and CCA sectors integrated in practice in the case of Ladakh?	

This chapter is based on data gathered through document analysis, semi-structured interviews conducted with organisations’ representatives and participant observation. It also uses accounts from villagers to explore how communities evaluate climate change-based interventions or other development initiatives being implemented in their area. The analysis is more straightforward as I extract quotes from documents, interviews and field notes and interpret them according to the focus of the research questions.

The third and final objective of this thesis is addressed through a discussion between the first and second parts of the analysis in order to point out and explain potential disjunctures between experiences of local communities and interventions supposed to help them in achieving and maintaining their well-being (see Table 3.7).

Table 3.5. Objective III and related research questions

Objective III. To identify and explain any disjunctures between approaches inscribed in climate-related interventions, DRR strategies and beneficiaries’ realities.			
Research questions	7.	To what extent interventions in Ladakh address vulnerability, gender inequality and local communities’ opinions and priorities when implementing local projects?	
	8.	What are the limits constraining the effectiveness and relevance of interventions to address environmental shocks and trends and what recommendations can stem from these?	Literature review, Interviews, FGD

Chapter 8 thus discusses the analysis of the case study *vis à vis* the main points advanced by the literature review i.e. (i) whether factors of vulnerabilities and capacities characterising men and

women, identified by both respondents and researcher's interpretations, constitute the focus of policies and projects to tackle risks, (ii) to what extent current DRR and CCA strategies may or may not be part of a successful integrated approach to tackle natural hazards and longer-term environmental changes and (iii) what recommendations can be drawn to ensure the effectiveness and relevance of DRR, CCA and development projects in relation to local communities' experiences and needs and attention to gender.

3.6 Conclusion

Overall, this research is embedded within the theoretical underpinning of feminist political ecology. By giving attention to both gender and the environment, the methodology and analysis follow an approach that views environmental issues including climate change in relation to social processes, gendered knowledges and politics. Feminist political ecology thus provides a framework that grounds concepts of gender, marginalisation, vulnerability and capacity in order to understand the impacts of environmental degradation for people's daily lives and the implications for policies and development projects. The methodology combines critical theory, empirical fieldwork and qualitative analysis. Ladakh, located in the Indian Himalayas, was selected as a case study to help addressing the research objectives. The fieldwork was conducted for seven months with a gender-balanced team of researchers and interpreters to address gender issues both in the methodological and analytical processes. Methods for collecting data included document analysis, participant observation, informal and formal semi-structured interviews and focus group discussions. Finally, the analysis undertaken in the following chapters follows DRR theoretical and conceptual frameworks to examine the relevance of climate change-related interventions to beneficiaries' local realities and whether the integration of the fields of DRR, CCA and gender, advocated by academics and policy-makers, is evident in practice.



Chapter 4

4

DRIVERS OF CHANGE AND THEIR IMPACTS IN THE CONTEXT OF LADAKH

Objective I.

To produce a holistic analysis of the way Ladakhi communities experience climate change and natural hazards in relation to their everyday risks using DRR frameworks and a gender perspective.

- | | |
|---|--------------|
| 1. What are the structural factors shaping the development of mountainous communities in the South specifically Ladakh? | Chapter
4 |
| 2. What are the vulnerabilities and capacities of men and women to climate change in Ladakh, in relation to their broader marginalisation and the role of gender? | Chapter
5 |
| 3. How do Ladakhi men and women perceive and explain climate change in relation to their everyday risks and which solutions do they identify to tackle the impacts of climate change and natural hazards? | Chapter
6 |

This chapter introduces the case study of Ladakh and grounds it within the broader context of development in mountain regions. It brings together the literature documenting challenges faced by mountain communities in the global South and studies conducted in Ladakh in order to (i) draw an overview of the development of Ladakhi societies in relation to their environment, (ii) identify environmental and social challenges faced by local communities and (iii) understand how those challenges are influenced by various structural processes that are inter-connected. This chapter presents key elements of the geographical, historical, political and socio-economic context of the case study where local communities experience natural hazards and the predicted impacts of climate change. By examining how climate change relates to other structures, this chapter will support the analysis of the vulnerability and capacity assessment in

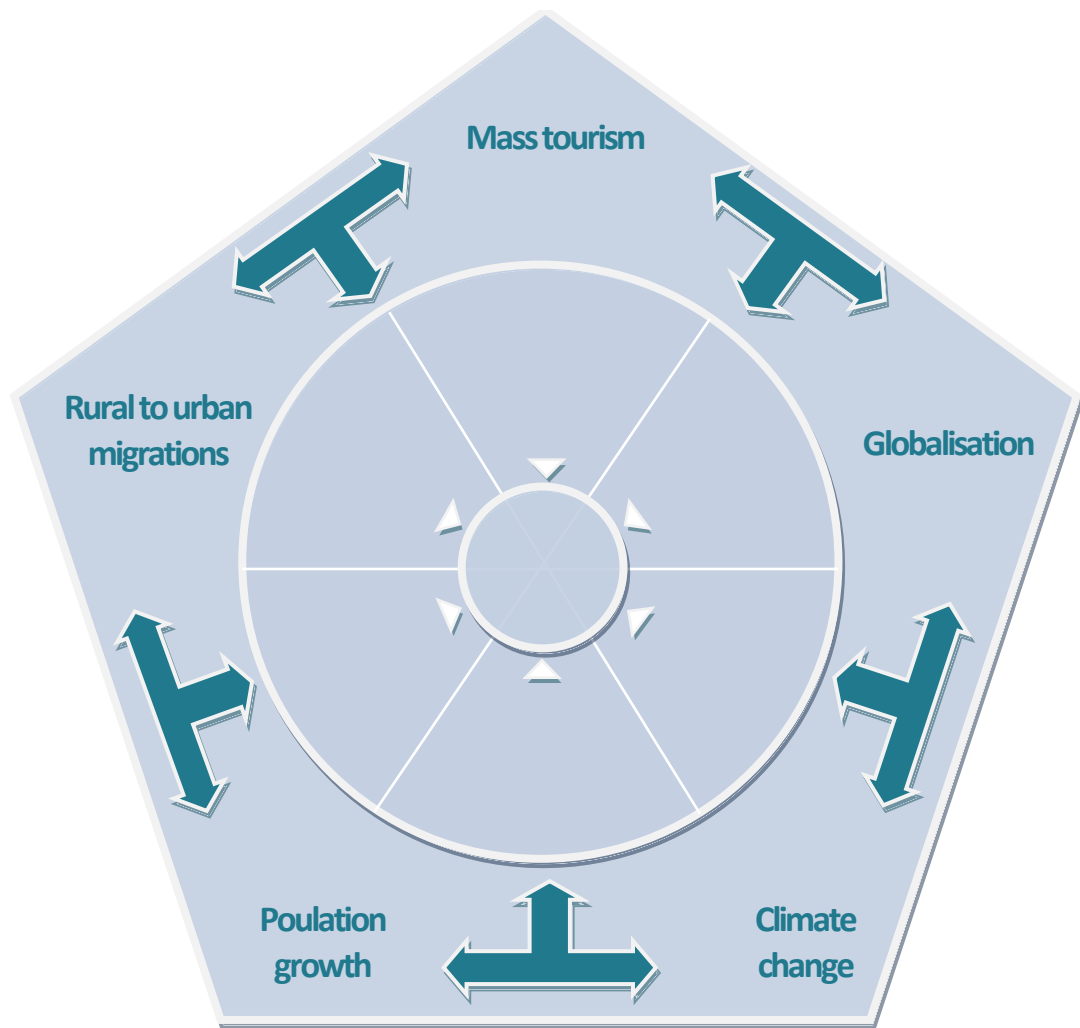
the face of environmental shocks and trends in Chapter 5 and challenges faced by local communities in their daily lives in Chapter 6. This chapter is thus necessary as the first step to address Objective I of this thesis.

The holistic approach used here is strongly influenced by a geographical perspective which involves the interdependence of disciplines, locations, scales and processes both societal (economic, political, cultural, etc.) and biophysical (geological, climatic, etc.) (Gregory, 2009). In identifying and critically

reviewing some of the large-scale processes shaping the development of Ladakh (See Dame and Nüsser, 2011 for a similar approach), I draw from Disaster Risk Reduction (DRR) frameworks particularly the Pressure and Release Model described earlier (See Figure 2.1 in Chapter 2) and the Triangle of Vulnerability (Figure 2.2 in Chapter 2). According to these frameworks, there is a wide range of processes to take into consideration when identifying the root causes of vulnerability in the face of either natural hazards or climate change impacts. These root causes include historical factors such as post-colonial heritages or war; economic factors like global trade, fluctuations of market prices or government debt; political factors such as poor governance, corruption or on-going armed conflicts and other processes that determine for instance land-use planning or natural resources management. To identify and select those relevant in the context of Ladakh, I draw from Schild and Banskota (2008) from the International Centre for Integrated Mountain Development (ICIMOD) who have identified three main drivers of change shaping the development of the Hindu Kush Himalayan (HKH) region, namely: population growth, globalisation and climate change. The chapter follows this typology and adds two others processes identified from the literature review and data from the fieldwork, these being rural to urban migrations and mass tourism.

Although, those drivers will be categorised in different sections, they are understood to be interconnected and impact on each other as illustrated in Figure 4.1. This framework, introduced in Chapter 3 will help structure the analysis in the next 2 chapters.

Figure 4.1 Summary of drivers of change in Ladakh that will be addressed in Chapter 4.

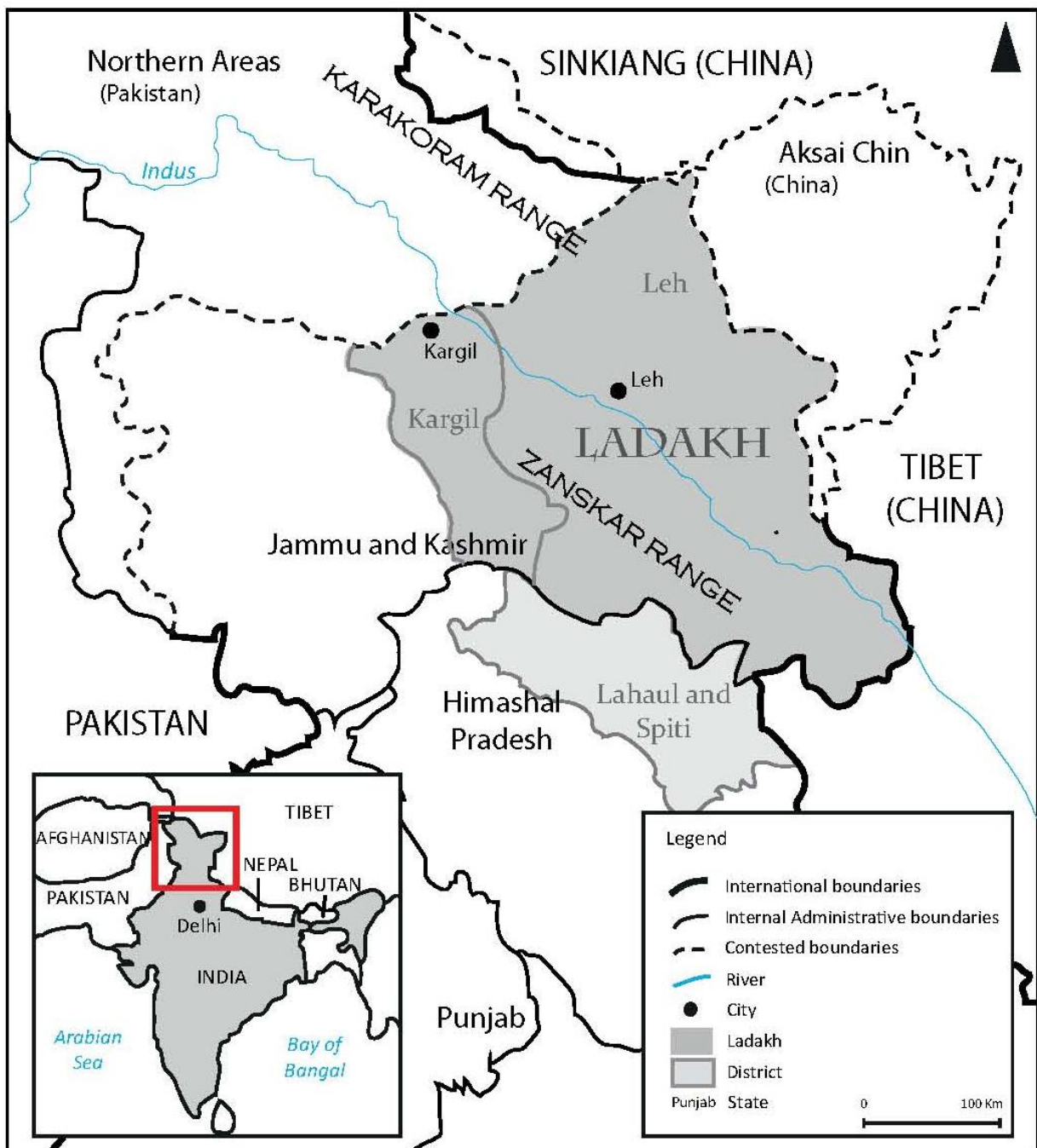


The chapter begins with a brief historical overview of Ladakhi society and its reliance on limited natural resources in order to better understand current challenges faced by local communities. The following sections successively highlight population dynamics, globalisation, migrations, mass tourism and climate change as the main drivers of change affecting mountain communities. Each section will narrow down to the particular context of Ladakh by drawing on available studies.

4.1 Ladakh, an historical overview

Located in Northern India, Ladakh is the largest province of the state of Jammu and Kashmir (see Figure 4.2). The landscape is dominated by barren mountains, with the highest summits culminating at an altitude above 6,000 metres. The capital, Leh, situated at 3,500 metres, is enclosed by the Karakoram Mountains to the North and by the Zangskar range in the South across the Indus valley.

Figure 4.2 Map of the Ladakh province (Author)



Ladakh is characterized by wide variations in the seasons. Mean monthly winter temperatures range between -15°C and -5°C in January and February whereas summer months experience mean temperatures approximately between 17°C and 24°C (Fowler and Archer, 2004). Due to elevation and high relief that blocks monsoon clouds, the atmosphere is very dry all year round with little precipitation even in winter. Typical average annual precipitation is less than 100 mm in the Upper Indus Valley (Dame and Nüsser, 2011). Ladakh is thus a high altitude cold desert hosting a Trans-Himalayan ecosystem (Geneletti and Dawa, 2009). At a high elevation and with very little rainfall, the vegetation is extremely sparse and almost nonexistent in some areas. As Norberg-Hodge (2000: 11) describes it:

Life in Ladakh is dictated by the seasons [...]. Scorched by the sun in summer, the entire region freezes solid for eight months in winter [...]. This is the fiercest of climates: winds whip up tornadoes along the empty corridors of desert; rain is so rare that it is easy to forget its very existence.

Until 1947, 85% of Ladakhis were self-supporting farmers (Crook, 1980) scattered in high altitude villages between 2,600 metres to around 4,600 metres above sea level (Dame and Nüsser, 2011). The main livelihoods of high mountain rural villagers typically include crop farming, animal husbandry, the collection of fuel, additional fodder and wild vegetables (Dame and Mankelow, 2010). Agriculture is entirely based on irrigation which implies the diversion of melt water from glaciers and snowfields to villages usually located along river courses (Dame and Nüsser, 2011) (see Figure 4.3). As explained by Norberg-Hodge (2000), water availability determines the amount of land that can be cultivated and therefore the number of settlements that it can sustain.

The remaining inhabitants were nobles, monks, merchants and caravaners, mostly concentrated in the capital, Leh (Michaud, 1991). Ladakh has long been a major focal point for the caravan trade from the subcontinent to Central Asia (Rizvi, 1999) which brought Persian and Muslim influence but also put the region under threat of constant invasions from Kashmir and Mongol Empires (Sellier, 2004; Soutif, 2009). However, it is mostly with Tibet that Ladakh developed strong linguistic, cultural, economic and religious affiliations. Until the 19th century, Ladakh remained an independent Buddhist kingdom that shared the practice of lamaist Buddhism with its neighbouring Tibet and the adaptation to a harsh mountainous ecosystem among inhabitants of the Tibetan plateau (Michaud, 1991). In 1834, Ladakh was captured by the Dogras Gulab Singh of Jammu and became a principality of the Indian state Jammu and Kashmir (J&K) (Champollion and Bazin, 2001).

Figure 4.3 View of the upper part of Leh town with the Ladakh range in the background (Le Masson, 2010)



During the decolonisation of the South Indian continent by the British, the caravan trade between Ladakhi, Tibetan and Yarkandi Muslim merchants ended in the late 1940s due to conflicts between Pakistan and India and between India and China. Since 1949, the western part of Kashmir has been under the control of Pakistan and has been the scene of violent confrontations on both sides of the cease-fire line (now 'Line of Control') in 1965, 1971 and 1984 (Sellier, 2004). In parallel, when communist China invaded Tibet in the 1950s it also occupied the region of Aksai Chin located in the Eastern part of Ladakh. Resulting conflicts with China, especially in 1962, led to the closing of Ladakh's borders to traders and the permanent settlement of Indian military camps and several tens of thousands troops in strategic passes and towns across Ladakh (Mutin and Durand-Dastès, 1995). Throughout the second part of the 20th century, the Indian government reinforced its political control and military presence in the state of J&K (Michaud, 1991). India's capital, New Delhi, together with the state capital, Srinagar, became involved at every level of socioeconomic policies related to the 'development' of Ladakh (Ibid). After the successive wars with Pakistan and China and the resulting collapse of caravan trade, the government invested in the construction of hydroelectric projects, the

improvement of irrigation and the development of mining and light industry (Gielen, 2001). Such projects generated major transformations in the socioeconomic characteristics of Ladakh.

While Ladakh was cut off from the rest of the world, transportation significantly improved across the state of J&K due to the military activities but also in order to better implement the Indian government's development projects in the region. The first motorable road was built between Srinagar and Leh in the 1960s and reduced a normally one-month journey to only two days (Champollion and Bazin, 2001). In parallel, the construction of a military airport introduced air transport to reach Ladakh throughout the year (Mesplier and Bloc-Duraffour, 2008). In 1974, India opened the borders of Ladakh to national and foreign visitors. Hence, in addition to remaining a militarily and politically strategic region, Ladakh became a privileged destination for mountaineers and tourists eager to experience the last remains of the Tibetan culture untouched by Chinese communism (Crook, 1980).

Overall, human societies have long evolved to adapt to new environments and new influences resulting from interactions with outsiders. Ladakh too, faced successive and significant changes over generations due to its strategic location as a trade centre and a destination for Buddhist pilgrims. Therefore, the region was not cut off from the rest of the world for its entire history. As Goldsmith (1998: 256) points out: “[...] *traditions have been altered [but] the people have absorbed change at a human, manageable pace, and above all on their terms*”. The rate of change however, significantly accelerated during in the second part of the 20th century and the social implications constitute a recurrent topic in the literature documenting Ladakh since the 1980s (e.g. Crook, 1980; Osborne et al., 1983; Michaud, 1996; Norberg-Hodge, 2000, 2001; Bhasin, 2008; Dame and Mankelow, 2010; Ladakh Melong, 1995-2006).

4.2 Population dynamics and pressures on resources

4.2.1 Population growth

Ahmad et al. (1990) argue that mountain people have evolved biologically, socially and economically in closer relationships with their physical and harsh environmental conditions than lowlanders. Mountain agriculture has sustained generations of mountain communities through traditional practices that relied on sophisticated water management and small-scale irrigation techniques particularly in arid regions (FAO, 2002). With the raising of livestock, fishing or the collection of forest

products, livelihoods of the majority of mountain people have long maintained their communities at a pace that always enabled the environment to support the development of local human societies. In fact, despite living in a challenging environment (steep slopes, long commutes from one valley to another, remoteness, etc.), well-adapted mountain communities have often benefited from a greater security (with mountains acting as natural barriers) and a healthier environment compared to surrounding lowland regions (Marty, 2009; Zingari and Fiebiger, 2008).

However, this long history of adaptation to their living conditions is strongly linked with the size of communities. Overpopulation is one of the major factors that undermine the balance between mountain communities and their environment because an increasing population means more competition over limited resources (Ahmad et al, 1990). Mountain population pressure is not a unique phenomenon of contemporary society but has occurred in the past (Ibid; Diamond, 2005). Today however, although population growth can be considered a normal trend, the world population has constantly increased particularly since the Industrial Revolution in the 19th century. High fertility rates combined with a longer life expectancy have contributed to increase the number of people, reaching 7 billion worldwide in 2011 (Kunzig, 2011).

The global South accounts for more than 95% of population growth (Kunzig, 2011). Pressure on natural resources increases through higher demand for land, energy, agricultural products, fresh water supply and industrial goods (Beniston 2003; Fenner 2009). This, combined with traditional land-use practices that are not suitable for a larger population, often lead to scarcity of resources and conflicts over their control (FAO, 2002). The intensification of farming to produce more food to feed a growing number of people may lead to soil exhaustion or crop failure (Xu et al., 2008). Additionally, excessive animal population causes degradation of open pastures (Ibid). The objective is not to adopt a Malthusian perspective which consists of blaming population growth for the depletion of natural resources. However, the rapid increase of population is one factor among others that lead to the unsustainable development of a society because it partly imbalances with the carrying capacity of the environment. For instance, Wood (1990) researched the Northern Highlands of Ethiopia where the extension of cultivated areas on slopes has enabled the growing population needs to be met temporarily but increased soil erosion, and eventually has led to serious ecological damage that undermines agricultural productivity. In other words, societies can adjust to the changing size of their populations but they still depend on the environment whose natural resources are not unlimited or might take longer to replenish. For an increasing and mostly rural population, the fact that 78% of land in mountain areas is not suitable or is only marginally suitable for growing

crops (Hofer and Ceci, 2009) partly explains some of the issues faced by the majority of mountain communities (e.g. Ives and Messerli, 1989; Ives, 2004). For instance, between 30 and 40% of mountain areas' inhabitants are estimated to face food insecurity (Dame and Nüsser, 2011). High rates of malnutrition and disease are exacerbated by population growth that increase demand for food but also a lack of crop diversity, the seasonality of food production, the remoteness of markets and the alteration of land-use patterns and ecosystems due to changes in agrarian activities (Xu et al., 2008).

4.2.2 The increasing pressure on resources in Ladakh

At the beginning of the 20th century, Ladakh counted a total of 60,500 inhabitants. Overall, the literature suggests that the relative stability of Ladakh's population until the 1970s is partly explained by the practice of marital polyandry (Norberg Hodge, 2000; Singh, 2009). As Norberg-Hodge (2000) explains, a polyandrous system, where the eldest son of a family and his brothers are married to the same woman, generates a higher number of women left without the possibility to get married and thus have children (assuming that formal marriage is perceived as a prerequisite for bearing children). This does not mean that polyandry prevented population growth but that the rate of growth was slower than in non-polyandrous societies (Childs, 2003). The practice of polyandry coupled with that of inheritance by primogeniture ensured that the landholdings were not divided over generations (Crook, 1980). On the other hand, polyandry was not the only marriage practice and polygamy and monogamy existed as well (Singh, 2009)). Norberg-Hodge (2000) suggests that this flexibility demonstrates the adaptation to scarce resources and particularly to land:

In other words, from one generation to another, each family has the freedom to choose the ideal marriage option, depending on the amount of land available, the number of offspring and potential partners and so on.

Norberg-Hodge (2000) also suggests that population growth has also been limited by the practice of Lamaism. In Buddhist families, it is common for the second and/or third sons within the family to become monks, which underlines, according to the same author, the narrow relationship between polyandry and the monasticism of Tibetan Buddhism. Additionally, many women who did not or could not marry became nuns. The documentation thus suggests that a stable population as well as the high level of Lamaism has maintained a subsistence economy in balance with the carrying capacity of the environment which perhaps reduced the risk of fighting over limited resources (Crook, 1980; Singh, 2009; Norberg-Hodge, 2000).

However, the trend of population growth observed throughout the world finds now similar echo in Ladakh. From 105,291 inhabitants in 1971 (Singh, 2009), the number of people in Leh and Kargil districts combined has reached more than 290,000 people in 2011 (147,104 in Leh district) (Census of India, 2011) which means it has almost tripled in 30 years. Several reasons can be advanced. Although the practice of polyandry was forbidden by the government of J&K in 1941, polyandrous marriages continued in the following decades. However, greater interactions with the outside world and accessibility to modern sources of food supplies led to the reduction of socio-economic constraints on the traditional households that maintained the practice of polyandry (Crook, 1980). Younger brothers of polyandrous families, supposed to marry their brother's wife or become lamas, were thus given the opportunity to seek alternative livelihoods and a way of life outside the household, outside the village or outside a *Gompa* (i.e. monastery). This has also led to decreasing numbers of lamas in monasteries. Together with the break-up of inheritance by primogeniture, the neglect of polyandry resulted in increasing numbers of households (Ibid). Additionally, the increasing preference for monogamous marriage has generated smaller households (Dame and Mankelow, 2010) resulting in the division and ownership of the land by nuclear families.

Natural population growth contributes to higher demand for water, land, food, energy or services, as previously highlighted, which can eventually exceed the carrying capacity of the environment and therefore lead to increasing vulnerabilities due to more limited resources. However, resulting shifts in land-use patterns, modification of agrarian practices, alteration of ecosystems and impacts on human health have to be considered in connection with other wider processes related to changes in the economy and in living standards.

4.3 The globalisation of economies

4.3.1 Globalisation and its effects in mountain areas

Societies are transformed by population growth and dynamics but also by the way we produce, consume and trade goods and energy (Barnett et al, 2010). Although subsistence agriculture still represents the majority of food production in rural areas in the South, it is nowadays almost impossible to live outside monetary systems (Bret, 2002). Through their gradual integration into regional and global markets, mountain agricultural practices have progressively moved from subsistence farming to market-based food production and from food crops to cash crops (e.g.

horticultural products, spices, vegetables) in order to meet wider demand from an increasing and urban population (Hofer and Ceci, 2009).

However, the model of growth followed by western societies as a means to increase standards of living has been accompanied by various processes with positive and negative impacts. Jodha (2000: 296) explains that *'mountain communities are among the weaker participants being integrated into the global system'*. The adoption of market-economic policies, generally dictated by macro-level economic processes, imposes new production patterns, new trade and tax regulations, the restructuring of access to resources and the transfer of technologies onto micro-level economies (Ibid). Such mechanisms are not always in accordance with local environments and realities of mountain communities (Ibid).

According to the FAO (2002), 40% of mountain land in the South produces less than 100 kg of cereals per person per year. Food production is more costly in mountains because modern mechanized agriculture and feedlot-based meat production in lowland areas are more productive and efficient (Ahmad et al., 1990). This makes it hard to compete with modern agricultural prices and partly causes the abandonment of traditional production systems. Moreover, biophysical conditions in mountains (steep slopes, high altitudes, harsh climate and rugged terrains) limit the opportunity for intensive arable agriculture, forcing an increasing mountain population to rely on external sources of food supply (ICIMOD, 2008). This, combined with high and unstable prices of energy and food crops controlled by a global financial market, means that rural communities, especially in mountains, increasingly rely on subsidised food imports (Ibid). This is both a cause and a consequence of the decline of subsistence agriculture. Finally, market forces may have created employment opportunities and diversified the goods available, but the homogenisation of market-based food production has altered indigenous knowledge of local foods and practices. Many mountain communities now rely on a single cash crop for their livelihoods which has partly led to the decline of agriculture diversity (Jhoda, 2000; Hofer and Ceci, 2009).

In addition to market forces, Schild and Banskota (2008) consider communication technologies to be among the most visible effects of globalisation that have deeply affected mountain communities. Communication technologies as well as modern marketing have increased the demand and shaped the consumption of industrial goods. Globalisation fosters new incentives for technologies, infrastructure, goods and service which are mostly produced outside mountain areas (Jhoda, 2000) and therefore must be imported. Even certain products that were originally produced in mountain

regions such as honey or flowers are now imported because they can be produced more cheaply and in larger quantities in lowland areas (Ibid).

Overall, globalisation driven by financial markets and the focus on economic growth based on short-term profitability and external demand are processes disconnected from local environments which result in a wide range of negative impacts at local level (Ibid). Increased extraction activities (logging, mining), overfishing, extensive farming and non-sustainable agriculture are all causes of environmental degradation to the benefit of short-term economic growth (Ibid; Dankelman and Jansen, 2010).

4.3.2 The implications of globalisation for Ladakh

Ladakh has long been depicted as a poor and underdeveloped region. For instance, Warikoo (2009: 9) describes Ladakhis until the 1950's as "*poor and illiterate*". In his description of the trans-Himalayan trade and cultural movements through Kashmir and Ladakh at the end of the 19th century, he asserts: "*Those Ladakhi [...] settlers in Leh who traded with Central Asia and Tibet turned into a richer and affluent class as compared to the majority of Ladakh's population which was poor*". Goldsmith (1998) also notes the absence of money exchanges and the low level of per capita incomes in the area while unemployment is very high. However, Goldsmith suggests that those indicators do not reflect the balance that has characterised Ladakh for many decades in terms of health, food production and use of natural resources. Norberg-Hodge (2000) insists on the fact that subsistence farmers living in a non-monetary society are not necessarily poor.

Despite the fact that rural communities have existed and developed in Ladakh for centuries relying on a short growing season and a subsistence economy, the economic development of Ladakh has been a recurrent objective for both the state and central governments. The opening of Ladakhi society to the outside world, the military presence and the monetization of exchanges have influenced the reorientation of the traditional agrarian system. Cultivation practices have changed in order to respond to market-driven demand and almost half of food production in certain villages is now marketed in Leh or supplied to military troops (Norberg-Hodge, 2000; Dame and Nüsser, 2011). In parallel, the opening of the region to domestic and international tourists has accelerated the influx of cash into the local economy. The proximity of Indian military and civilian administrative centres and/or the visit of tourists in certain areas has benefitted significantly many Ladakhis in terms of employment opportunities (Bhasin, 1999). Ladakhi households now typically and increasingly rely on

monetary income in addition to subsistence agriculture which enables them to purchase other food and commodities (Dame and Nüsser, 2011). Items such as rice, sugar or wheat flour benefit from subsidised rates and are typically purchased from government or military 'ration stores'. Dame and Nüsser (2011) have thus analysed an increasing diversification of dietary patterns over the last 30 years.

However, mountain communities do not have access to the benefits of the market economy in the same way as lowlanders or as inhabitants of industrialized countries (Schild and Banskota, 2008). The integration of Ladakh within India and globalisation processes have generated a demand for new services and products, many of which can only be imported. Yet, the remoteness of mountain communities from markets requires the transportation of goods over longer distances. Whether it is food, including vegetables, fruits and rice, or manufactured goods from lowland India, the cost of goods' transportation by road or by air increases their price significantly. Nonetheless, these processes still contributed to end the traditional trade in salt and butter within Ladakh because cheaper items could be more easily obtained from India (Crook, 1980).

Furthermore, Dame and Nüsser (2011) emphasise the typical seasonality of food availability and access in Ladakh as in most high altitude regions. The cold arid climate does not enable people to grow food in winter which significantly reduces the quantity and availability of fresh food items in the market almost half of the year. Rural villagers typically store vegetables and potatoes for the winter months but the increasing urban population who do not rely on agrarian activities have to purchase food in the market where prices generally increase. As part of the government policy to reduce food insecurity and foster 'modernisation', domestic staple prices are controlled by the state and food produced in the Indian lowlands is redistributed at subsidised rates to targeted recipients through the Indian Public Distribution System (PDS) (Dame and Mankelow, 2010; Ghosh, 2011; DFPD, 2012). However, the economic incentive to purchase imported and subsidised commodities has created dependency of households and prevents them from maintaining or gaining self-sufficiency (Ibid). This, combined with the seasonality of food access and the higher prices found in Leh market, could actually exacerbate households' vulnerability to food insecurity if the government were to increase the price of staple foods and subsidies or stop subsidising certain commodities altogether (Dame and Mankelow, 2010) (further developed in Chapter 5).

Furthermore, Dame and Mankelow (2010) highlight the interconnection of traditional agricultural activities, with crop farming generating fodder to feed animals in winter while animal husbandry

provides manure, draught power and transportation sustaining sowing and harvesting activities. However, the increasing reliance on subsidised food combined with the diversification of income sources that are non-agrarian reduces the production of fodder and can lead farmers to reduce their livestock. Fewer livestock means a reduction of the amount of manure available for agricultural activities which encourages farmers to use subsidised chemical fertilizer. Although the use of fertilizers can contribute to food security, Xu et al. (2008) have documented how land-use transitions in the HKH can negatively affect the health of mountain farmers. For instance, with the use of agricultural chemicals, increasing amount of nitrates leaks into irrigation canals, pollutes water resources and affects ecosystems which in turn generates health risks for human populations (Ibid).

This reflects how external impacts can alter the balance sustaining subsistence agriculture and limits the 'economic development' fostered by governmental strategies. Today, 25% of households in Ladakh are considered to be Below the Poverty Line (BPL) and another 28% considered eligible for BPL status (TISS-LADHC, 2010a). The BPL is set by the Indian government according to the average monthly consumption expenditure of households whose members consume (per capita and per day) 2,400 calories of food in rural areas and 2,100 calories in urban centres (see Ghosh, 2011 for a critique). Based on this benchmark, rural dwellers need a minimum of 35 rupees (66 rupees for their urban counterparts) for their daily survival which means that 65% of the Indian population is estimated to fall below this cut-off (Deshpande, 2012).

Overall, economic changes in the Ladakhi society were and are received with ambivalent opinions. The improvement of infrastructures and transportation, the existence of new modern services and the integration of the region into a market economy has undoubtedly brought great material benefit to communities (Crook, 1980). For instance, the widespread introduction of modern schooling as a means to foster the development of the region has significantly improved the literacy rate of the population and guaranteed girls a more equal access to education.

However, this has also led to the decreasing use of traditional Tibetan languages and the abandonment of the old monastic education whereby children learnt to acquire a Buddhist culture (Crook, 1980). Western science and knowledge created outside the local context became the norm and a requirement to obtain a job in the administration (Ibid). This shift in education oriented the young generation towards a new society functioning where they aspire to occupy qualified jobs and leave behind traditional economic activities perceived as confining and non-lucrative (Gielen, 2001).

This has created a wider gap between the expectations of the young generation compared with customs and beliefs of the elderly (Ibid).

Shifts in traditional agricultural practices and an education model which is disconnected from the reality of the local context are some of the consequences of increasing interactions with the rest of India and the integration of Ladakh within the globalised economy. Shifts in migratory patterns and particularly the increase of urban to rural migrations constitute additional major impacts of the transition from subsistence agriculture to a market economy.

4.4 Rural to urban migration patterns

4.4.1 *The reasons that motivate or force mountain people to migrate*

Different incentives encourage people to migrate, including employment, education or family regrouping, with the common objective being to improve their standards of living (Grau and Aide, 2007). Migration is not necessarily permanent but is sometimes a temporary strategy to adapt to changing environments and livelihoods. Whether it implies migrating to lowland areas to work temporarily as a labourer in order to supplement incomes or spending the summer in higher altitude pastures to graze cattle, seasonal migration is widely practiced by mountain people across the globe.

Despite being predominantly rural, mountain areas have been experiencing an accelerating decline of their rural populations since the second half of the 20th century, a tendency common to the rest of the world (Ahmad et al., 1990). People not only concentrate in small local townships but also migrate to large cities in lowland areas and sometimes emigrate abroad (Grau and Aide, 2007). Increased and longer rural to urban migrations are nowadays explained by different factors, the first being the decrease of standards of living in rural areas mentioned earlier, partly resulting from the alteration of traditional agricultural practices. Additionally, access to land is a major issue in the global South, where population densities are high and where many former colonial states have created inequalities in land distribution and ownership. Many farmers do not own the land they cultivate (ICIMOD, 2008) which undermines their capacity for investment and control over their resources. Other factors such as local inheritance practices lead to fragmentation of land until the point where the remaining area is not large enough to generate sufficient incomes (Cardinalli, 1990). Pollution or over-exploitation of limited natural resources such as deforestation or overgrazing are also processes forcing rural mountain communities to migrate. Therefore, the majority of migrants settle in cities for economic

reasons (Anderson, 2009) where they expect to diversify their livelihood options. Village inhabitants are also generally attracted by higher urban wages in certain sectors and by modern products and services which migrants have access to in cities (Bret, 2002). In consequence, relatives of migrants tend also to migrate in order to benefit from this new affluence and the promise of having better standards of living. According to Anderson (2009), labour migration is thus often explained by the 'push-pull hypothesis' where economic factors in the place of origin push workers into other markets, while economic factors in cities pull migrants in. The literature suggests that rural-urban migration reduces the human capital in rural areas (see Olimova and Olimov, 2007) and creates gender imbalances in the remaining available workforce in villages (Leduc et al., 2008). Although the frequent migrations of men for herding, trading or finding livelihoods in cities leave women in charge of managing the household and community resources, the absence of male labourers usually results in employing extra wage labourers and severely increases women's workload (Demetriades and Espen, 2008; Dankelman and Jansen, 2010). A high proportion of migrants can also lead to a gradual reduction in local food production, the weakening of local institutions and facilities such as schools and clinics and therefore a decrease in household living standards (Ahmad et al., 1990).

In parallel, the majority of migrants in the global South arrive on the periphery of cities in informal areas where living conditions in slums might be as bad as those back in the village or worse. Depending on individual characteristics or places of origin, migrants can benefit from better access to livelihoods but they usually occupy low-skilled jobs requiring heavy manual work (Olimova and Olimov, 2007). Migrants also expect to have better access to basic services such as electricity or gas (often illegally), however their standards of living do not necessarily increase and their health may suffer from bad sanitation, air and water pollution, etc. (Semmoud, 2001). As highlighted in the literature review, many immigrants end up settling in the periphery of urban cities where there is no urban planning and which are often prone to natural hazards. In parallel, being confronted with new products and services and, in general, with the modern marketing that dominates in cities, also increases the need for cash. However, for those maintaining strong ties with their relatives, much of their incomes are saved for remittances. This is an additional factor influencing people to migrate temporarily for several months a year, or permanently. It enables them to save or supplement incomes during difficult times but can also exacerbate their vulnerability.

Although, rural-urban migration has long been described as having negative effects both in urban 'receiving' regions and rural places of origins, consequences of rural outmigration can also be positive. With examples in mountain regions in the Caribbean, Central and South America, Grau and

Aide (2007) argue that most traditional land use practices are not economically and environmentally sustainable considering population growth, and that migrants thus contribute to reduce agricultural activities, grazing, hunting and firewood collection in mountain areas enabling the natural ecosystem to recover and promoting the conservation of land. The FAO is also in favour of the development of mountain cities that would “*help to maintain the equilibrium between the mountain population and the carrying capacity of the natural resource base*” (FAO, 2002:15). For international institutions such as the World Bank or the IMF, an increasing urban population is a positive trend because a higher density reduces the cost for governments to provide basic services such as water supply and sanitation and because the poor living in cities are economically ‘richer’ than those living in rural areas (Semroud, 2001).

However, a different approach, currently followed by the Indian government, consists in fostering rural development initiatives in order to encourage rural populations to remain in their villages (Goodall, 2007). Here, tackling rural poverty is supposed to improve standards of living of rural dwellers, slow down rural to urban migration and thus limit problems linked with rapid and unplanned urbanisation.

4.4.2 Migration trends in Ladakh

The majority of the population of Ladakh is rural, scattered among 243 villages (113 in Leh district and 130 in Kargil district) but the rate of urban population growth in Leh District reached 23% in 2001 and is still increasing (Census of India, 2001). Goodall (2004) found that between 1981 and 2001, the urban population in Leh grew at an average rate of 5.92% each year, a rate higher than the national average of 2.95% in Indian urban areas. This urban growth results both from a combination of factors including the increasing population growth observed in Ladakh, the immigration of rural inhabitants to Leh, the settlement of Tibetan refugees in the 1960s, the seasonal migration of labourers from the lowlands or from neighbouring Nepal and the settlement of traders from other parts of J&K. Although, the exact contribution of rural migrants to the urban growth in Leh is unclear, it is considered to be of secondary and declining importance to the role of natural population growth (Goodall, 2007). Nevertheless, the review of processes leading to rural to urban migration in Ladakh helps explain the context of change and factors exacerbating the vulnerability of certain groups.

Since the 1970s, the opening of borders to nationals and later to foreigners accelerated migratory movements between Ladakh and the rest of India and the rest of the world. The construction and

provision of military camps and the implementation of state administrations resulted in a high demand for labour but also clerical services and schools in order to educate and train young Ladakhis (Crook, 1980). This resulted in an increasing number of Indian immigrants in Leh while new schooling and employment opportunities are, since then, continually attracting Ladakh rural inhabitants.

The migration of young Ladakhi people away from their villages has reduced the labour force available for traditional agricultural activities or for construction purposes (Dame and Mankelow, 2010). Farmers used to mutually help each other without relying on money exchange whereas they now have to pay labourers to compensate the loss of workforce (Norberg-Hodge, 2000). Many paid labourers are employed from outside the region because their wage is lower than Ladakhis'. The cost, usually increasing with inflation, still represents an economic burden for families relying on agriculture for their living. This further accelerates rural to urban migrations whereby more villagers seek other livelihoods in the capital. Those who remain farmers are increasingly pressured to grow cash crops instead of food for themselves (Norberg-Hodge, 2000) in order to compensate the cost of labourers and to afford higher demand for services including schooling, health care, energy and manufactured goods.

Goodall (2004; 2007) explored and compared migratory trends of nomadic pastoral communities coming from different areas. She finds that, depending on their place of origin, nomads developed various adaptive strategies. Some adopted a seasonal and circular migration while maintaining strong financial and social obligations in their community of origin while others completely resettled in the urban area of Leh. For those, migration was less motivated by economic incentive than the willingness to gain a better access to education, health care and modern services. In effect, people tended to reconvert themselves as unskilled labours in construction sites or in fieldwork activities which usually provides them with an equal if not lower wage than the one from their area of origin. In return, their savings and the financial capital resulting from the sale of their livestock and belongings, enabled migrants to invest in the future of their children (Goodall, 2007). Goodall's research emphasises the fact that although communities across Ladakh face similar and global socio-economic changes, households develop different responses to daily pressures.

In parallel, migrations of labourers and increasing arrivals of tourists in the capital have sustained a high demand for new housing construction (Bhasin, 1999; Norberg-Hodge, 2000) which further attracts migrants to work as low skilled labourers, particularly lowland Indians from Bihar and Nepalis. As Leh is located in a relatively narrow valley, new constructions require the conversion of

agriculture land or barren land on the margins of the city (See Figure 4.4). Often, available areas are also those prone to floods and other natural hazards which is the reason why they were left unplanned in the first place. In other words, the accelerated urbanisation fuelled by the prospects of developing new and better livelihoods is usually synonymous with unplanned land-use. This creates sanitation issues with sewage disposal obstructing water channels and polluting aquifers (Bhasin, 1999). Agriculture in Leh is therefore significantly impacted by the shrinking and pollution of fields. Such migratory processes are explained by a combination of increasing pressures on limited natural resources, alterations in agricultural practices, a higher demand for education access but also due to the impacts of tourism that attracts workers but also tens of thousands visitors each year.

Figure 4.4 Recent constructions on barren land in the margins of Leh town (Le Masson, 2011)



4.5 The role of mass tourism

4.5.1 Mass tourism and mountain development

Besides physical characteristics that have benefited well adapted mountain communities but also undermined the development of others, mountains have long attracted visitors for their natural

beauty and their biodiversity. They fascinate mountaineers eager to conquer the highest summits and constitute a privileged environment for city inhabitants seeking wilderness, wide areas of solitude and pure air (Boller, 2005). Meanwhile, tourism is no longer an activity privileged to high income families within industrialised nations (Mesplier and Bloc-Duraffour, 2008). The global South also attracts an increasing numbers of tourists because low cost flights are abundant and everyday expenses can be cheaper (Ibid).

On the one hand, tourism is perceived and promoted as a factor of economic and social development because it can benefit all kinds of sectors. Local food production can be boosted by higher demand for food supplies; the development of tourist accommodation and restaurants creates employment as well as various opportunities for local handicraft makers while the presence of tourists motivates the promotion of local traditions and cultural events. With the increase of hiking tourism, a wide range of services are needed in mountain areas: trail networks, accommodation with energy and water supplies, guided tours, information with signposting, maps, books and shops (Boller, 2010). In the case of European mountains, Mesplier and Bloc-Duraffour (2008) argue that the development of tourism has compensated for the decline of agriculture which now survives only thanks to high subsidies. They also assert that tourism stopped or decreased the depopulation of villages and has been the unique element for the revitalisation of mountain economy in many areas. Moreover, tourism often contributes to improve basic infrastructure (water supply, sanitation, roads construction or village electrification) and better access to modern goods and services such as radio, television, mobile phones and the Internet that connect previously isolated mountain communities to the rest of the world (Olimova and Olimov, 2007).

On the other hand, positive outcomes from tourism do not necessarily apply to every mountain region especially in the global South. Tourism usually generates inflation. The import of food to meet foreign demand and standards makes it hard for local food producers to compete with imported food prices which usually benefit from subsidies (Mesplier and Bloc-Duraffour 2008). Moreover, tourism generates the import of foreign currencies that is considered in many governments in the South to be safer than incomes resulting from primary commodity exports (Ibid). The more lucrative tourism thus tends to replace traditional livelihood systems and contributes to create a dependence on the global economy that goes beyond the control of mountain people (Goldsmith, 1998). However, higher demand from tourism can also generate the opposite effect and intensify agriculture production to earn more income. This exacerbates the pressure on natural resources and can lead to environmental degradation.

Furthermore, new infrastructures built for a foreign demand do not generally correspond to the realities and needs of local mountain communities (Cognat, 1973; Mesplier and Bloc-Duraffour 2008; Geneletti and Dawa, 2009). If better access to basic services such as electricity, health or education constitute some of the positive outcomes of tourism-related development, the import of tonnes of new manufactured goods are more questionable as they generate more non-biodegradable waste that rural areas struggle to manage (Allison, 2008). While technology, information and financial means enable industrialized countries to handle hazardous materials, poor infrastructure in the South make the disposal of non-biodegradable waste a serious challenge (Ibid). Hence, the negative impacts of mass tourism on the environment can sometimes be greater than the economic benefits both in industrialised countries and in the global South (Padoa-Schioppa and Baietto, 2008). In fact, tourism development creates a paradoxical situation where the installation of tourism facilities and services can eventually reduce the primary qualities of mountain areas (remote areas, unspoiled wilderness, small communities with unchanged traditional practices, etc.) that attracted tourists in the first place (Boller, 2010). Deprest (1997) goes further by accusing mass tourism of leading to environmental destruction followed by economic collapse in many instances.

Finally, tourism in the global South is controversial: some consider tourism as a mean for economic development, cultural exchange and integration while others perceive it as new form of domination and exploitation (Caze, 1992; Mesplier and Bloc-Duraffour 2008). Foreign tourists bring along their own cultural and social perspectives and behaviours in terms of clothing, culinary habits, language and social codes that differ from those of the people they interact with. On the one hand, this often generates envy and a desire for imitation from 'those visited' who are also highly influenced by marketing, promoting western standards. On the other hand, differences sometimes lead to cultural and social shocks which are negatively perceived by the local population who fear a relaxing of social, moral and religious values (Mesplier and Bloc-Duraffour 2008). Finally, Caze (1992) argues that the presence of a majority of white, western and often rich tourists spending their leisure time in 'poor countries' automatically creates visible contrasts in standards of living between visitors and locals. It can also replicate models of domination through new jobs (waiters, accommodation managers, drivers, cleaners, guides, etc.) that are in the service of foreigners (Ibid). All these impacts find echo in the case of Ladakh.

4.5.2 Opening of Ladakh to foreigners

When Ladakh opened its doors to foreigners in 1974, a few hundred visitors travelled in the region (Pellicciardi 2011). Despite successive periods of political instability in nearby Kashmir the number of tourists and trekkers mainly from North America, Western Europe, Australia and Japan multiplied with 25,000 arrivals in 1988, 50,000 in 2006 (Geneletti and Dawa, 2009) and almost 100,000 in 2011. The contribution of domestic tourists from lowland India is equally increasing and represents a third of the total number of visitors since the 1970s (Pellicciardi, 2011). Such a high number of visitors who spend money throughout the summer season provides new livelihoods for local communities which has accelerated the transition of the traditional Ladakhi society into the market economy. In Ladakh, as elsewhere in mountain areas, the promotion and development of tourism often constitutes a key strategy to alleviate poverty by diversifying livelihoods opportunities and stimulating the local economy (Michaud, 1991; Geneletti and Dawa, 2009).

Because no hotels existed in Leh when tourists began to arrive in Ladakh, accommodation was provided by the local inhabitants themselves by renting out a room within their home (Banerjee, 2010). The rapid increase of tourism multiplied the number of these home-stays and guest-houses in Leh, later followed by hotels. More than 400 tourist accommodations are now available in the capital (Singh, 2009). Leh is thus growing fast with cement buildings adding to the traditional houses built of sun-dried mud bricks (Ibid) (See Figure 4.5).

Leh is developing as a cosmopolitan town with the influence of Indian, Tibetan, Kashmiri and Western cultures. The capital attracts a growing number of migrants wanting to benefit from economic opportunities and wide range of goods and services brought mainly by tourism. As in many other Himalayan regions, tourists come from June to September for mountaineering activities (trekking, rafting, tours with camels and horses) but also for visiting monasteries and symbols of Tibetan Buddhism which have been preserved in Ladakh. Such activities have opened up a whole new range of services that generated the diversification of the local economy. Tourism-related business is now estimated to represent half of the local Gross Domestic Product (GDP i.e. the sum of gross value of products and services produced in the economy). The need for guides, porters, workers in hotels and restaurants, travel agents, shop keepers, taxi drivers and handicraft products is a strong incentive for local inhabitants to change their activities.

Figure 4.5 View of the centre of Leh town and the combination of building structures (Le Masson, 2011)



As mentioned earlier, this has reduced the agricultural labour available in villages during the harvest season which coincides with the peak tourist season. If tourism provides new sources of higher income, it is also to the detriment of agricultural activities whereby rural families have to compensate the loss of workforce with paid wage labourers. The next chapter will show that these economic shifts are not gender neutral and influence differences of access to resources between men and women.

Adverse impacts of tourism combined with wider economic or 'development' activities in Ladakh have been extensively documented (e.g. Osborne et al., 1983; Bhasin, 1999; Geneletti and Dawa, 2009). Geneletti and Dawa (2009) who undertook an assessment of environmental impacts of trekking-related activities in Ladakh, note the lack of adequate touristic infrastructures and planning and the high interference of tourism with fragile ecosystems. They explain that the massive use of trails (more than 3,000 trekkers who walk along the Markha trail each summer) and the logistics it requires (trekking expeditions of ten persons usually make use of approximately seven pack animals

and five porters), generate waste accumulation and environmental impacts in very localised areas. Trekking activities typically cause soil erosion and compaction, vegetation degradation, wildlife disturbance, surface and groundwater pollution or depletion of firewood, but also air and noise pollution due to increase in four-wheel-drive traffic (Ibid).

The urban growth, the presence of non-local people with different lifestyles, the influx of money and goods on top of military activities, all have taken their toll on the environment of Ladakh. In Leh, there is a large amount of solid waste pollution, particularly from plastic, littering the streets and water channels (See Figure 4.6). A system of waste collection exists but most garbage is burnt and almost no recycling facilities exist. Cleaning detergents and chemicals spoil the glacier melt water rendering the water running in canals undrinkable. The pressure on water from unplanned bore wells and high consumption of tourists is

having knock-on effects for the delicately balanced agricultural regime which has been in place for centuries (Geneletti & Dawa, 2009; Pelliciardi, 2011).

Resulting negative environmental impacts from tourism were emphasised during fieldwork as a serious concern for local inhabitants who often consider the protection of their environment a more important issue than economic development. Additionally, the opening of a region to the eyes of foreigners, mainly Westerners, exposed both visitors and visited to new perspectives. Apart from environmental changes, an increasing number of Indian and foreign visitors have caused or reinforced socio-cultural and psychological changes among

Figure 4.6 Washing of cars and litter on the banks of a river in Leh (Le Masson, 2010)



Ladakhis (Gielen, 2001). During the early stages of tourism in Ladakh, Crook (1980) wrote that the inappropriate behaviours of some tourists visiting monasteries (unsuitable clothing, constant and intrusive photography during ceremonies, deep ignorance of the host culture or indiscrete attitudes) were causing growing concern and irritation to the monks. Westerners who have visited Ladakh often recall situations where they witnessed the influence of mass tourism on people's behaviours such as children begging for pens or chocolate, teenagers wearing western clothes or people feeling inferior and frustrated not to benefit from modern goods and services in the same way as tourists (Crook, 1980; Norberg-Hodge, 2000). Ladakhis' way of living has thus significantly changed for those located in the surroundings of touristic spots and trails (Gielen, 2001). Counter-development and environmentalists' discourse underline how rapid change has affected the traditional system and regrets that local people follow new trends brought by foreigners (Norberg-Hodge, 2000; Singh, 2009).

On the other hand, accounts of young interviewees during the fieldwork emphasised tourism as the primary source of income and progress in Ladakh and explained that it had brought them new foods, new clothes, access to the Internet and greater opportunities to go outside Ladakh to study and travel. Some of the interviewees highlighted however, that Ladakhis should take care of their traditions because these attract tourists and therefore sustain their sources of income.

This search for authenticity was documented by Simoni (2004) who studied behaviours of tourists visiting Ladakh. It appears that one of their main expectations was to discover and experience an authentic Ladakhi way of living. Many visitors, despite asking for modern and Western facilities (e.g. flushing seated toilets, diversity of food, internet access) also criticise the impacts of mass tourism on landscapes and on social characteristics of local people. This illustrates the paradoxical situation mentioned previously whereby the adaptation of Ladakh to demands generated by tourism can alter the 'authenticity' sought by many visitors and eventually lead to a decrease of the number of tourists. This has led several authors to question the tourism driven development of Ladakh stressing that the political instability of the region, economic slowdowns, fluctuations in touristic trend destinations or extreme weather events are all factors that could eventually reduce tourist arrivals (Michaud, 1996; Norberg Hodge, 2000). Using Butler's (1980) theoretical curve which represents the lifecycle of a tourist destination, Pellicciardi (2011) shows that Ladakh is going up through a 'development phase' but questions whether it will follow the curve up towards 'consolidation' before experiencing 'stagnation' and eventually going down towards 'decline'.

The previous sections have highlighted how economic processes and tourism generate negative impacts for the environment in mountainous areas. The next and final section will show how anthropogenic activities have to be included in the assessment of current and predicted effects of climate change in Ladakh.

4.6 Hazards and the impacts of climate change in the HKH and Ladakh

Mountain areas constitute intrinsically an environment prone to all sorts of hazards (floods, avalanches, landslides, earthquakes, etc.) (Dauphiné, 2001). The next section provides a review of hazards and projections of climate change impacts affecting the HKH region and particularly Ladakh. However, the susceptibility of such hazards to have detrimental impacts for mountainous communities depends upon aspects that go beyond environmental processes (see Hewitt, 1992 for a review). The fact that mountains are particularly exposed to the predicted impacts of climate change also has to be considered in light of the other drivers of socio-economic change depicted earlier that shape the vulnerability and capacities of mountainous communities to long-term environmental change.

4.6.1 Sources of climate data and studies documenting climate change in Ladakh

Although an increasing amount of research documents the various impacts of climate change in mountainous regions (e.g. Beniston, 2003; UNEP, 2009; Kohler et al., 2010), in the HKH range (e.g. Fenner, 2009; ICIMOD, 2009, 2009; Xu et al., 2009) and in the Eastern Himalayas (e.g. Sharma et al., 2010), mountains differ in altitude, shape, geology, vegetation cover and climate regime which means global warming will affect mountain areas in different ways (Neu, 2009). Climate change projections are thus difficult to build because they have to take into consideration the complex topography of mountain regions and its influence on local climate regimes. Thereby, if climate change is widely documented on a global scale, data relevant for a particular region is often missing.

A limited but growing number of studies documenting physical processes in Ladakh exist, mainly undertaken in the fields of glaciology and hydrology. Mukhopadhyay and Dutta (2010) and Mukhopadhyay (2012), for instance, have built a stream water availability model for the Upper Indus Basin. However, very little information exists to document climate trends and their impacts on local environments and livelihoods specifically in the district of Leh. The report from the French NGO

GERES, built in collaboration with Ladakhi organisations, is one of the few studies that have attempted to document the impacts of climate change on communities living in the districts of Leh and Kargil in the State of J&K, as well as the districts of Lahaul and Spiti in Himachal Pradesh. The study uses the only available source of temperature and rainfall data provided by the Meteorological Department of the Indian Air Force station in Leh (Angmo and Heiniger, 2009). The data provide monthly mean minimum and maximum temperatures and precipitation data (rain and snowfall) for Leh town since 1973, giving 35 years of data.

The GERES report additionally combines scientific measurements with human perceptions of the impacts of climate change on the environment and on local livelihoods. The authors, Angmo and Heiniger (2009), explain that interviews were conducted with older people from villages located within the working area of local NGOs and with prominent persons from the headquarters of each district. Although the report specifies that 20 such interviews were conducted for the district of Leh, it is not clear how many were done for the three other districts. Additionally, more than 200 Ladakhi inhabitants older than 35 years old were asked questions regarding changes in temperatures and precipitation over the last two or three decades as part of a survey that covered the four districts and over thirty villages (Ibid).

Authors of the report acknowledge that their research does not constitute an indisputable scientific assessment and point out the subjectivity of information gained through interviews. A deeper discussion of the accuracy of climate data from the Indian Air Force and its relevance for the entire territory of Ladakh was written as a book chapter and serves as a basis for the next section (see Le Masson and Nair, 2012). Nevertheless, the GERES report constitutes the evidence and a first step for analysing the impact of climate change in Ladakh. Given the limited nature of the available scientific data, the human perceptions of climate change collected by the NGOs' survey provide an additional and useful local source of information that can be correlated with scientific measurements. As stressed in Chapter 2, it is necessary to combine scientific expertise and local knowledge when studying adaptation to climate change (e.g. Tibby et al., 2007; Kelman et al., 2009; Le Masson and Kelman, 2010).

4.6.2 Projections of climate change impacts in Ladakh

In line with the expected patterns of global warming of the atmosphere across the globe, temperatures are expected to rise three times more in the HKH than the global average (Noguès-

Bravo et al., 2007; IPCC, 2007; Neu, 2009). In Ladakh, the analysis of maximum temperature for summer months in Leh conducted by Angmo and Heiniger (2009) shows an overall rise of 0.5°C since 1973, while the minimum temperatures for all the winter months have risen by nearly 1°C. The GERES report also indicates that the rising trend is sharper for the minimum temperatures in winter months. This increase of temperatures particularly in winter is supported by the base line survey and interviews conducted by the NGOs: 80% of respondents felt that the summer seasons were warmer and 90% felt that the winters were warmer too (Leh and Kargil districts only).

From studies conducted by Fowler and Archer (2006) in the district of Kargil and in Northern areas of Pakistan, slightly different trends can be extrapolated. Their scientific analysis of climate statistics suggest, for example, a general cooling of mean and minimum summer temperatures from the 1960s. However, their observations indicate an increase of winter mean and maximum temperatures and overall a winter warming trend which is consistent with other studies.

Variations of temperatures can generate a wide range of different impacts related to water runoff, glacier movement or biodiversity. With only a handful of scientific assessments conducted in Ladakh specifically, it is a hazardous task to summarise climate change projections that may not be relevant to certain areas within the region. The formulation of scenarios is highly dependent on the nature, availability and accuracy of climate data. In the case of Ladakh, for instance, climate data was only recorded for the military air strip in Leh town. Is it possible for data collected from a single point source to be relevant for the wider region of Ladakh, particularly in a mountainous region where the topography has a significant influence on climate variability? (See Le Masson and Nair, 2012 for a critique). Ahmed and Joyia (2003) indicate that stations that are often located on valley floors do not automatically represent similar meteorological data than those implemented at higher altitude or more exposed to wind. Moreover, measurements only began in 1973, which limits the general trends presented by the models in the GERES report. Is a 35-year period sufficient to draw generalisations? (Le Masson and Nair, 2012) With these limitations in mind, the next section attempts to review some of the predictions formulated for the HKH and compare them with the latest studies that particularly focus on Ladakh.

4.6.2.1 Disrupted seasonal precipitation

Studies generally suggest that seasonal rainfall and monsoon patterns in the HKH are likely to be disrupted (Xu et al 2009; Marty, 2009). For instance, the IPCC (2007) predicts an increase of the

average annual precipitation by up to 30% on the Tibetan Plateau by the end of the 21st century (Xu et al, 2009). On the other hand, precipitation in many areas seems to fall as rain instead of snow while the melting of winter snow occurs earlier in spring (Viviroli et al., 2007). An increase of temperature of just 1°C would raise the snow line by about 150 metres on average (Neu, 2009). Some areas could be particularly affected if they undergo a shift from snow-covered to snow-free which will affect the entire ecosystem at this altitude.

In Ladakh, data from the Indian Air Force indicates a decline in the precipitation amount in the form of snowfall from November to March. However, the data does not show any significant decline in the amount of precipitation in the form of rain for the summer months (Angmo and Heiniger, 2009). Among people interviewed in Leh District, 75% consider there to have been a decrease in snowfalls while 100% of those interviewed in Kargil District repeat a similar situation which is consistent with precipitation data. The GERES report provides the example of the main link road with the State capital Srinagar that closes later in the autumn and opens earlier in the spring than 20-30 years ago.

Respondents also indicated that summer precipitation is becoming more unpredictable, with episodes of sudden heavy rains which damage crops and fruit trees. Such events are commonly called 'cloudbursts' which are, according to the India Meteorological Department (IMD, 2010), a phenomenon where heavy rains fall over a very localised area which is what triggered the flood in August 2010. They typically occur "*when monsoon clouds associated with low-pressure area travel northward from the Bay of Bengal across the Ganges plains onto the Himalayas and 'burst' in heavy downpours (75–100mm per hour)*" (Ashrit, 2010: 1). For the Meteorological Department, Laddakh is not known to be frequently affected by cloudbursts (IMD, 2010) but the Indian National Centre for Medium Range Weather Forecasting offset this statement and explains that when these phenomena occur over remote and unpopulated areas, they simply go unnoticed (Ashrit, 2010).

Overall, projections of changes in precipitation patterns remain uncertain because climate models have to take many mechanisms into account such as the topography of the region or the influence of climatic variability (Beniston, 2003). Mountains themselves strongly influence regional climate regimes by acting as barriers for air flow which creates higher temperatures on the windward side and lower ones on the leeward side (Neu, 2009). Therefore, climate data can greatly differ from one valley to another which emphasises once more the necessity to study the impacts and build models at local scale (Ahmed and Joyia, 2003).

4.6.2.2 Contradictory predictions regarding the evolution of glaciers

Evidence of accelerated glacier shrinkage is increasing mainly through the measurements of glaciers' lengths that began in 1894 (Haeberli and Zemp, 2009). Despite the controversy in January 2010 regarding the IPCC report of 2007 which warned that most Himalayan glaciers would melt away by 2035, a statement later being disproved due to lack of "*well-established standards of evidence*" (IPCC, 2010), numerous scientific assessments have built up scenarios that predict the retreat of glaciers, particularly in the HKH region (e.g., Yao et al., 2004; Rees and Colins, 2006; Akhtar et al., 2008; Bhambri and Bolch, 2009; Chaujar, 2009; Dyurgerov et al., 2009; Fenner, 2009). A few studies focus specifically on the Upper Indus basin (e.g. Fowler and Archer, 2006; Schmidt and Nüsser, 2010; Kamp et al., 2011; Sangode et al., 2011).

In the GERES report, people interviewed gave several examples of glaciers that are retreating in the Zaskar Range due to the reduction in the amount of snowfall and the increase of winter temperatures which accelerate the melting. The creation and extension of glaciers depends on extremely low temperatures in combination with heavy snowfall during peak winter. The winter months in Ladakh are particularly important as the region receives almost 70% of its total precipitation in the form of snow (Mishra and Angmo, 2009). However, if annual temperatures are rising and snowfall decreasing, glacial cover will diminish impacting on water availability in streams, springs and groundwater (Ibid). Findings in the GERES report also state that the region's famous winter ice trek is accessible for a shorter period (Jan-Feb compared to Dec-March) and the Tsokar Lake begins melting in early March rather than the middle of April, creating difficulties for the traditional nomadic populations to cross with their cattle (Angmo and Heiniger, 2009).

Other scientific evidence shows different trends. The observed increase of mean and maxima winter temperatures, observed by Fowler and Archer (2006) in Kargil district and Pakistan, and the resulting decrease of snowfall is expected to only impact on the lower part of glaciers (Ibid). However, the general reduction of summer temperatures and positive trends in winter precipitation, according to their analysis, reduces ablation (i.e. the removal of snow and ice from the glacier by melting or evaporation) and favours the accumulation of glaciers (Ibid; Archer and Fowler, 2004). This observation appears consistent with studies documenting the thickening and expansion of Karakorum glaciers (Hewitt, 2005) but contrasts with the widespread retreat of glaciers in the Eastern Himalayas (Fowler and Archer, 2006).

4.6.2.3 A predicted decrease of water runoff and reduction of water storage

According to a global overview conducted by Viviroli et al. (2007), mountains provide twice as much runoff per unit area as lowlands in temperate climates, and often contribute as much as 90% to the total runoff of a river basin in arid areas. More than 1 billion people worldwide rely on snow-melt dominated runoff for their water supply (Viviroli et al., 2003). With the combined effects of glaciers melting, less snow storage, and changes in precipitation, hydrological systems throughout mountain ranges could be deeply affected (Bhutiyan et al., 2008). Studies suggest that stream flows in the HKH region are likely to increase significantly over the next decades due to the rising amount of melt water (Rees and Collins, 2006; Shrestha, et al., 2008). This, combined with the abrupt relief of the HKH region, explains partly the high frequency of natural hazards such as floods and flash floods on top of common hazards occurring in the area such as mudflows, landslides, erosion and avalanches (Merz, 2004). Additionally, with increases in seasonal maxima predicted by the IPCC, the increasing winter runoff is likely to flow directly to the ocean because of a lack of storage capacity (Neu, 2009).

However, in the long term, fluctuations in snow and ice melt are expected to reduce the volume of ice available for water storage and in consequence the glacial runoff (IPCC, 2007). Countries that rely mainly on snow and glacier melt will thus be particularly affected, especially in the HKH (ICIMOD, 2009). Less precipitation in some areas due to global warming could also lead to the drying up of springs, the dehydration of soils on farmlands and the reduction in the flow of local streams (Bandyopadhyay 2009). A prolonged period of warmer temperatures could also lead to the desertification of regions such as the Tibetan plateau or Mongolia (Marty, 2009). The long term decrease in glacial runoff combined with disrupted rainfall could dramatically affect water supply for downstream communities, particularly in sub-tropical regions which depend on a single rainy season (the monsoon) and during the dry season where areas could experience droughts (Barnett et al., 2005). The Indus is one of the rivers considered to be most affected by decreases in water availability (Xu et al 2009). Yet, Himalayan rivers provide freshwater for about 1.3 billion people which means that almost 20% of the world population will be affected by water shortage (Viviroli et al., 2009). Decreases in runoff could eventually reduce water for drinking, domestic use, irrigation and industry for mountainous communities but also in the whole area surrounding mountains (Fenner, 2009). Combined with higher temperatures, this could lead some regions to experience a decline in agricultural land, crop failures and loss of livestock (Hofer and Ceci, 2009). As 70% of the population of the HKH is estimated to rely on agriculture and animal husbandry for their livelihoods, the reduction of water runoff could seriously undermine food security (Sharma et al., 2010).

This is particularly the case in Ladakh, where the majority of communities rely on melt water and small glaciers for irrigation, domestic consumption and industry. Ladakh is relatively untouched by the summer monsoon season, meaning all glacial replenishment occurs during the winter months in the form of snowfall. Therefore, the predicted decrease in winter precipitation could result in long-term water scarcity as glaciers are depleted before they can be replenished (Rees and Collins, 2006). Additionally, shifts in precipitation patterns combined with fluctuations of water could potentially exacerbate hydrological-related hazards in the form of heavy and sudden rainfall, flash floods, floods, landslides or mudflows. Ladakh experiences recurrent flood events triggered by heavy and sudden precipitation as happened for instance in 2006 and 2010. A study conducted by ICIMOD on water storage in the HKH region deplores the lack of data on eco-hydrology (Bandyopadhyay, 2009). Fowler and Archer (2006), whose observations suggest different climate change trends than those generally expected in the HKH, stress that predictions of runoff response must be made cautiously. The Indus basin forms a complex catchment influenced by different climatic regimes (Ibid). According to their analysis, the cooling trend of regional temperature suggests a 20% decrease of runoff but this prediction varies from one river to another across the Upper Indus Basin (Ibid). Mukhopadhyay and Dutta (2010) and Mukhopadhyay (2012) have observed a substantial decrease in peak summer discharges throughout the Upper Indus Basin. They have also identified a shift of the peak river runoff from middle and late summer to late spring and early summer which has significant consequences on agricultural practices. The GERES study concurs with these scientific assessments whereby the majority of interviewees reported a decrease in water runoff in glacier-fed streams and natural springs in Ladakh (Angmo and Heiniger, 2009). On the other hand, the report reveals contradictions between accounts from the same village where some respondents report more water and others report less. Such differences of perception were also noticed during the fieldwork (See chapter 6).

Overall, water access is likely to be significantly affected by the impacts of climate change. However, this needs to be placed in the context of other processes described earlier including population growth, economic development, increased urbanisation and pollution which all contribute to the increasing pressure on water resources (Viviroli et al., 2009). One can easily foresee a potential for conflict resulting from higher demand and lower supplies, between downstream users and mountain peoples who are also usually located in different states. This will be highlighted in the next chapter. Climate change thus comes as an additional process that exacerbates existing pressures on natural resources.

4.6.2.4 Alteration of biodiversity and potential consequences for human livelihoods

Mountains host half of the world's biodiversity and a high level of endemic species (Kohler et al, 2010). However, increasing pressures on natural resources throughout the development of 'modern' societies have already caused loss of biodiversity. Ecosystems and biodiversity are now also likely to be deeply affected by rising temperatures, changing rainfall patterns and disrupted hydrological processes (IPCC, 2007). The consequences for the flora and fauna in the HKH region such as habitat destruction or shifting of the tree line could lead to the migration or even the extinction of certain species (Beniston 2003; Xu et al 2009).

According to Sharma et al (2010), changes in the timing of hibernation, migration and breeding in animals have already been observed as well as early budding, flowering and ripening of fruits. Even though animal and vegetal species could evolve or migrate in order to adapt to new environmental conditions, scientists warn that changes happen too fast for evolution to follow the same pace (Spehn and Koemer, 2009). Furthermore, the warming of temperatures could lead some species to extend their habitat to higher altitudes. This means that insect-borne diseases could spread in areas that were previously not affected by health risks, as already reported from East Africa and the Andes (Xu et al., 2008; Marty, 2009; Hofer and Ceci, 2009).

In Ladakh, based on observations from local inhabitants and the Worldwide Fund for Nature (WWF), the GERES report points out changes in local bird life with increases in certain populations and alterations of migratory patterns. This is possibly due to increased temperatures but also thanks to a better wildlife protection policy (Mishra and Angmo, 2009). Respondents also mentioned an increase in the number of pests and insects in fields and within homes which were not common before (Ibid). Furthermore, those interviewed as part of the Geres research agreed that apple trees were now grown at higher altitudes of 3,600 meters whereas they used to be grown only at 2,700 meters. Apricot and apple trees are reported to blossom earlier in spring. Overall, people grow more varieties of vegetables, including those with long maturation like pumpkin, eggplant and capsicum (Angmo and Heiniger, 2009). This illustrates the fact that mountain communities could also benefit from rising temperatures to develop agriculture and diversify their diets (Kohler et al, 2010; Hofer and Ceci, 2009). However, this opportunity requires water availability as well as land access and human capital which are all threatened by population growth, labour migration, and environmental degradation, as it is the case in Ladakh.

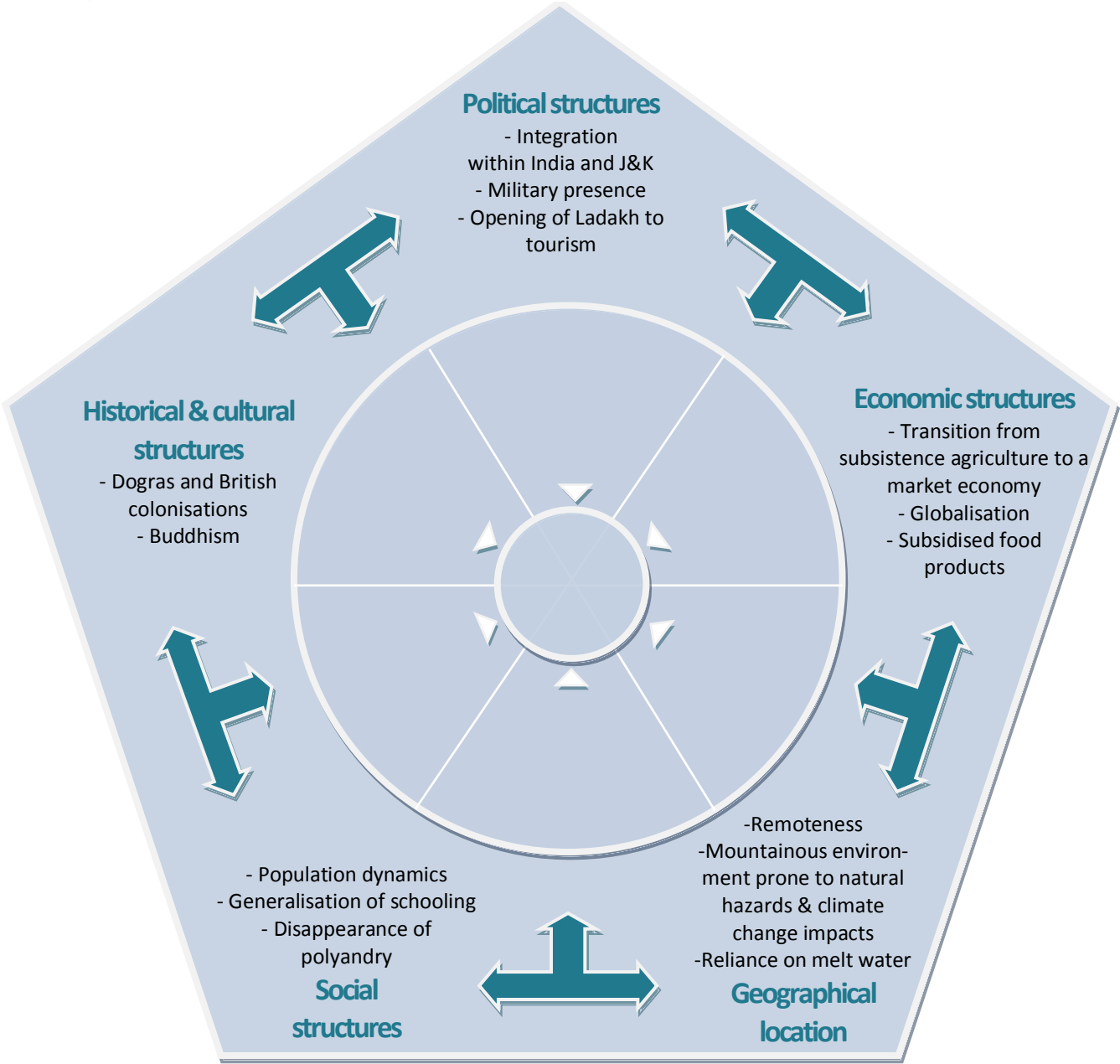
4.7 Conclusion

This chapter introduced the case study of Ladakh through the wider context of development in mountain regions of the global South. Societies are not static but they constantly change due to influences brought by trade, conquests, wars or exploratory and scientific expeditions (Goldsmith, 1998). The literature on resilience shows how societies can cope with changes brought by calamities or ongoing interactions with their neighbours, either by maintaining their socio-economic characteristics or by adjusting their functioning in order to survive and maintain their identity (see Gaillard, 2007 for a review). However, the rate of change, especially in mountain areas, is occurring much faster, from one generation to another (Hewitt and Metha, 2012). Population and economic growth are directly impacting negatively on the environment by generating more pressure on natural resources. Agricultural systems are losing their diversity and no longer sustain higher demands for water, land, food and energy. Increasing rural to urban migration modifies familial relationships and the socio-economic characteristics of mountain villages. Communities increasingly depend on the modern wage economy controlled by the global market upon which they have no control. Finally increasing interactions with western cultures through mass tourism are transforming local mountain societies in the South in both positive and negative ways. All these processes have occurred in Ladakh in a matter of only 40 years. Within this global context of rapid 'development', climate change comes as one driver of change among others that is likely to increase the risk of natural hazards, exacerbate existing issues linked to natural resource access and unsustainable development, such as food insecurity, and challenge local communities' capacities to adapt. This chapter accentuates the need for a holistic approach that emphasises social, economic and political structures rather than just climate. This aims to support the understanding of factors causing the marginalisation and the vulnerability of mountain communities to natural hazards and climate change from a societal perspective rather than the common hazard-centred approach (Hewitt and Metha, 2012). This addresses the literature that emphasises the necessity to acknowledge and explore the underlying causes of disasters as well as the particular context of mountain areas which are considered by Gaillard and Kelman (2012) to be under-researched.

Structures reviewed in this chapter serve as a starting point to understand the assessment of Ladakhi communities' vulnerability and capacities presented in Chapter 5. To facilitate linkages in the analysis, I draw from DRR frameworks, namely the Pressure and Release model (PAR) model and the Triangle diagram (see Figures 2.1 and 2.2 in Chapter 2) to re-organise the historical, socio-economic and political context of Ladakh according to a new typology. The latter includes political, economic

and social structures from the Triangle diagram as well as historical and cultural structures mentioned in the PAR. I have also added the geographical location as a factor shaping the marginalisation of the region in the face of natural hazards and the potential adverse impacts of climate change. Figure 4.7 summarises the resulting five structures in order to visualise how they relate to each other and shape the development context in Ladakh. This framework, which also enables other elements introduced in this chapter to fit into one or more of the categories, will support the vulnerability and capacity analysis conducted in the next chapter.

Figure 4.7 Summary of the main structures for Ladakh that will inform the assessment of vulnerability and capacity





Chapter 5

5

GENDERED VULNERABILITIES AND CAPACITIES IN RELATION TO DISASTER RISK AND CLIMATE CHANGE IN LADAKH

Objective I.

To produce a holistic analysis of the way Ladakhi communities experience climate change and natural hazards in relation to their everyday risks, using DRR frameworks and a gender perspective.

1. What are the structural factors shaping the development of mountainous communities in the South specifically Ladakh?

Chapter
4

2. What are the vulnerabilities and capacities of men and women to climate change in Ladakh, in relation to their broader marginalisation and the role of gender?

Chapter
5

3. How do Ladakhi men and women perceive and explain climate change compared to their everyday risks and which solutions do they identify to tackle the impacts of climate change and natural hazards?

Chapter
6

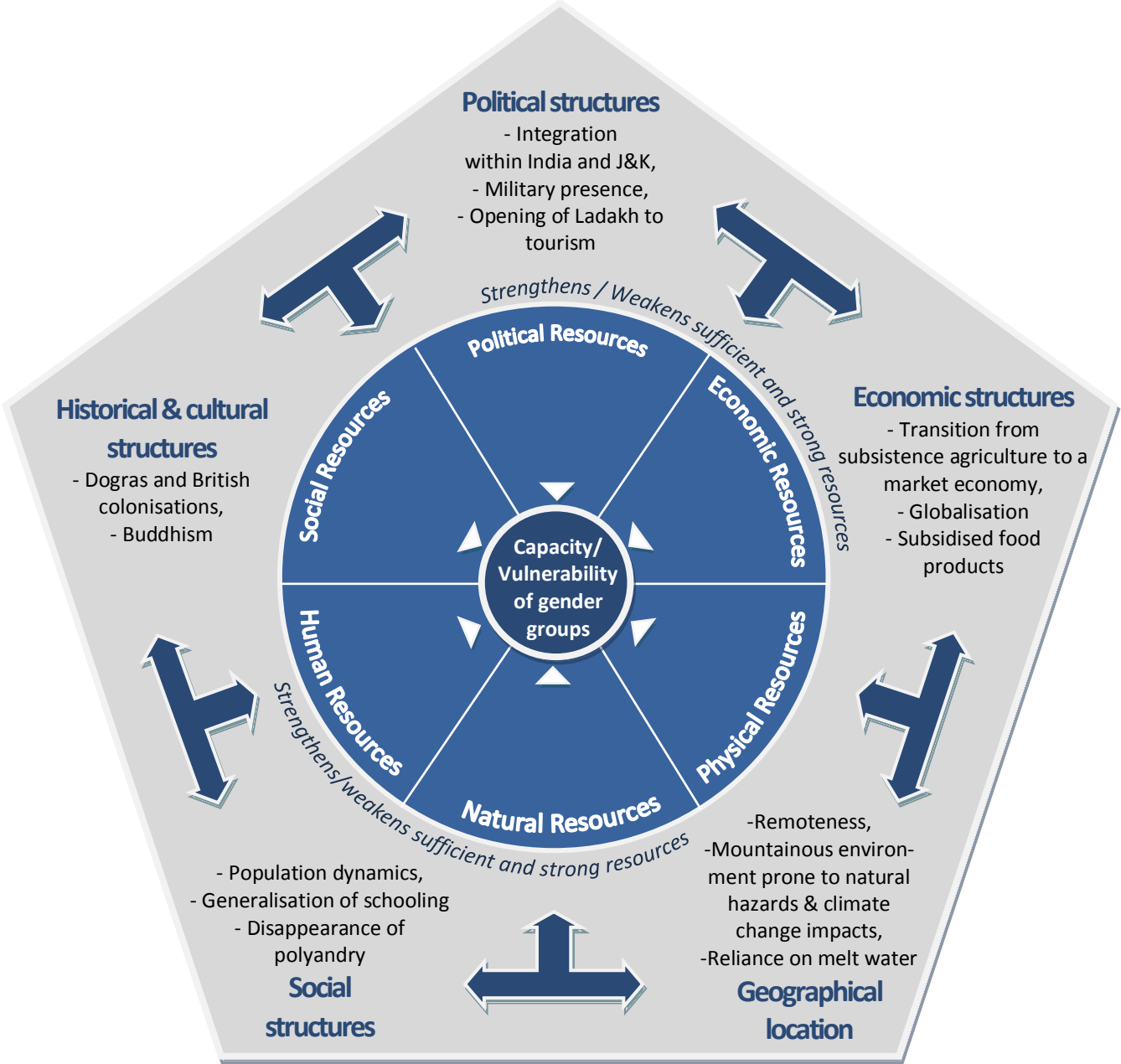
Drawing on the vulnerability approach to disasters, the previous chapter reviewed the structural factors shaping the development of mountain communities narrowing the analysis down to the particular case of Ladakh. The aim of this was to support the assessment of the vulnerabilities and capacities of local communities to hazards driven by climate change and other societal processes which constitute the focus of the current chapter. This assessment serves as a basis to evaluate the relevance of current strategies regarding Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) which will be the focus of Chapter 7. The assessment conducted in this chapter thus uses a social approach to disasters and climate change that *“invites consideration of mountains as physical as well as social entities, but also views their risks as embedded in human land uses, activities and interactions”* (Hewitt and Mehta, 2012: 2). It also adopts a gender perspective to address

recommendations that advocate the integration of gender in vulnerability and capacity assessments in both DRR and CCA sectors. Ultimately, this chapter, combined with Chapters 4 and 6, will help to build a holistic analysis of the way Ladakhi communities experience climate change and natural hazards in relation to their everyday risks and with attention to the interconnection of socio-economic contexts.

As explained in the methodology chapter, the following assessment supposes that vulnerability and capacity are reflected by people's access to resources and shaped by wider structures (Gaillard, 2010; Wisner et al., 2012). These structures, described in the previous chapter, can be associated with the 'root causes' of people's vulnerability and include the integration of Ladakh within India, mountain features of the region, population dynamics, rural to urban migration, the transition from subsistence agriculture to a market economy, tourism and predicted impacts of climate change. Such processes determine people's marginalisation and therefore the un/availability of and (lack of) access to resources, which are going to be reviewed in this chapter, in order to interpret and explain people's vulnerability and capacities. The literature review highlighted that in the face of natural hazards and other climate-related environmental changes, communities' and individuals' resources define people's hindrances or abilities to protect themselves, cope and recover from external shocks as well as daily pressures. The nature, strength and diversity of resources are thus fundamental factors that help us understand their vulnerabilities and capacities (Gaillard et al., 2009). This holistic approach considers that factors of marginalisation and resources are all interconnected. Therefore, despite using different categories of resources to help structure the text according to the new framework set out in Chapter 3, the assessment of Ladakhi communities' vulnerabilities and capacities has to be comprehended in a way in which people's resources and structural processes described in Chapter 4 can be all related to each other (Figure 5.1).

The first section begins with the analysis of gender differences that shape different roles and status and that build men's and women's human resources. The second section explores the way gender, as well as societal processes, influence people's perceptions of and access to natural resources, particularly water, rather than just looking at environmental features. Thirdly, the analysis focuses on households' economic and physical resources in order to examine how they influence individuals' vulnerability and capacity. In the fourth section, social resources mobilised by communities, but especially individuals, are assessed to determine how they strengthen their capacities and which factors could threaten these resources. The fifth and final section focuses on the political marginalisation of both communities and individuals and links this to their vulnerability. Although the analysis focuses on the three sites of study, Leh, Saboo and Phuktse, relating the data to the literature sometimes enables the analysis to reflect a wider reality at both household and community levels and across the region.

Figure 5.1. The influence of structures on resource access as a basis for analysing the vulnerability and capacity of gender groups



5.1 Social processes shaping gendered human resources

The literature review highlighted how social processes influence the marginalisation of individuals if they belong to a minority group and/or their age, gender, religion, sexual orientation, disability or if their caste is discriminated against. While this thesis acknowledges the influence and the interconnection of these different variables, I specifically explore the role of gender in shaping people’s vulnerabilities and capacities throughout this assessment. The next section begins with the

analysis of human resources and the way gender, together with the role of age, influence individuals' skills, health status, knowledge and access to formal education.

5.1.1 The underestimation of gender as a factor of marginalisation within Ladakhi communities

When participants were asked their opinion about gender equality in Ladakh, the majority of them, both male and female, and in the three sites of study, replied that although women were discriminated against in the past, they were now benefitting from an equal status with men as a result of the better access to education for girls. This is best summarised by Raheela (F, 70, Leh, housewife):

Before men were more privileged and girls could not go to school, they had to stay at home doing housework. Now gender is equal in Ladakh.

Many interviewees also considered that Ladakhi women have an equal if not higher position than men within the household or in the village, especially when compared with the rest of India, as emphasised by Stanzin (M, 31, Leh, tour operator):

I think women are much more superior in Ladakh because they take more decisions than men. I think this thing is part of Ladakh. So it is a kind of different respect for women compare to other parts of India. In farming also, they are the main to grow things.

The way interviewees considered gender equality may be that they genuinely perceived gender relations to be equal, but it is also possible that they were keen to represent Ladakh as relatively modern or morally superior to other parts of India (to a Western researcher). The gender sensitive methodology presented to participants also meant that they were perhaps more inclined to stress that women are equal to men. Such a perspective on gender equality and women's relatively higher status in Ladakh has been highlighted in the literature documenting Ladakh (see Norberg-Hodge, 2000). According to Crook (1980), polyandry provided women with a higher status and greater influence within the household, the main level for decision-making regarding basic needs. In terms of gender roles and activities, which, as highlighted in the literature review, influence the status of individuals, Norberg-Hodge (2000) found that roles between men and women in Ladakh are not so clearly defined as elsewhere. Although a few tasks such as ploughing the fields, slaughtering cattle and felling trees are carried out exclusively by men, both sexes undertake most activities within the house and in the village. She adds that women overall work harder but that the difference is marginal and that the reproductive role of women is much more recognised than in the industrialised world as

well as their knowledge of natural resources (Ibid). She further emphasises that Ladakhi women thus have the opportunity to take an active part in the economic life of the family. Similar accounts were provided by interviewees especially men who considered that although some gender roles are clearly defined (reproductive activities and domestic chores are the responsibility of women while men are usually in charge of productive and income generating activities) the workload is equally shared, both sexes participate in the fieldwork or labour work and both enjoy an equal status. This was also the case of the majority of female interviewees who saw differences in gender roles as being complementary, such as Yangchen (F, 50, Saboo, farmer):

Women work more but men work outside and earn money so still gender is equal.

On the other hand, Hay (1997) used a feminist perspective to explore more in depth the position of Ladakhi women within marital and household structures, power and resource allocation within these structures and the division of labour. Her research suggests that facing the rapid process of modernisation, changes in the Ladakhi society might have led to a '*polarization in gender roles*' (Hay, 1997: 189). For instance, with the decline of polyandry and the shift towards nuclear families, she found that women were slowly losing their traditional decision making power within the household. With this perspective in mind, questions asked during interviews progressively evolved in order to triangulate the initial response of participants.

At first, people were asked how the workload was organised within their household between men and women. Female interviewees mostly considered that their workload was more or less equal compare to their male counterparts. In contrast, men's opinions were more ambivalent. Half of them considered that the workload is actually heavier for men such as Phunchok (M, 17, Phuktse, student):

Men do more work because they earn, they go shopping and they have to take the main responsibilities. Women they just look after the fields.

Interviewees who shared this opinion also provided accounts that suggest a lesser role for women in decision-making. Konshok (M, 69, Phuktse, farmer/shepherd) explained:

In the house, women do more work but outside it is the men. Overall, men bear the burden on what has to be done, they have the power to decide and to plan.

This has to be balanced with the tendency of the other half of male interviewees who thought that the workload is equal if not heavier for women. Those sharing this opinion also considered that women have a great role in decision-making in the family especially when they compare with the rest

of India. Sonam (M, 25, Phuktse, farmer/trekking guide) and Jigmet (M, 44, Phuktse, farmer/labourer) respectively said that:

Generally speaking, it is the men who are treated as the dominant part, but in the house it is actually women who have the power, they have the say. And these days, the women are also educated so they have more say.

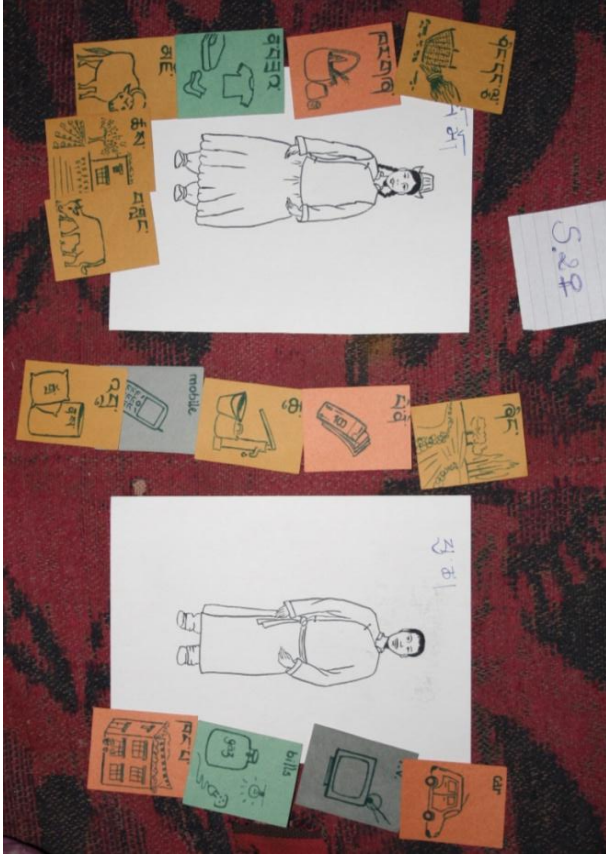
Women are more powerful. [Why is that?] Because women are more assertive, if they say you shut up, then you shut up. And women face more hardship.

Such differences in perceptions of gender roles and power were further explored during the participatory activity conducted as part of the interview. Interviewees were asked, in relation to each physical asset and daily activity, whether male or female members of the household were in charge of managing it (See Figure 5.3). If one asset was more the responsibility of women, the picture was placed on their side and similarly regarding assets more controlled by men. Assets shared and controlled by both men and women were placed in the middle. This activity was conducted with every interviewee to learn more about their physical resources but also to explore their perceptions of their gender roles, their status and to visualise potential conflicting views within the same households.

Among respondents' answers that could be compared with their male or female counterparts, several examples showed that men and women had similar perceptions of the distribution and the control of resources and on the sharing of their daily activities. However, and overall, the majority of comparisons indicate that although participants agreed on resources that they owned as a family, men and women seemed to have different perceptions of their daily tasks or responsibilities and control over certain physical assets. In Figure 5.2, for example, Norgyas in Saboo, represented in the top right corner, thought that since he is the one earning money, he is also in charge of the budget whereas his wife on the left indicated that they both manage their income together. In Phuktse, Nawang, in the lower right corner, stated that he is in charge of the fieldwork, collection of fuel and the management of grain stocks whereas his wife claimed that she does all this. This highlights people's different ways of seeing and commenting their own lives even if they share the same household, and therefore the need to take into consideration the diversity of people's views even if they belong to the same family or the same community. This will inform the analysis of local communities' perceptions of their everyday risks in relation to climate change in chapter 6.

Figure 5.2 Examples of activities conducted with members of the same household in Saboo and Phuktse (Le Masson and Nair, 2011)

Saboo



Women



Phuktse

Men



Overall, the majority of women's pictures from the activity show a greater number of yellow cards on their side which represent fieldwork activities, the collection of fuel, the fetching of water or looking after the animals. In contrast, grey, orange and green cards which respectively represented the use of modern technology, responsibilities for shopping or managing the house and the control over the household's financial budget were more often on men's side.

Participants were asked later in the interview who they thought between men and women, have a harder life in Ladakh. It could be advanced that the activity influenced answers provided by some interviewees such as Thupstan (M, 27, Leh, travel agent) who said that he never realised his mother was doing so much work (as mentioned in Chapter 3). This seems to have been especially the case for women. Although the majority of female interviewees expressed, at first, that Ladakhi men and women have equal status and workload, their accounts altered after the activity when they were asked who had a harder life. Perhaps, this activity enabled participants to reflect more on their roles and provide answers that correspond more closely to the actual gendered distribution of resources and power. Hence, every female interviewee eventually stated that life is harder for them because their amount of work is heavier than men's and remains constant throughout the year. Yanchan (F, 67, Phuktse) and Chorol (F, 62, Phuktse) explained:

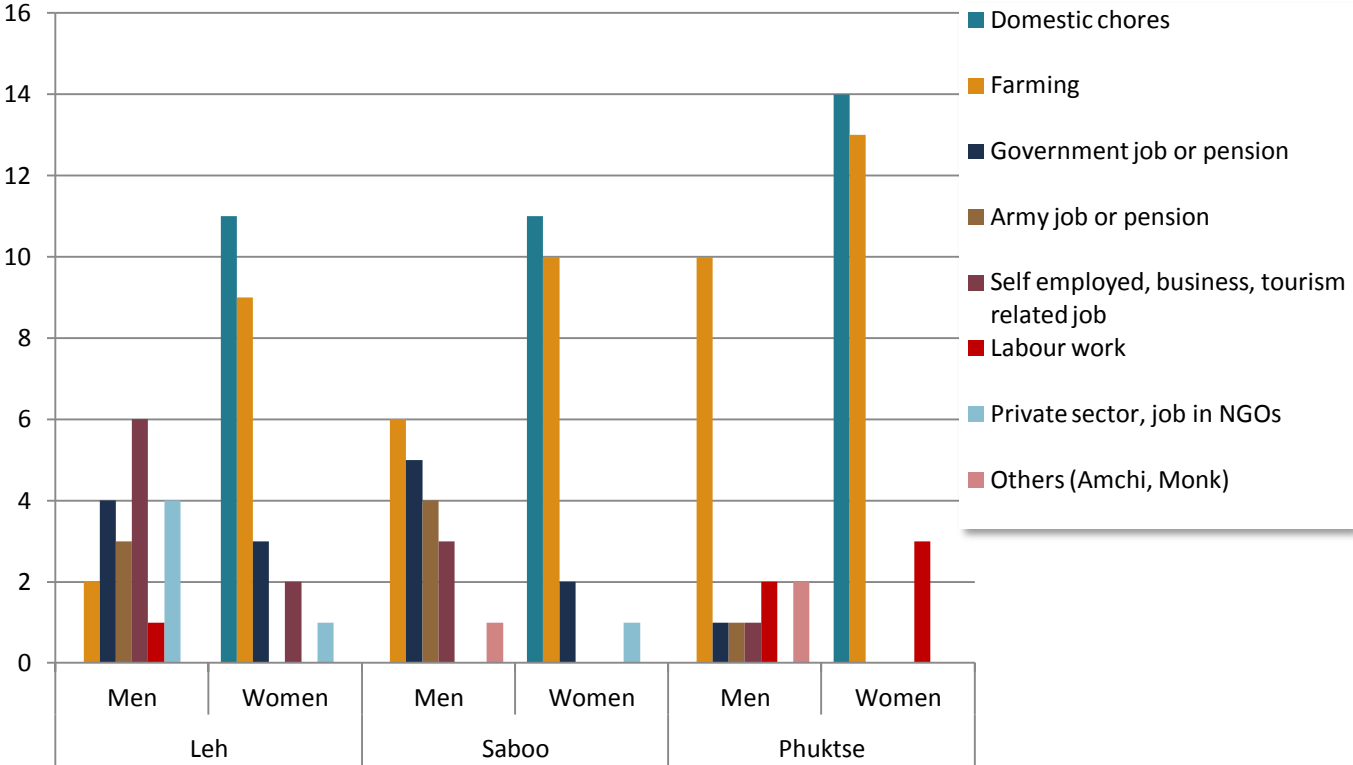
It is harder for women. We do all the household work [...]. The men don't do much on the field, only during the harvest season, they plough, they help a little, otherwise they don't water the field, and look after the livestock.

Most of the guys, they either go trekking or walk around, they don't do much work so women have to do all the work.

While women expressed facing heavier workloads, their answers also indicated that they have fewer opportunities than men to engage in income-generating activities or earn as much income as men. Graph 5.1 shows that in the three villages, women were mostly involved in domestic chores and farming while a few were undertaking tourism-based activities in Leh and a few others also worked as labourers in Phuktse. In contrast, male interviewees seemed to be involved in a wider range of activities which usually generate cash-based incomes and none of them stated participating in reproductive tasks within the household. The account of Yanchan (F, 67, Phuktse, farmer) illustrates this tendency:

In most villages, you will find more women in number because men are more employed either in the army, or in running a business in Leh, or driving taxis, and some are government employees, so women participate more in the field work.

Graph 5.1. The division of interviewees' activities according to their gender and the village they live in.



To explain this, Norberg-Hodge (1991) and Hay (1997) highlight the transition from subsistence agriculture to a market based economy that has widened gender differentials in Ladakh. Men seek employment in the army or in the government and take advantage of tourism by becoming travel agents, guides, cooks or taxi drivers while agriculture, devalued and considered as non-lucrative, is mostly associated with women. Section 5.2 will explain that people engaged in income-generating activities are characterised by greater capacities to cope in times of shocks and stress.

The gender-based division of labour whereby women are more assigned to devalued reproductive tasks and low paid jobs may limit their ability to save money or to take decisions. This makes them more dependent financially on other household members who earn sufficient and stable income and who are usually men. In some cases, their vulnerability is exacerbated when their families' male members also depend on an informal activity with irregular incomes. This was the case for a few female interviewees who highlighted problems of alcoholism among men, especially in Phuktse, which prevented them from accessing sufficient financial resources. Farmers and housewives Wangmo (F, 60) and Gyalpo (F, 41 - See Figure 5.3) from Phuktse respectively explained:

I don't get help from my husband. He just sits at home, eats and drinks. Most men drink in the village.

My husband drinks a lot so he doesn't work that much. Whatever he earns he spends it on liquor.

To cope with this, women explained that they either worked as temporary labourers and/or borrowed money from richer households in the village in times of crisis. These are some of the examples of coping strategies developed by women that show their capacities to generate and manage income, their skills that enable them to cope in difficult situations and the value of their knowledge and opinions for important decisions.

Figure 5.3. *Gyalpo's perception of resources that she owes and controls and her daily responsibilities compared to her husband (Le Masson, 2011)*



Despite preconceptions about men as the main breadwinners, Ladakhi women, most of whom are subsistence farmers, are the primary food producers and thus have a crucial role in providing daily sustenance. Urygan (M, 23, Leh, travel agent) recognised that:

Without women, it is too difficult for us because they can cook everything and take care of the house.

This also stresses that stereotyped gender divisions of work may enhance the capacities of women with skills such as cooking, taking care of and providing for children and the elderly which all help

people better cope in times of crisis. For instance, I learned during one informal discussion with a local woman that, in 2010, the floods had washed away a camp site near a remote village where trekkers were staying. She said that women led others villagers to search seabuckton bushes (local thorny bush) downstream to look for foreigners' belongings that might have been caught up. In parallel, all women washed the trekkers' clothes.

Finally, a few female interviewees highlighted that their role and activities give them legitimate power in their family and community even if some of their male counterparts will not admit it. Laila (F, 37, Saboo, farmer/housewife) emphasised that:

Within the house the mother leads more because she looks after everything.

The burden of everyday and repetitive chores seemed also to be accepted by many women as an intrinsic part of their life that cannot be questioned and therefore was not automatically raised as a concern. During one focus group discussion in Leh, a group of women instantly removed from the ranking of problems the pictures that illustrated 'physical work', 'domestic tasks' and 'looking after children'. Below is an extract of their conversation:

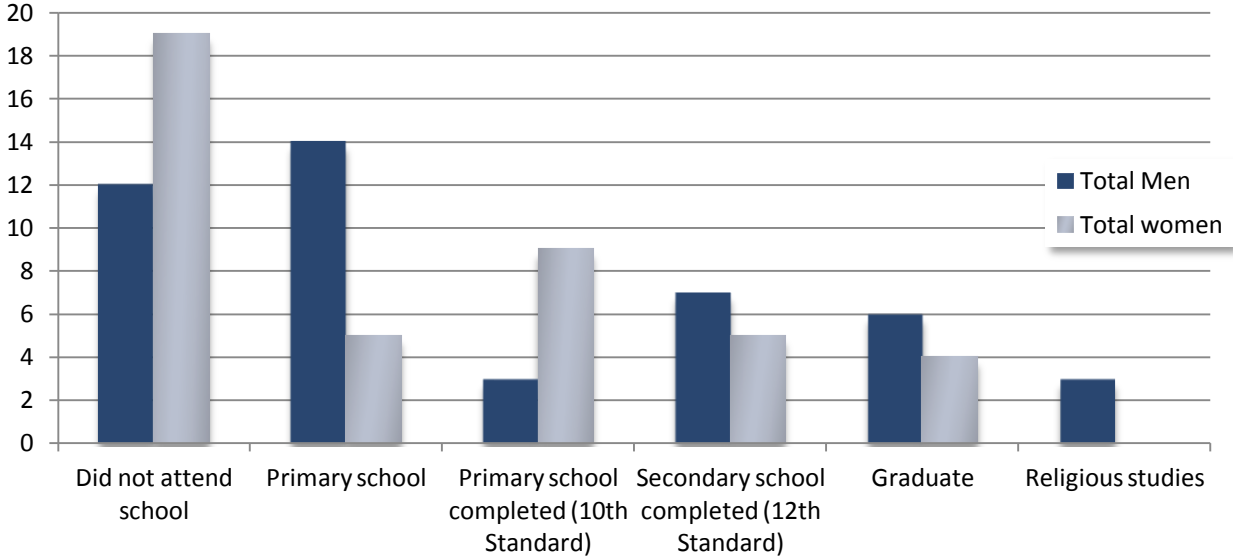
- *We have to take care of children.*
- *It [looking after children] should be important because kids are the future of Ladakh... even working on the land, we don't have a choice, we have to do it and we have to take care of children. Even food is important, we have to cook and eat.*
- *Yeah, so these three [pointing at the pictures] are not really a problem.*

Their conversation suggests that (i) those tasks need to be done for the proper functioning of the household and the community and that (ii) they should be valued as fundamentally important activities performed by women and not highlighted as problems. This underlines how a gender analysis can provide important insights regarding actors' situated positions and way of seeing in contrast to dominant perceptions of productive activities (Harcourt, 1994). This will inform the discussion in the following chapters.

5.1.2 The role of education to balance gender inequities?

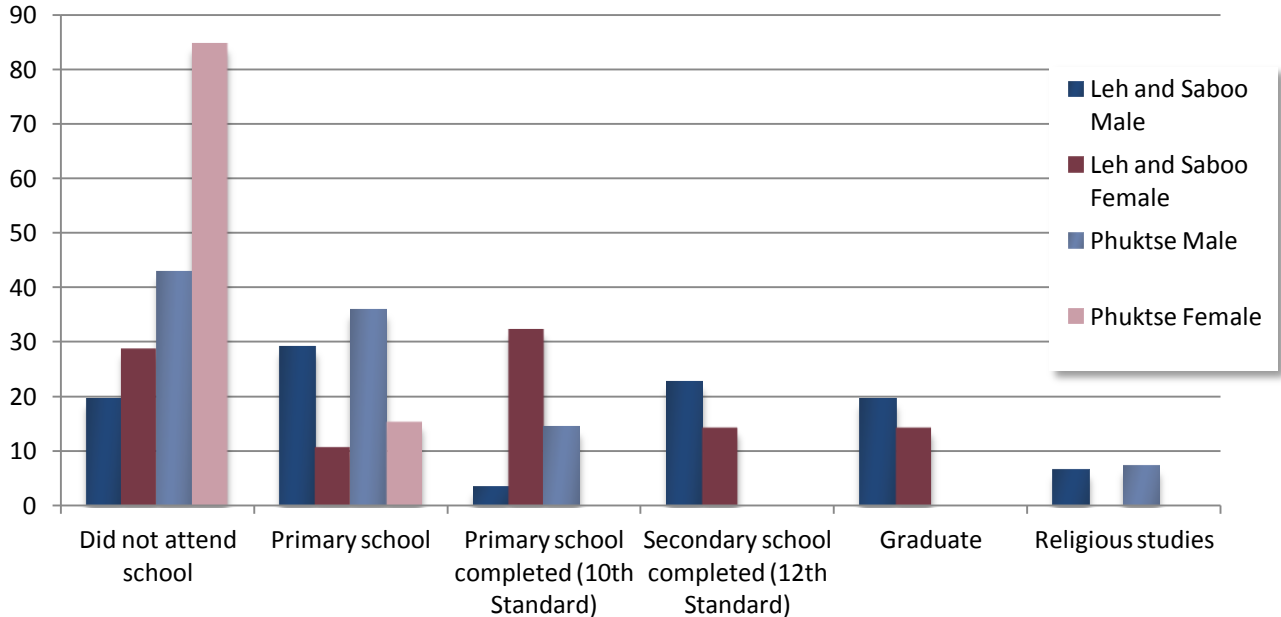
In light of gender inequities in workload and access to certain activities, the majority of interviewees considered that access to school and formal education now equalise younger men and women. In 2001, 75.5% of men in Ladakh were literate against 52.7% of women (Census of India, 2001).

Graph 5.2. Comparison of the level of formal education between male and female interviewees.



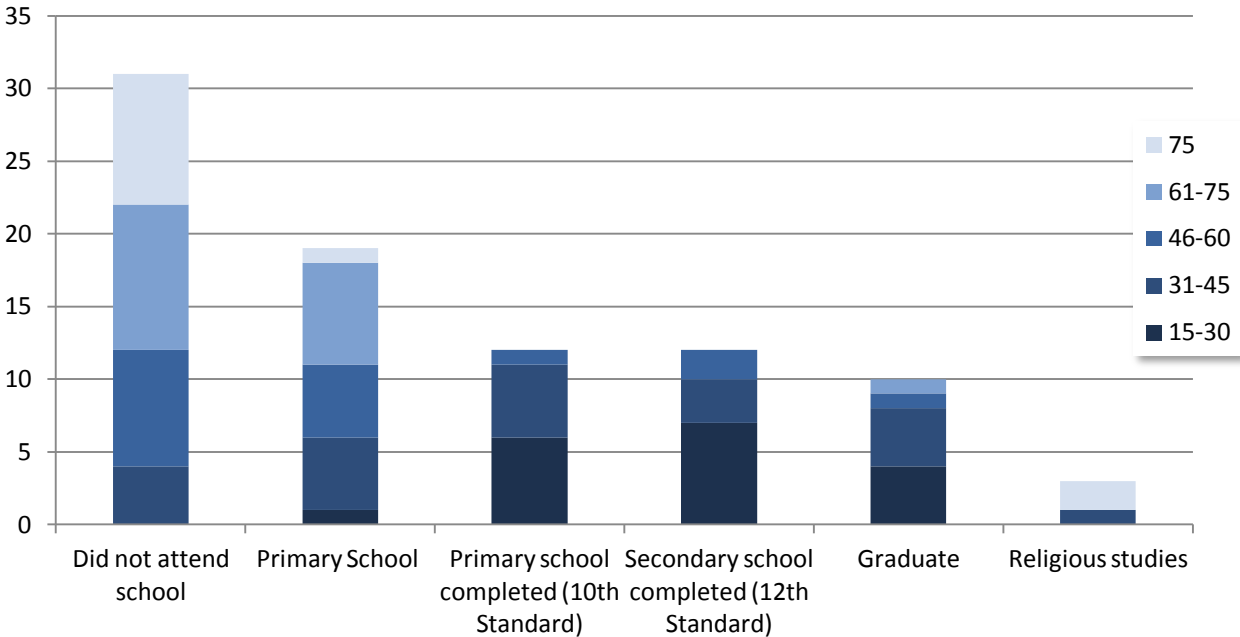
Graph 5.2 shows that among interviewees, a higher proportion of women never attended school while a higher number of men had completed secondary school and had a university degree. This trend has to be related to the geographical location, as geographical remoteness tends to accentuate inequalities to the detriment of women. Graph 5.3 shows that 85% of female interviewees in Phuktse never attended school while the remaining 15% never completed primary school. In contrast, almost half of male interviewees went to primary school but none of them continued their education beyond the secondary level, which compared unfavourably to interviewees living in Saboo and Leh.

Graph 5.3. Comparison of the level of formal education among male and female interviewees and between those living in Leh and Saboo combined and Phuktse



Inequities of access to formal education are also evident when looking at interviewees' ages. Graph 5.4 shows no one above 60 years had completed primary school whereas almost all younger respondents below 30 years old had. Available statistics for Ladakh do not enable a comparison between inhabitants' ages and the literacy rate but and it is reasonable to think that a similar observation can be made across the whole region.

Graph 5.4. Level of formal education according to interviewees' age in the 3 sites of study.



The disparity between men's and women's literacy results from their unequal access to school that prevailed until recently. Since modern schooling was introduced in Ladakh in the 1960s, it remained a boys-only privilege for the following two decades. The majority of interviewees, especially women, explained that girls had to stay at home while their brothers attended school. This was the case for Dolkar, 37, from Phuktse:

When I was young, parents did not send the daughter to school because they thought the girl should be more involved with the housework, cattle grazing, watering the field and all. Only the boys would go to school.

The majority of interviewees emphasised that although the lower level of formal education characterising women above 30 or 40 years old prevented many of them from accessing formal employment and earning a stable salary, they emphasised that the trend has changed and both young men and women can now access formal employment.

Formal education might increase the opportunities of getting a formal job, earning a higher salary and thus accumulating savings as security against a shock (Sanderson, 2012). Graph 5.1 showed that those who are the most involved in formal employment within governmental institutions, the army and tourism are men who are also those who went to school and/or studied to higher levels. In contrast, women's lower literacy might have undermined their chances to access formal employment. Therefore, they are likely to rely on subsistence agriculture or informal income generation activities, a category that will be highlighted in section 5.2 as the most marginalised economically.

Conversely, the lower literacy rate characterising the elderly does not seem to have stopped the majority of men accessing formal employment, which confirms gender disparities to the detriment of women. For instance, out of 17 male interviewees that were aged above 60 years old, 13 were retired from the Indian administration or the army and were thus benefitting from a pension. Yet, none of them completed primary school. In contrast, two out of the 17 female interviewees above 60 years old were occasionally working as labourers and only two were retired from the government. These two were also the only ones to have attended school. Therefore, while access to formal education appears to be a factor favouring access to employment in the case of women, it has not prevented older men from accessing formal work and diversifying their economic livelihoods. In fact, many uneducated men have been employed by the administration or the army in the previous decades, which provided their households with high and stable cash revenue. Today, pensions of elder males provide most households with a significant economic resource particularly for widows and for farmers who might not have any other means to obtain cash as is the case for many families living in Phuktse. Moreover, while lower literacy rates do not prevent men from engaging in productive activities, the better access to formal education does not necessarily guarantee women greater access to formal employment. One local NGO worker explained:

Women migrate to Leh or outside Ladakh to study and many find themselves unemployed living in rented flat. Educated women expect to have a job in an office. They are waiting for a governmental job but it is very hard for them. Women can't find jobs in the army so many are unemployed compare to men.

This compromises the role of education as a factor reducing gender inequities because other social structures, such as traditional gender roles, have to be taken into consideration. This underlines the relevance of adopting gender lenses to understand inequalities between people that create different constraints for men and women.

5.1.3 Formal education to enhance people's capacities?

Despite the analysis above, education was nonetheless perceived as a gender equalising factor by the majority of interviewees but also as the main way to achieve 'modern development'. Gurmet (M, 37, Leh, taxi driver) explained:

Ladakh is a very backward area but in the rest of the country, people are very advantaged so our children they have to work [study] more because they have to face modernisation.

However, although the young generation benefit from a higher literacy rate, better access to higher education and have more opportunities to migrate within and outside the region, they face tough competition to access formal employment. The lack of job opportunities was a recurrent topic in people's discussions, as for Karma (M, 80, Saboo, retired from the administration):

There is a big problem of unemployment in Ladakh. Because all the young after having completed their education, they are coming back to Leh. And really, they don't have big hope and opportunities. We lack opportunities in Ladakh because we don't have industries. Only tourism. The governmental jobs are very few and only the best candidates are selected. But now it is a very critical situation. No jobs, no work.

When talking about issues of unemployment, interviewees meant the difficulties to obtain a job within the army or the governmental administration. In fact, only a position within a governmental office or military facility is considered as a 'job'. For instance, when 37 year old Gurmet was asked what his occupation was, he replied that he was unemployed but later in the interview he said that he was a taxi driver. Similarly, guesthouse-owner Tsewang from Leh considered herself as an unemployed housewife and farmer despite earning most of her income through the hosting of tourists. Perhaps one of the reasons that lead most people to hope for a job within the government for themselves or for their children is the pension received by elder household members.

The role of formal education as a way to enhance people's capacities can also be discussed. For instance, the incentive to obtain a job within the administration or the army leads the younger generation to progressively abandon farming. Rabgyas (M, 48, Saboo, farmer) explained:

The population is increasing at a fast rate and the present generation is all into school education and they won't do what their grandfathers and mothers do [...] ploughing, farming, looking after trees... Being educated they will neglect this part. So because of the overpopulation there will be fewer government vacancies, it will be very hard to get a proper job and there will be a big problem for the next generation.

Phuntsog (M, 41, Phuktse, shepherd) also stressed:

In the coming years because children are sent to school, they will be educated so they will neglect this farming work and they won't look after the livestock [...] because they treat it as an inferior job. And because of that there will be a shortage of food grain, meat, milk... So the future looks bleak.

Therefore, and although the majority of interviewees considered that the generalisation of schooling has enabled young people to widen their economic resources and perspectives, a third of respondents, particularly the elderly, were worried that this has been at the expense of traditional knowledge of farming practices. In Phuktse, interviewees also stressed that because children now attend school, they have less time to provide help to other household members. Konchok (M, 69, Phuktse, shepherd) emphasised:

There is no shepherd boy because they are sent out for education. It is very hard for parents back home because there is no one to help looking after the cattle.

Since women are primarily responsible for domestic and fieldwork activities, reducing help from their children (but also from men working outside their villages as further explained in section 5.3) increases their workload while costing more money to the household. Kunzes (F, 50, Saboo, housewife/farmer) and Gyalpo (F, 41, Phuktse, farmer/housewife) respectively explained:

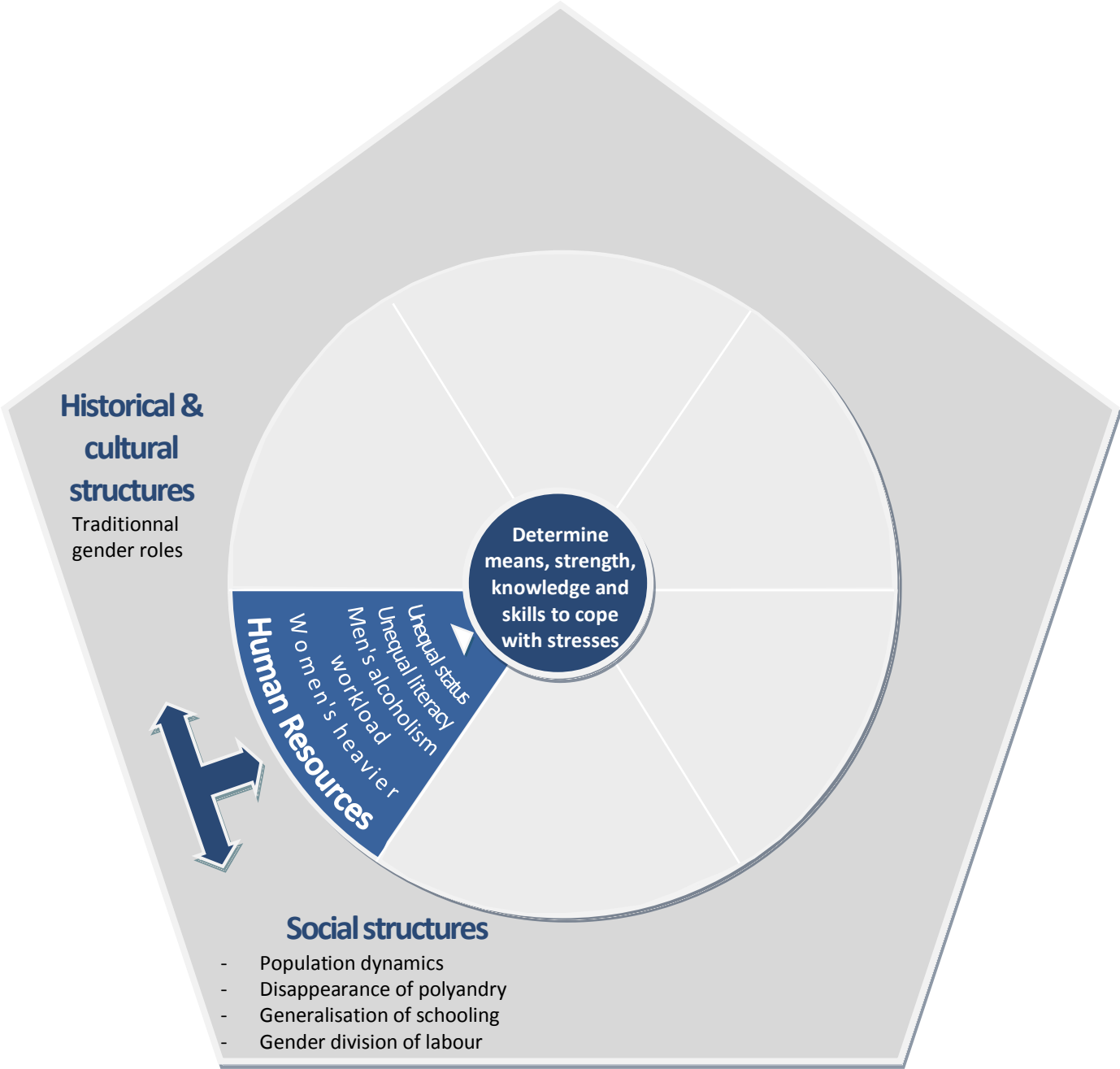
I worry about the fieldwork due to the lack of family members so we have to hire labours and it is the same with other families. Before families were big and only some children could go to school.

My life is more difficult now because each kid has to be educated. Before it wasn't the case. But without education we can't get money. Even labourers need to be educated now.

This emphasises the paradox linked with education and development. Despite the difficulties to afford children's studies and increasing competition over limited job opportunities, the majority of interviewees considered the education of their children as their main priority because it still provides them with a better chance to access a cash income generating activity. People underlined that their efforts were worth the hope of an easier life and improved living standards. In contrast, whereas the older generation combine subsistence agriculture and salaries from one or several members of the household, the next generation who tend and aspire to live in a separate household might find itself with less economic resources to afford basic services at higher prices. This could increase their vulnerability in times of crisis and force them to also rely on external assistance.

In summary, this first section has introduced how the interconnection of different socio-economic structures shape the marginalisation of individuals, men and women, young and the elderly, in different ways. As illustrated in Figure 5.4, this determines their human resources such as their knowledge, status and skills that influence their vulnerability in times of difficulties and their means to access other resources which will be reviewed in the following sections.

Figure 5.4. Summary of the way human resources are shaped by different structures and influence men’s and women’s vulnerabilities and capacities



5.2 Access to natural resources: the water issue

Communities in Ladakh have continually lived in one of the highest inhabited regions in the world and adapted to its cold and arid climate that constraints the availability of natural resources. The next section focuses on factors influencing local communities' access to water, underlined by interviewees as one of their primary concerns.

5.2.1 A cold desert vulnerable to shortages of water

Prolonged winter with freezing temperatures, scanty rainfall and rocky terrain at high altitude, all significantly limit the options of crops that can be cultivated in Ladakh (Singh, 2009). This has not prevented Ladakhi communities from developing agriculture and livestock rearing in such a restrictive environment. For centuries, they have relied on the production of wheat and especially barley, the main cereal that grows across the Tibetan plateau. Depending on the altitude and availability of water, many families also grow vegetables, fruits and potatoes that can be sold in the market.

As in the rest of the mountains of Central Asia, families living in very high settlements and nomadic populations largely depend on animal husbandry and use high pasture for grazing livestock. Domestic animals are essential in daily activities and for the economy (Dame and Mankelow, 2010). The yak and the *dzo*, a hybrid between the yak and the cow, are used for ploughing and for carrying loads. Cows, *dzo-mo* (female of the dzo) and *dri-mo* (female of the yak) provide milk, which families drink and use to make butter and cheese; sheep and goats provide wool and meat; ponies and donkeys are used for carrying loads and overall, domestic animals provide dung, the main fuel used for cooking and the main fertilizer.

To sustain both agriculture and livestock rearing, the availability and access to water constitutes a crucial issue. The majority of villages rely on water from the melting of snow in spring and the melting of glaciers in summer that is brought down to the fields through an old elaborate network of channels. In some hamlets like Ayu in Saboo, this is complemented by water from springs and marshes. In Leh and in a few other villages, bore wells located along the Indus River also tap the aquifers to provide inhabitants with water. Overall, irrigation needs to be organised and regulated in order to distribute water to every farmer. Local communities thus rely on a traditional water management system called the '*churpon*', i.e. one or several persons appointed by villagers who block or open the canals as required and allow householders to divert channels into their own fields

for a limited period of time (see Labbal, 2000 for a review). The equal allocation of water is paramount during the first two months of the growing season (April and May) when temperatures are not high enough to induce the melting of glaciers and when irrigation only relies on snow-melt.

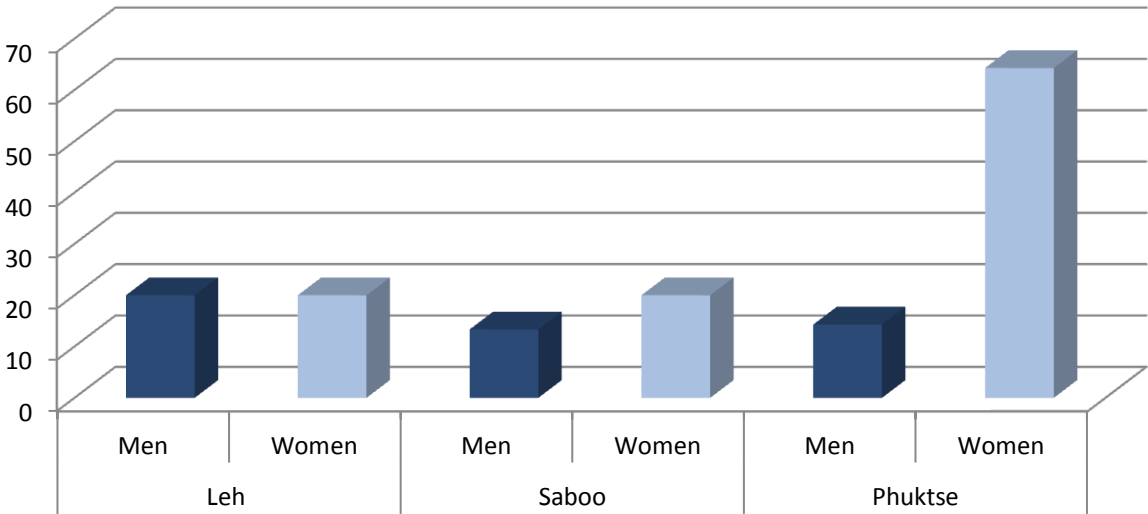
The geographical context means that communities, which are mostly rural, are highly vulnerable to fluctuations in water availability and shortages resulting from episodes of drought. In Phuktse, the majority of interviewees complained that in late spring the weather was cloudy and temperatures too cold for the glacier to melt. Therefore an insufficient amount of water could be distributed to all villagers of the valley through the rotation system. Konchok (M, 69, Phuktse, farmer) explained:

We have already sown the wheat and the barley but I'm concerned that there is not so much water in the stream at the required time. [...] We have only one stream and the whole region is depending upon that main source. If there is not a good amount of sunlight and warmth then there is not a good amount of water. [...] We have this rotation basis, so if today it is Puktse's turn then tomorrow it will be the turn of Sharnos for 2 to 3 days and after that, next 2 days, Shara. Then again it will be our turn.

Although male respondents expressed ambivalent opinions on whether the quantity of water has been reducing over the years, almost every woman interviewed was concerned that water resources are depleting. According to Rinchen (F, 48, Saboo, housewife/farmer):

This is the main problem. Because of water shortages, it is not possible to farm. Many neighbours can't cultivate all their fields because of the lack of water.

Graph 5.5. Interviewees expressing concerns over water availability as a percentage of the total number of male and female interviewees in each site.



Graph 5.5 shows that women were more concerned with water fluctuations particularly in Phuktse. This could be explained by the fact that women are primarily responsible for collecting water, irrigating the fields and looking after their gardens and livestock which provide them with a strong knowledge of their surrounding natural resources and perhaps a greater awareness of current and/or potential impacts of environmental changes. Because their activities make them interact more with the environment women are likely to be the first to experience pressures linked with the availability of natural resources, particularly water. Women stressed that the lack of water is one of their primary concerns as it can prevent them from irrigating their fields and securing their yields which impacts negatively on their food stocks, incomes from cash crops, fodder for animals and, therefore, on the physical resources of the household as a whole. For instance, Lhamo (F, 74, Phuktse, housewife/farmer) explained:

There is less water because it is less warm now. Last year after half of the field dried out, then my turn for receiving water came. So I only had half of the harvest last year. So the winter was very difficult because there was also less pasture for the cattle [and] because my fields are the only way of getting food and money.

The fluctuation of water, due to changing weather conditions, puts at risk all those relying on agriculture for their subsistence and incomes. Although the example of Phuktse seems to contradict predictions of general warming of temperatures in the Himalayas, water availability remains a major condition to sustain Ladakhi daily lives regardless of whether the climate is warming or cooling. Access to enough water is crucial for everyday consumption and for agriculture which is entirely based on irrigation (see Figure 5.5). Water shortages thus potentially exacerbate the vulnerability of the most marginalised groups because they negatively affect harvests and therefore undermine people's ability to access and stock sufficient food for the winter or in case of a crisis. Overall, issues related to water are underscored when giving attention to women's views which confirms the necessity to acknowledge gender roles and experiences when exploring climate change impacts.

In parallel, the frequent occurrence of natural hazards such as drought, landslides and floods is another characteristic of the geographical context of the region that constitutes a challenge for accessing water, pursuing agricultural activities and ensuring people's safety in general. After the floods in 2010, many inhabitants of Changspa, a neighbourhood of Leh, were facing a lack of water to irrigate their fields. Nyima (M, 30, Leh, housewife/farmer) explained:

All the community is worried about water. The flood destroyed the systems of irrigation. So now there is a lack of water [...] because the repairs are not finished. The churpon is not enough to manage everybody's needs.

This introduces the fact that although the geographical context of the region partly limits the availability of a sufficient and constant amount of water, other societal structures also play a role to enable people access to natural resources.

Figure 5.5 Women diverting the water to irrigate their fields in Phuktse (Le Masson, 2011)



5.2.2 The role of anthropogenic processes

Chapter 4 suggested issues linked with increasing pressure on natural resources from population growth, changes in lifestyles and tourism combined with climate-related environmental changes. Such processes introduce inequalities of access to water, a situation described by Norgyas (M, 66, Phuktse, shepherd):

In the past people used to be much more satisfied regarding the cultivation of crops, there were no competitive tendencies. Now they don't leave any land untouched, they convert more land into a cultivable state, to have more income, to have more yields. Because of more land, then there is more demand for water. That is why there is this scarcity of water. It is not scarce like naturally but the use of water has increased. And encouragement to plant has increased. So there is more demand for water.

This means that although the geographical context of Ladakh limits the availability of water resources, other societal processes have increased the demand for water which explains in many places the reasons for water problems. For instance, every interviewee living in Ayu, the lowest part of Saboo, is concerned with scarcity of water. Khabira (F, 80 year, Saboo, farmer) explained that her hamlet mostly relies on spring water because water coming from the glacier is mainly distributed to villagers upstream. However, she stressed that every year she faces water shortages:

I worry about the future if the water does not come any more. We have many fields in Ayu, but some can't be cultivated because of shortages of water. [...] Some people upstream store the water with many dams so Ayu is left with less water. Ayu people asked for a better distribution but villagers upstream said they can't accept. [...] The problem is that there are many more families in Ayu instead of only one or two, with more agriculture land.

This highlights issues in the management of the available amount of water as well as the increase of the number of households having to share the same spring water. Lobsang (F, 69, Phuktse, farmer) further explained:

It is a water crisis in Ayu. For example, we don't have the benefit of the churpon, the water management system. The government has been constructing reservoirs, mainly in upper Saboo, alongside the main streams [...] They have neglected Ayu so it is a marginalised area.

In contrast, the majority of interviewees in other parts of Saboo did not report experiencing any shortages of water although many were concerned with the global lack of water in Ladakh and predictions that this could worsen due to climate change. The example of Ayu shows that people's access to water is not only limited by the physical and environmental characteristics of Ladakh but also because of the inequalities in water distribution and the increase in demand which render many inhabitants vulnerable to water scarcity. This means that any CCA strategies have to take this reality into consideration. In other words, any projects supposed to improve water access for villagers will only be beneficial to the largest number of people if they acknowledge inequalities of water access.

In the face of water shortages, people's strategies vary according to the location. In Phuktse, those living in the higher part of the village explained that they collect the water in October/November in their fields to create small shallow ponds. As their fields are located at a high altitude, the water remains frozen during the whole winter until warmer temperatures in spring enable it to melt and therefore irrigate the fields. A few other interviewees also reported leaving one of their fields dry in order to concentrate the remaining water on the others. According to Skalzung (F, 44, Phuktse, housewife/farmer), if they take the water when it is not their turn and without being allowed, they get fined by the village committee. In Leh, some families decide in advance which fields they are not

going to cultivate in the next season. In Leh and Saboo, inhabitants also temporarily repaired water channels in order to meet their short-term needs for water access (see Figure 5.6).

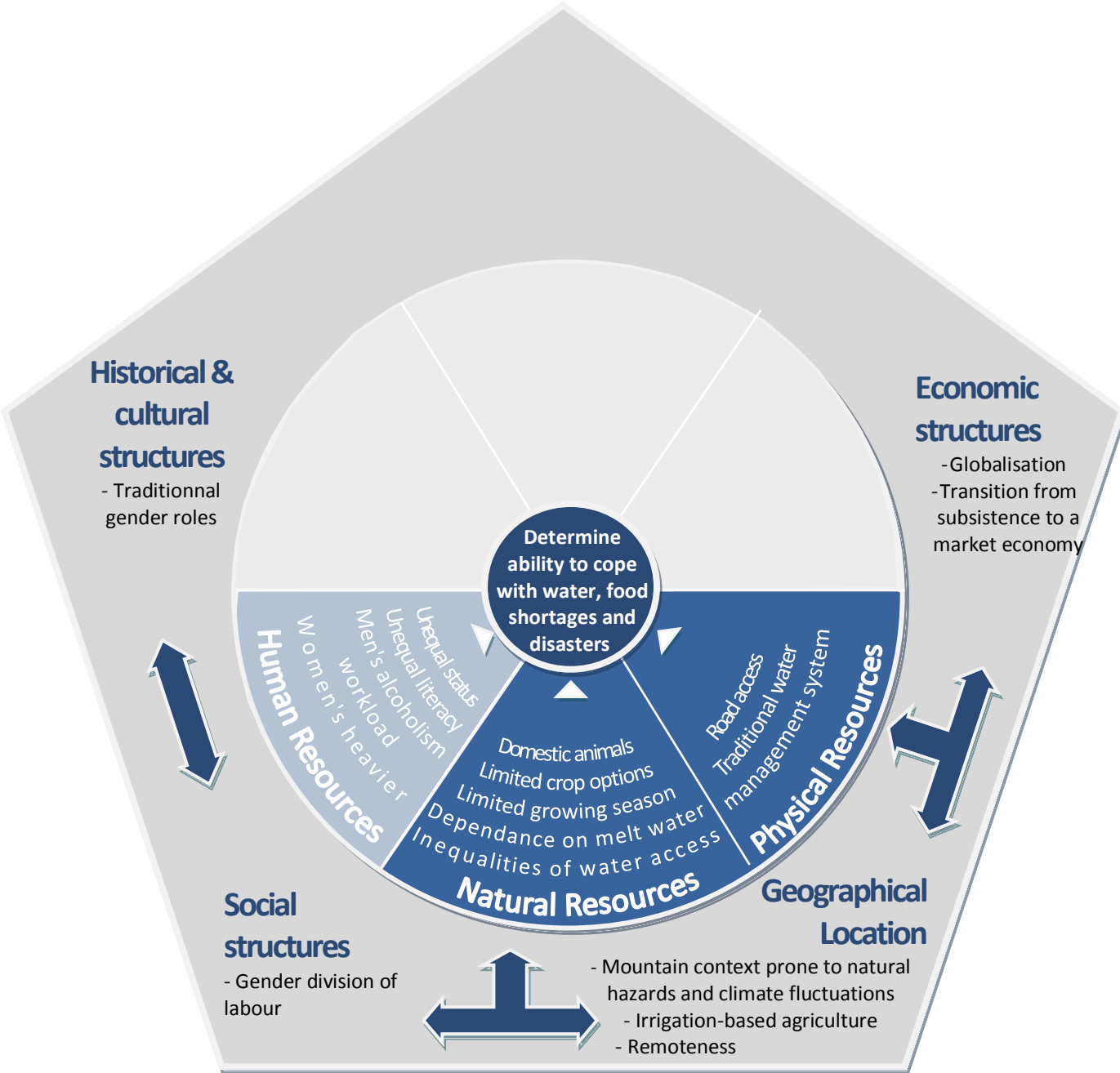
Figure 5.6. Repairs undertaken along the river stream in Saboo using meatl steel (Le Masson, 2011)



In Ayu, interviewees explained that spring water is collected in a pond and is distributed during the day to each family for a strict and limited period of time, i.e. one hour per household. Sometimes, when water is needed most, some families also receive water during the night. One household in Ayu, that cultivates apricots and apples in orchards and thus heavily relies on water, copes by buying water tanks delivered by trucks. It costs them 500 rupees per tank and they need three tanks for 1,000 trees. Such a strategy is obviously reserved for (i) those living in an area accessible by road and (ii) those having the financial means to pay for the water. This underlines the fact that people are not all equipped to face hazards and longer-term changes resulted from climate change, and that their vulnerabilities and capacities also depend on their physical and financial resources. The latter constitute the focus of the following section.

In summary, the combination of geographical and socio-economic structures determines the availability of natural resources, the ability of local communities to access them, particularly water, and therefore their means to produce food or face food shortages and other crises (Figure 5.7). This section has also shown how different gender roles influence people’s perceptions of their environment with the example of women feeling more concerned about their access to water as it would primarily affect their activities.

Figure 5.7 Summary of the way access to natural resources is shaped by different structures, and how it influences men’s and women’s vulnerabilities and capacities



5.3 Households' economic and physical resources and resulting capacities

The economic marginalisation of individuals and communities is another strong factor shaping their vulnerability to hazards and to climate change. People do not share equal physical and financial resources, which mean that some households are less able to cope in times of crisis than others.

5.3.1 *The preponderance of agriculture and livestock rearing*

As already mentioned, subsistence agriculture and nomadic pastoralism have sustained the development of Ladakhi communities for centuries. In 2010, 81% of households in Leh district were involved in agriculture and combined crop production with livestock rearing (TISS-LAHDC, 2010a). In today's context however, changes in standards of living have increased the demand for a more diverse diet. The majority of interviewees, in the three studies sites, indicated that the quantity and variety of food has significantly improved especially for those living in Saboo, like Tingle (M, 37, farmer) and in Phuktse, like Tsetan (F, 52, housewife) who respectively highlighted that:

Before, there was scarcity of food. Now [...] everywhere there is plenty of food, all the rice, vegetables, dhal, chowmein, maggi [noodles]. We have plenty of food, vegetables and we have the money power so we can buy food from the market.

Before there weren't many crops to grow, just wheat and barley. It is better now. [...] The quantity of food has also increased.

Some farmers attributed this improvement to better access to new varieties of seeds, higher temperatures which enables them to grow new crops and at a higher altitude, or the introduction of new machines like the thresher which reduces the workload and encourages the conversion of more land into cultivable fields. However, the majority of accounts focussed on the availability of food due to imports and subsidies, as Konchok (M, 39, Phuktse, farmer) explained:

Because of the government we are having plenty of food commodities; we have ration stores where we get food at subsidised rates.

As explained in the previous chapter, the reliance on rations might increase people's access to basic needs and alleviate food insecurity but it also threatens agricultural practices. The low cost of imported rice or wheat flour means that Ladakhi farmers find it difficult to compete with market and subsidised prices. To increase their production and productivity, people also increasingly rely on chemical fertilizers whose effects on the environment are uncertain. Moreover, in Leh, fields tend to

be sold or converted into guesthouses which generate more cash based incomes but could reduce the physical and natural resources available to people, namely their agricultural land and trees. Furthermore, alterations in local food production systems and the integration of Ladakh within the market economy described in Chapter 4, means that households that still solely rely on subsistence agriculture are not necessarily able to afford new imported products and services. Pema (F, 66, Phuktse, shepherd) explained:

Earlier we used to consume only barley; that is all we needed. Right now there are vegetables coming up and all sort of things but we don't have them. Sure for people who have a lot of money, now for them there are big changes, but for people like us who don't have the money, we can't afford change.

Among the 17 households interviewed in Phuktse, about 11 had farmers and shepherds as the primary breadwinners. In parallel, the local government considers that 73% of households in Ladakh are 'marginal farmers' (TISS-LAHDC, 2010a: 23). Given the social and economic changes happening in the region, those households that mainly or solely rely on agriculture and animal husbandry to make a living are the most vulnerable to daily pressures. Many farmers who were interviewed explained that they were primarily concerned by the outcomes of each summer season. The productivity of their fields and the income they can generate from them depend on a sufficient amount of water, enough income to pay for the labourers, the availability of family members or the absence of any calamitous event. Such uncertainties increase in Phuktse where the cattle, one of villagers' main resources, are threatened by wild animals such as wolves and snow leopards. Pema (F, 66, housewife/farmer) explained:

[The main challenge is] grazing the cattle because there are a lot of wolves so we have to watch and be careful especially with baby cows and baby yaks which can be killed easily.

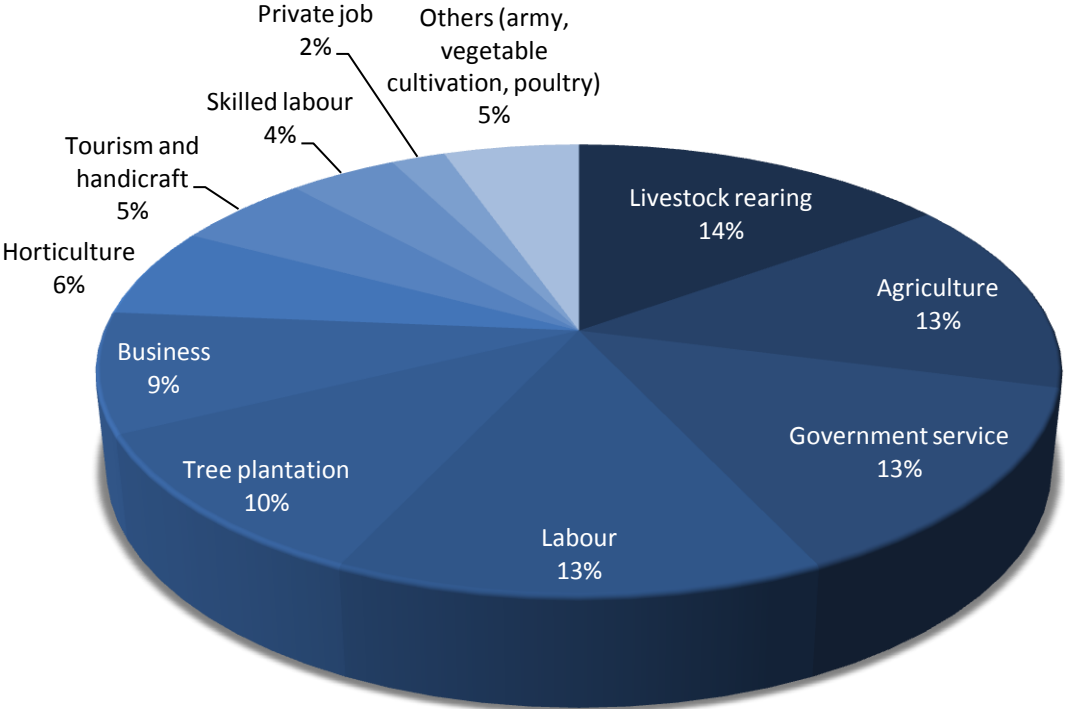
During the week before the interview took place, Dawa (M, 58, Puktse, farmer/shepherd) lost 15 goats. When he went to the Ladakh office of the J&K Wildlife Department along with other affected villagers to ask for means of compensation, they were told that the protection of the livestock was their responsibility. However, they are not allowed to kill or injure the predators because conservation policies have been enforced to protect endangered species such as snow leopards (see Wangchuk and Jackson, 2007 for a discussion). This example, combined with a lack of family members to look after the cattle, particularly teenagers who now attend school, contribute to explain why farmers can struggle with securing their main livelihoods which constitute an everyday concern for the majority of respondents.

On top of daily pressures, households relying on subsistence agriculture and livestock rearing are also the most vulnerable in the face of increasingly common extreme events as well as the impacts of climate change. Not only could hazards destroy their main physical resources including their fields, cattle or grain stocks, but such families would not have any other mean to generate incomes and would thus be dependent on external assistance. For instance, at least half of those affected by the 2010 floods were dependent substantially or entirely on agriculture and were thus identified as the primary group of vulnerable people by the local authorities (TISS-LADHC, 2010).

5.3.2 Diversification of economic resources depending on the location

Although farming and livestock rearing are the primary sources of income for the three quarters of households in Ladakh, they usually combine an average of 10 other economic resources (TISS-LAHDC, 2010a). Graph 5.6 shows the contribution of each income generating activity to the economy of households.

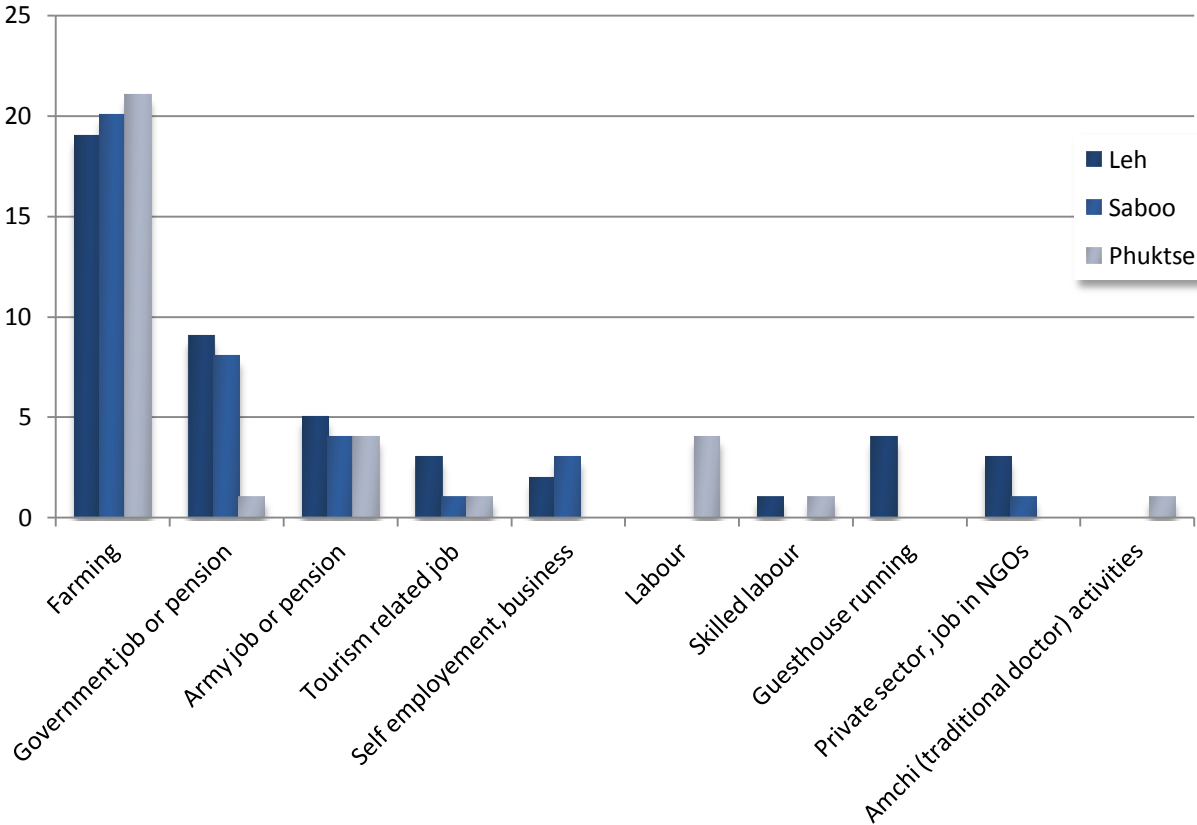
Graph 5.6 proportion of total household income derived from each activity in Ladakh. (Adapted from TISS-LAHDC, 2010a)



This reflects the household as the primary unit for analysing economic resources. The graph also shows that on average, households are able to secure economic resources in the form of consumable assets (such as grain and food stocks, wood and dung for fuel, milk, fodder, manure, wool, etc.) and money (monthly salary, pension, labour contract payments, small businesses and cash resulting from

the selling of crops, vegetables, wood, flowers, wool and derived products). However, wide inequalities exist between households based on a range of factors, starting with their geographical location. The survey conducted by the local government indicates that in Leh, households combine on average between 12 and 15 different activities whereas in more remote areas, households rely on eight to 10 different activities (TISS-LAHDC, 2010a). This suggests that the closer to the capital, the more diverse the economic and financial resources appear. This trend finds similar echo among households who were interviewed in Leh, Saboo and Puktse (see Graph 5.7).

Graph 5.7. Distribution of income generation activities of households interviewed in Leh, Saboo and Phuktse.



In Phuktse, the majority of interviewees relied on farming while a few complemented their income with labour work. Only one household out of 28 benefitted from a pension from the government. In contrast, interviewees from Leh and Saboo were involved in a wider range of activities such as working as a guide or as a cook for trekking tours, driving a taxi, running a shop or a travel agency, converting one’s house into a home stay as well as working for NGOs or in the private sector. Additionally, respectively 20% and 22% of households interviewed in Leh and Saboo had one member working for or retired from the government. This observation is confirmed by the local authorities’ survey whereby government service constitutes the second source of economic resources after agriculture for Saboo’s inhabitants whereas it occupies the fourth rank in Phuktse after agriculture, livestock rearing and tree plantation (TISS-LAHDC, 2010a). The economic context in

Phuktse was particularly constraining for households only composed of elderly people whose limited physical mobility or chronic diseases limit their opportunities to work and be self-sufficient. Dorje (M, 85, Phuktse, monk/farmer) explained:

I have two sons, one is in Leh and one is a monk so there is no one to look after us, so there is no money and so there is no good and sufficient food to eat because there is no earning person in the house.

This accentuates the geographical marginalisation of individuals as a determining factor, in addition to human resources. It influences people's opportunities to diversify their income generation and therefore their capacities to secure a minimum of economic and financial resources.

5.3.3 Seasonality of income generation activities

Except for government and military employees and all those earning a monthly salary, there is a significant seasonal dimension in the generation of incomes as illustrated by Tingle (M, 37, Saboo, farmer):

It [income] is not so calculable, it comes and goes, like self subsistence, mostly it is seasonal.

Most activities are dictated by the seasons and the majority of interviewees explained that their workload, reduced in winter, significantly increases in summer and provides more opportunities to generate income from agriculture, trade and tourism. Sonam (M, 25, Phuktse, farmer/trekking guide) explained:

Summer is the season for earning incomes whereas in winter we stay mostly in the house and the weather is very harsh.

Although Chapter 4 has shown that reasons for people or households to migrate vary according to areas and contexts of origin, interviews conducted with households in Phuktse demonstrate that it is common practice for individuals to migrate temporarily to Leh and engage in unskilled labour activities to supplement their household's income. This was the case for both men and women even though men had wider opportunities to work in the army or get involved in tourism-based activities. For instance, husband and wife Norgyas (M, 66, shepherd) and Pema (F, 66, shepherd) in Phuktse, generated their primary income from the sale of their livestock and also worked temporarily as labourers:

Now we don't have any goats left. We just grow wheat and we buy the rest of the food from somewhere else. We get rations from the government. We can't grow vegetables here

because it is too cold and it freezes. It snows even in summer. [And do you go to Leh?] Yes we have to, we go as labourers, once a month or once every two weeks. We don't like it but we have to because we have to earn some income.

Those leaving Ladakh in winter to work in lowland areas also adapt their economic resources according to the season and migrate accordingly. Such patterns were mostly observed among young Ladakhis in Leh running travel agencies, restaurants and shops which are only open during the summer months. Thupstan (M, 27, Leh, travel agent) explained:

From April to September, we run this agency, we make some money and after that it is a big question mark, whether you want to be here or whether you want to escape the winter. If I made a good amount of money during the season, I go to Delhi, I work in a call centre or I don't know, taking some job there and then come back next summer.

The fact that income generation for the majority of Ladakhi households fluctuates according to the season potentially exacerbates their economic marginalisation and therefore their vulnerability at certain times of the year. For instance, both floods in 2006 and 2010 occurred in early August, i.e. before the beginning of the harvest. In 2010, not only did an estimated 2,000 households lose their crops, tree plantations and/or livestock (TISS-LADC, 2010), but people also lost their means to generate income at the most crucial time of the year and make food stocks for the winter months. The need to address farmers' livelihoods for the approaching winter and the next year was identified as one of the priorities of the local authorities for rehabilitation efforts. Those relying on tourism-based activities were also significantly affected by the floods since the tourist arrivals dropped two months before the end of the season.

To balance this statement, studies have also documented examples where Ladakhi farmers modified or adapted their economic resources to face risks linked to water shortages, crop infestations, extreme weather events or yield shortfalls (Dame and Mankelow, 2010). Subsistence farmers interviewed in Phuktse reported supplementing their diet with wild vegetables that they collect in high pastures in summer. Regarding health care, the majority of people also rely on the *Amchi* (traditional healers practising Tibetan medicine) who play a crucial role in delivering basic health care for free or in exchange for services (Gurmet, 2007). In times of money shortages and as highlighted in section 5.1, a few interviewees in Phuktse reported resorting to borrowing money, such as Gyalpo (F, 41, Phuktse, housewife/farmer):

I borrow money from others, those working in the army and I work as a labourer to pay the debt back.

This highlights some of the short-term strategies that people develop to face socio-economic changes or better cope in times of stress, although the borrowing of money can increase the vulnerability of people in the long run if there are high interest rates involved.

Overall, available and sufficient economic livelihoods help people reduce their vulnerability and recover in the aftermath of a disaster. Salaries, pensions and the selling of crops in the market and to the army give households the financial resources to pay for basic services. As highlighted in the previous section, people who have cash can buy food in the market or from the government subsidised store which enable them to increase and diversify their diet. This in turn improves their health status and increases their capacities in times of crisis (Cannon, 2000; Wisner et al., 2004). Households benefiting from a monthly pension or salary also have a better chance to cope and recover from damages because some or all of their income is less likely to be disrupted or because their regular and sufficient incomes enable them to pay for health care or insurance without necessarily resorting to borrowing money. Overall, households with more diverse and regular income are less vulnerable to environmental shocks such as natural hazards or longer-term changes.

5.3.4 Physical resources and vulnerability

Schooling in private institutions, health care, transportation, gas, fertilizers, electricity, food, all cost a lot of money. The lack of income to afford basic services as well as new imported and modern products was raised by almost a third of interviewees, especially in Phuktse. People explained that everything has a price now and the price is high compared to their incomes. For instance, Dorje (M, 85, Phuktse, monk) said:

Earlier we used to get the dzo for the ploughing work for free and we could cut talu [wood] from any tree without any doubt or any asking. Now we have to pay for the dzos to plough the fields and if you cut any tree branches, you get fined.

As mentioned in the previous chapter, people now pay for certain commodities that they used to produce themselves such as wheat flour and they buy subsidised rice, whereas the basic ingredients of Ladakhi food are wheat and barley (see Dame and Nüsser, 2011 for a review). The account of Chuskit (F, 74, Phuktse, housewife/farmer) underlined the contradictions and the interconnection of various economic and social changes. She complained that chemical fertilizers are very expensive but when asked why she uses them then instead of costless traditional manure, she replied:

Because there are not so many people in the family and we don't have our goats any more so we don't have enough natural manure.

Another example was provided by Spalzes (F, 73, Leh, housewife):

I used to have a lot of livestock but now I have nothing. My children didn't look after the livestock because they were too busy. They are educated so they work outside [not in Ladakh]. And now the family also is not so united. Before they were many donkeys in Leh but now they are all replaced by cars!

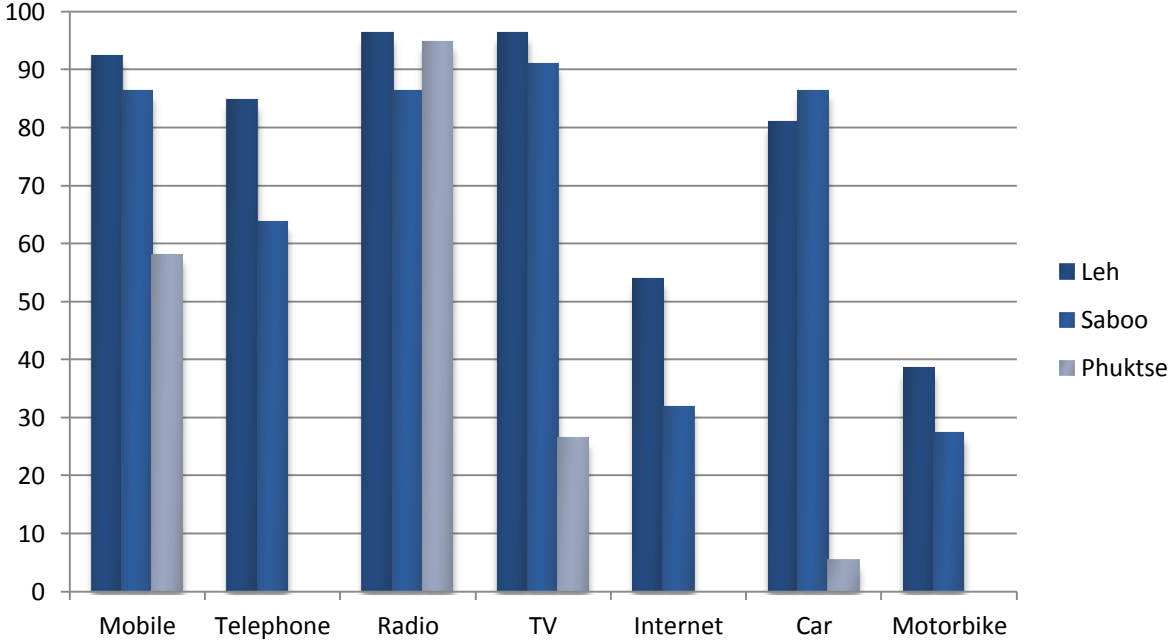
This underlines the impacts of social and economic structures (fragmentation of families, generalisation of schooling, migrations) and the link between economic revenues and physical assets. Many farmers, primarily women, struggle to compensate for the resulting loss of physical resources by, for instance, buying manure or spend a lot of money to hire labourers. Hence, households which have fewer opportunities to diversify their income generation have lesser means to access and secure physical resources. This is an incentive for many families to migrate to Leh and become totally dependent on the modern wage economy, but it also confines women to low-paid labour and removes their responsibility as food producers. As highlighted in section 5.1, the economic situation of women does not necessarily improve for those living in urban areas.

In contrast, those benefitting from sufficient economic resources or regular income can invest in improving their physical assets such as their housing. Following the heavy rains in 2010, Tsewang (F, 37, Leh, housewife/farmer/guesthouse owner) hired masons to cover her traditional mud roof with concrete and metal sheets to protect her house from heavy rains. She was imitated by many of her neighbours who also run guest houses and thus benefit from cash from the tourists. This means that their investment is likely to be paid off quickly.

One again, this is also influenced by people's more remote geographical location. As already mentioned, inhabitants of Phuktse primarily rely on agriculture and livestock rearing for their economic resources. If their fields, gardens and livestock were destroyed by a calamity, as it was the case for numerous families in 2006 in Phuktse and in 2010 in Saboo, people would lose their main physical resources, i.e. their primary means for producing food and earning money. In contrast, households interviewed in Saboo and especially in Leh, who benefit from more diverse sources of income, are more likely to protect themselves and recover from a disastrous event. Moreover, in post-emergency contexts, people with secured financial resources have a better chance to afford basic services and replace the loss of their physical resources. On the contrary, those with poor economic resources and whose main physical capital was destroyed in a disaster have to resort to external assistance or loans to provide for their need for cash to recover (Wisner et al., 2012) (see Figure 5.8).

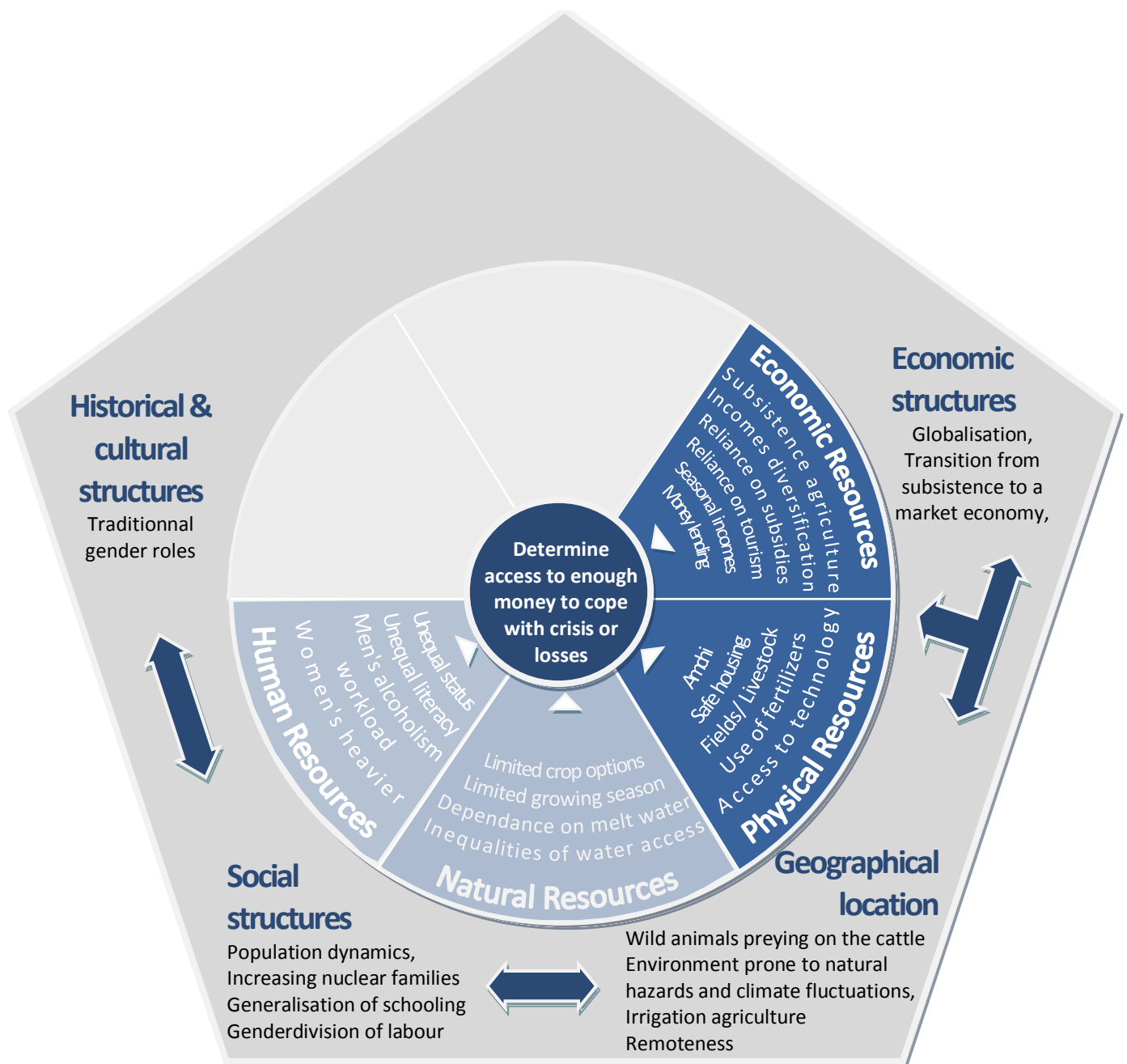
Finally, lower economic incomes combined with the geographical location seems to reduce people’s access to technology and means of information, communication and mobility.

Graph 5.8. Percentage of households in Leh, Saboo and Phuktse owning a range of physical assets.



Graph 5.8 shows that the majority of households in Leh and Saboo owned one or more mobile phones, telephones, radios, TVs and cars. Half of the interviewees in Leh and a third from Saboo also had access to the Internet. In contrast, none of the interviewees from Phuktse used the Internet. The limited signal also constrained the use of mobile phones and only a few households had a TV which made the radio and word to mouth the sole means for people to communicate and access information, without leaving their valley. This might be a reason that explains differences of perceptions and opinions about climate change from Phuktse inhabitants compared to other interviewees, which will be highlighted in Chapter 6. This also means that the implementation of any early warning systems, a strategy often advocated by scientists and/or authorities to help prevent future flood-related disasters, will have to acknowledge differences of access to means of information and the prevalence of word of mouth. This introduces the role that social resources play for the capacities of Ladakhi communities.

Figure 5.8. Summary of the way access to economic and physical resources are shaped by different structures and influence men's and women's vulnerabilities and capacities



5.4 Local communities' social resources and resulting capacities

Strong links existing between family or community members are often highlighted as a major factor enhancing people's capacity in times of crisis (Wisner et al., 2012). Therefore, although individuals or households may lack secure and sufficient economic or human resources which exacerbate their vulnerability, this can be balanced by the availability of, and access to, social resources. The next

section underlines the influence of the high level of solidarity that exists between and within Ladakhi communities which was repeatedly emphasised by interviewees.

5.4.1 Strong cooperation within and between communities

Studies in Ladakh highlight how the traditional ‘shared work’ and mutual aid shapes the functioning of the economy and society. Norberg-Hodge (2000) suggests that given the scale of their territory, Ladakhi people directly experience the effects of their actions and are aware of the interdependence of their own interests with those of the whole community. She adds that cooperation between households is often formalised in social institutions such as a group of households called *pashphun* whose members mutually assist in the organisation of social events and harvesting. Jigmet (M, 44, Phuktse, farmer), also described the communal organisation of agricultural activities:

During the sowing and the harvesting time, I’m helped by the neighbours; we work on a help sharing basis. [...] The sowing is done by women and the ploughing is done by men and both lead the yak. (see Figure 5.9)

Figure 5.9 Neighbours ploughing their fields with dzos to harvest potatoes in Leh (Nair, 2010)



Wangchuk (M, 79, Phuktse, shepherd) and Chuskit (F, 63, Phuktse, farmer) also respectively explained the communal sharing of activities:

We have this turn basis like if it is my turn I have to go for one day with 10 goats in the pastures. If somebody has 20 goats then they have to go for two days. So on a turn basis we share this workload and look after each other's goats all in one big flock.

It is like exchange: when we need labour, all the families who help are from the neighbourhood so we help them in return.

Interviewees' accounts were thus numerous to highlight the reliance on neighbours and family members to undertake daily activities which tend to reduce the burden of women's fieldwork.

This cooperation among inhabitants proves paramount in times of disaster. In the aftermath of the 2010 floods, rescue operations were first undertaken by local inhabitants, neighbours and people living in surrounding villages (TISS-LADHC, 2010). Interviewees who were directly affected by the disaster related that their neighbours and relatives were the first to help with offering shelter and food, searching for survivors, recovering dead bodies and providing emotional support (see Box 5.1). For instance, Norgyas (M, 66, Phuktse, farmer) explained:

Just after the floods, people from this community, Phuktse, they all helped with whatever they could, like carrying the barley flour... they went all the way to Igoo [another village located 20 km away] and helped those families affected by the floods, cleaning the mud out of the rooms.

According to Wangyal (M, 50, Leh, farmer):

Ladakhi people help each other. This is a very good thing. If somebody's house has been washed away, people are offering their own house to help them. We have many relatives in Ladakh. So if my house is washed away, I will go to my relatives' house.

This strong cooperation makes it easier for the community to recover from shocks. For instance, the floods of 2010 occurred in August just

Box 5.1. Padma's account of the 5th August 2010 flood in Saboo.

Padma: There was very heavy rain. We were sitting in the room and we were crying, screaming but nobody heard us. The floods came all around the house, in the front, the back and then inside the house. The house started to break while we were still inside. We went in the prayer room and all statues and things were washed away. All the rooms were destroyed and the prayer room was the last one to stand. All together, 8 rooms including the cow shed were destroyed. The floor was covered in mud and stones. All the grain was washed away too.

VLM: And then what happened? What did you do?
The neighbours started to come in to see but they could not do anything because of the mud. They came back after half an hour and carried my mother away and helped me too to go out. The disaster started around 22h30 and lasted until 1 o'clock in the morning.

And then where did you stay?
For one week, we were in complete shock.... We stayed with neighbours up in the mountain... We feared that it would come again so we were thinking and worrying a lot.

Is there anybody else who came to help you?
After 3 or 4 days, the government came just to look. After 1 week, we moved to other relatives and then we alternated with relatives and neighbours for 3 months.

before the harvesting season destroying one season's yield, grain and food stocks which severely affected people physically, morally and financially. Consequently, most ceremonial events such as wedding and birth celebrations that often take place in October, and which require significant financial means from both the hosting family and guests, were cancelled or postponed until the following year. For most interviewees, the reliance on their relatives and community members was the primary factor enabling people to cope and recover from a shock, as illustrated by Kushog (M, 70, Saboo, retired):

It is mostly the bonding between the families members first of all and then at the village level, and the region level. Unlike other parts of the country, there is some sense of kinship you know. Because you don't feel lonely if your family is here... [...] It is the main thing, not being alone, the main factor that helps you to cope.

To explain the strong bond between Ladakhi people, Tingle (M, 37, Saboo, farmer) pointed out their spirituality and faith in their religion:

It is because of the religion in which we are brought up. Buddhism. It has the basic tennets to help the neighbours, to help fellowship... it is customary since ancestors, this love, compassion and helping others.

When interviewees were asked what were the factors that helped them the most to cope in times of crisis, many of them, both Muslims and Buddhists, thus highlighted their relatives but also their faith in their religion as their main capacities.

5.4.2 Faith as a major component of individuals' and communities' capacities

Tsewang (F, 37, Leh, housewife/guesthouse owner) was not directly affected by the floods in 2010 but like most of her neighbours she ran up the hill to the *Shanti Stupa* (see Figure 5.10) to seek refuge on a higher ground and near a holy place. She said during an informal conversation that if another cloudburst happened again, she is confident that the spirit in her prayer room would protect her and she would not have to rush outside.

When Kusal (M, 30, Leh, shopkeeper) explained that he lost three family members in the floods, he said that he copes with his loss thanks to his faith:

Because we are Buddhists, we think that everything is impermanent, the body is like a cloth, we just have to change it. So we don't have that much grief but still they will be reborn in the next life, they may be happy. It is all due to the karma that they died.

Figure 5.10 The Shanti Stupa in Leh, located a few hundred meters above the city (Le Masson, 2011)



The reliance on their faith was also respectively emphasised in Phuktse by Nawang (M, 54, farmer) and Gyalson (M, 37, farmer):

We Ladakhi people, we live in such remote areas, we don't have many tools and machinery to deal with these calamities but we have this genuine faith... We can pray to Buddha and the guardian deities to protect us.

If you have a good faith and good heart, it helps to face any situation.

Furthermore, being affiliated to a religion often enables those affected to seek or receive assistance from their religious institution and their faith leaders (see Gaillard and Texier, 2010 for a discussion). After the floods in Saboo, for instance, whilst Padma (F, 44, housewife/farmer) was recovering at her neighbours for a few weeks, she explained that the monks of Hemis monastery came to provide her with emotional support and help to clear the mud away. She also said that members from the Office of Administration of the Karmapa (one of the spiritual leaders of Tibetan Buddhism) provided relief materials such as blankets and kitchen utensils as well as blessings. Faith-based NGOs often prove to be a significant source of moral support for survivors. They also play a major role in material and

financial help by collecting donations such as relief goods and for delivering them quickly thanks to their widespread network (Ibid).

If the reliance on their faith is definitely a factor helping Ladakhi people to cope with difficult situations, it sometimes implies a sense of fatalism, with the risk of preventing certain people from undertaking disaster preparedness and/or mitigation which, actually, increases their vulnerability (See Chester et al. 2012, for a discussion). For instance, Morup (M, 91, Saboo, retired from the government) explained:

It is not in our hands for the water flood because what we can do? We can only perform regular puja and offerings.

This introduces some of Ladakhi people's opinions and attitudes towards natural hazards and climate change which will be explored in more depth in the next Chapter.

5.4.3 Societal changes threatening social resources

The majority of interviewees were worried that their traditional lifestyle based on subsistence farming, communally shared activities and responsible use and management of natural resources has been rapidly replaced by a non-sustainable way of producing, consuming and living. For instance, interviewees living in Leh were particularly concerned by the number of new houses and hotels that are being built in the capital in place of agricultural land (see Figure 5.11). Lonpo (M, 85, Leh, retired) explained:

There are a lot of new constructions [...]. Earlier it used to be a huge amount of fertile land. Now there are no joint families; the sons leave and build their own houses. The future will be very difficult because the cultivable land is being replaced by houses so the coming generations won't have any cultivable land left.

Different factors were advanced by interviewees to explain changes threatening Ladakhi people's social and economic resources, the first one being the rising individualism. Lonpo further explained:

These days people are losing their moral values and religious practices because they are more into money making. People are becoming more selfish and narrow minded.

Figure 5.11 View of habitations in upper Leh and the Shanti Stupa in the background (Le Masson, 2011)



In the same perspective, most interviewees talked about “growing arrogance”, “increasing competition” between people, the “loss of respect for the elders”, “selfishness”, the “rise of materialism”, the “loss of moral values”, the “lack of solidarity” and the fact that people do not have time for each other because they are now too busy. For the majority of respondents, such changes in people’s behaviour result from higher demand for limited natural resources, increasing competition over limited opportunities for stable and well-paid jobs, modernisation and development processes occurring in Ladakh. For instance, Kushog (M, 70, Saboo, retired) explained:

Earlier people did not have good money; there were also no labourers because they could not afford to hire somebody so they had to keep close to each other to help each other. The concept of interdependence was more relevant than it is now. Now everybody has his own individual power, people have a better financial position so they can buy labour and they can buy anything.

Although the bond between Ladakhi people and among families and communities still appears, from an outsider’s point of view, as one of, if not the most, important component of their capacities, interviewees were adamant to highlight rising individualism as a major problem threatening their solidarity. Shaksपो (M, 75, Leh, retired) pointed out:

Before, people were more trustworthy, closer to each other compared to these days... they are more materialistic. Relatives are getting slowly isolated, people are self-involved. So the gap is widening, even in the villages.

The increasing lack of cooperation among inhabitants and their alleged selfishness advanced by interviewees has negative impacts on the communities' well-functioning and as a result on people's well-being. The *Goba* (the head of the village) of Phuktse explained the impacts in his village:

People are becoming more self-centred [...] because they want to capture more land, more fields and extend the boundary lines. Earlier, they used to look after each other. Now we have this post harvest competition. Those who have more money get Nepali labours and they do the harvest work in one or two days and those who are poor are left behind and they take more time because they have no money to hire labours. So by that time, those who finished the harvest, they leave out the cattle on open fields which cause damages to the crops [of those who haven't finished].

The lack of cooperation combined with increasing rural to urban migration and the depletion of the workforce in villages implies that many households have to rely on paid labourers to help with farming. However, unequal financial resources highlighted in previous sections mean that some families cannot afford labourers and suffer more from the lack of family members and the decrease of the traditional 'sharing based system'. Since women are primarily responsible for fieldwork activities as highlighted in section 5.1, they are the first to be negatively impacted by the alleged weakening of social resources advanced by interviewees. This could exacerbate the vulnerability of already economically, geographically or socially marginalised individuals and households in times of stress, due to hazards or depletion of natural resources.

Finally, a third of respondents worried about the preservation of their culture because changes in people's behaviours accompany a shift in the respect for traditional customs. For instance, Dechan (F, 68, Leh, housewife/farmer) explained:

There is more development and progress but it is not good if the Ladakhi culture is lost. Progress is good if the culture is preserved.

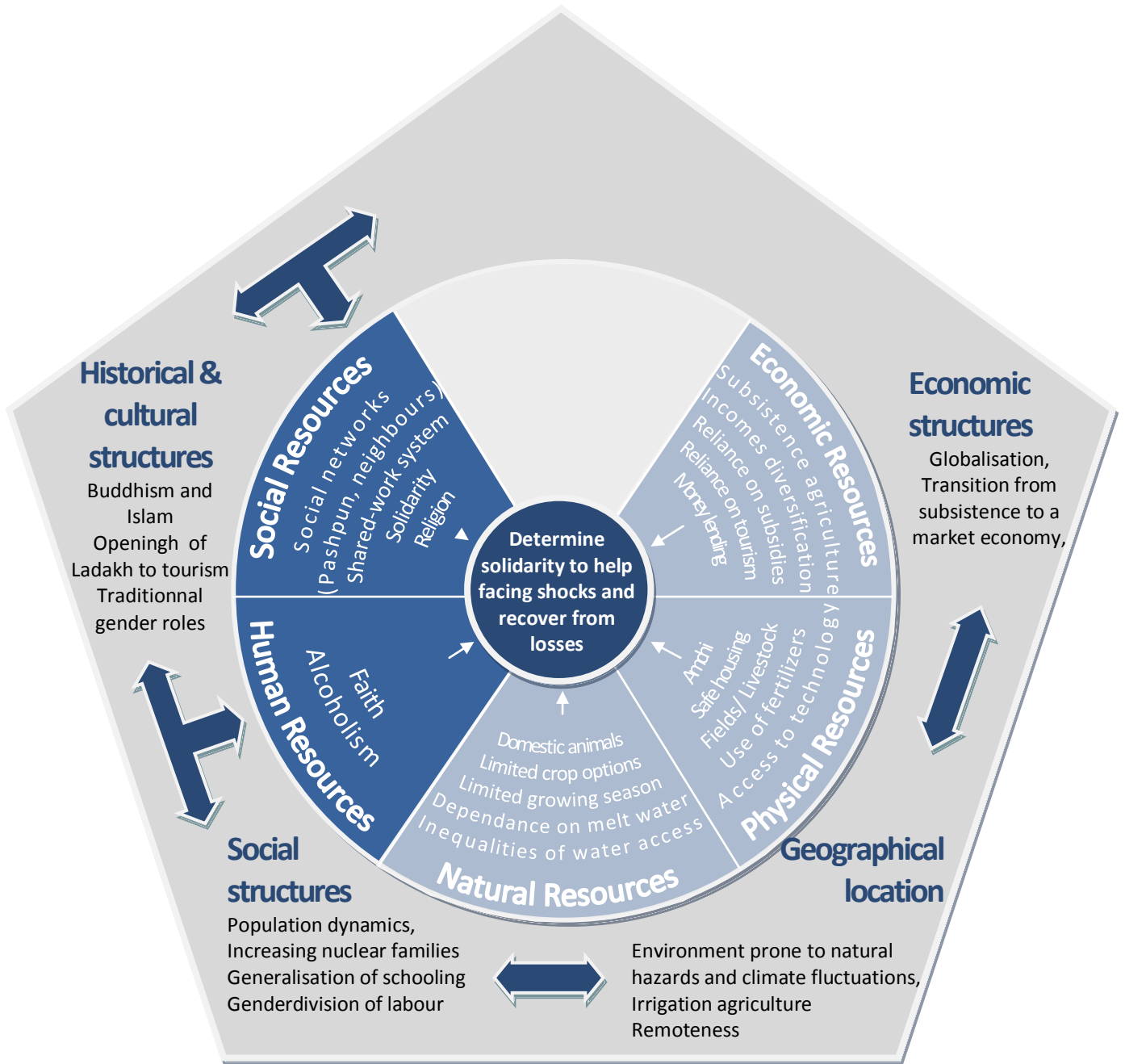
Concerns over the loss of traditions reflect differences that have widened between the old and young generations. Young Ladakhi people not only compare their living standards with the members of their own village and region, but also with those of Indian and foreign tourists whose economic resources and lifestyles constitute strong incentives for the younger generation to gain the same privileges (Norberg-Hodge, 2000). This is best illustrated by Thupstan (M, 27, Leh, travel agent). When asked what his main concerns and main wishes were, he respectively replied:

- *Main worry?... How to quit smoking and drinking [laughs]. No other worries. And, yeah, how to make money. That is very important. Make money quickly so that I can enjoy, to go to casinos or to go to Las Vegas... [laughs]*
- *Health and wealth. Good health for everybody, good wealth only for me! [laughs]*

This illustrates some of the concerns expressed by the elderly over rising individualism, the loss of spirituality and moral values, the slow disappearance of their traditional lifestyle, but also the consumption of alcohol. Although alcoholism was not raised by the majority of interviewees except a few women as mentioned in section 5.1, this was one of the top challenges ranked by participants of focus group discussions (see details in Chapter 7). The group of male participants in Saboo even identified alcoholism as the number one problem from which all sorts of other challenges stem, including the lack of workforce, the reduction of solidarity or the losing of spiritual values. However, this could be interpreted the other way around with societal changes such as the loss of faith leading certain people to seek refuge in alcohol. For instance, many interviewees explained that their lives were as good if not better in the past because people were not following a path where they could get more than they already had, and therefore the society was working together in harmony based on solidarity between people and between generations. Current development and economic shifts presented in Chapter 4 have been accompanied by deep cultural and psychological changes. As Crook (1980: 26) suggests: *“All this advance does not [...] necessarily lead to happiness. [...] the breakdown of traditional values in association with unrealistic expectations for employment and modernization may breed disappointment and discontent”*.

This section has accentuated how different social processes interact to shape Ladakhi people’s social resources which are characterised by a strong solidarity between community members (see Figure 5.12). It helps individuals to counterbalance their economic or social marginalisation which ultimately enhances their capacities to face difficulties. However, wider structures described in the previous chapters and raised by interviewees could potentially threaten local communities’ social resources and undermine their main capacities.

Figure 5.12 Summary of the way access to social resources is shaped by different structures and influences people’s vulnerabilities and capacities



5.5 Political resources and vulnerability

As highlighted in the literature review, the political level is another strong determinant and ultimately one of the most important parameter shaping the marginalisation of a community. In mountainous contexts, the geographical marginalisation often negatively impacts on people’s political participation, especially if they are part of a larger country and/or the political centre is located in better connected areas. However, this could also foster a greater independence for

mountainous communities. This implies a dimension of spatial scale: Ladakhi people are not politically marginalised at the national and the community level in the same way.

5.5.1 A province within a state and a state within a country

As introduced in the previous chapter, Ladakh, which was until the end of the 19th century an independent kingdom, gradually lost its sovereignty to become one province among many others within India. The region thus became a small portion of a much bigger country and Ladakhi people a minority among the 1.2 billion people that now comprise India. In parallel, the districts of Leh and Kargil which together form Ladakh, are governed by the Muslim majority-controlled Jammu and Kashmir (J&K), a state whose official language is Urdu and with a constitution of its own. J&K is itself one state among the 28 states and 7 Union territories of India, a country hosting a majority of Hindus, which has adopted a capitalist economy and whose official languages are Hindi and English.

On the one hand, this illustrates the concept of ‘internal periphery’ used by Michaud (1996) to characterise Ladakh as an ethnic minority dependent on a lowland majority at the state level but also at the country level (one could extend to the international level since the globalisation of the economy had reduced boundaries between nations). The interconnection of different cultural, social and economic contexts combined with the geographical marginalisation of Ladakh may negatively impact on the political representation of Ladakhis and their access to decision-making within the centralised economic and political power of their state and their country. This also means that governmental decisions, actions and development trajectories might not be appropriate to the specific context of Ladakh and this could imply discrepancies in terms of DRR and CCA strategies which will be explored in Chapter 7.

On the other hand, the change of scale and power and the progressive transition from a feudal system to the Indian legislation inherited from the British has had some positive impacts for the resources and well-being of Ladakhi people. For instance, some families were allowed by the new law to take ownership of the land they cultivated while people’s large debts in cash or kind to rich monks, aristocrats and traders got cancelled (Michaud, 1996; Van Beek 1999). A few elderly interviewees talked about this cancellation as a huge relief in their daily lives, such as Konchok (M, 69, Phuktse, farmer/shepherd):

Earlier, there was this big burden of loan system. It was very hard to get a loan from rich families. And when we got a loan we had to pay back extra, like extra bags of wheat or also doing labour work in return, like a servant.

Chamba's (M, 90, Saboo, monk) account also illustrates the opinion of many interviewees who appreciated the development of Ladakh within India:

Earlier it was the time of hardship, there was scarcity of food, scarcity of money... There was no road connection, no jeeps. Now there is a lot of development, you can find vehicles, we have a good network of roads, and there is no scarcity of food so it is much better in the present time.

This underlines the fact that although local communities have to deal with contradictions brought by their integration within modern monetary markets, they have embraced some of the positive aspects and hopes that it also offers. The development of infrastructure and transportation or the improvement of diet, all contribute to enhance people's resources and therefore their capacities. It can also balance communities' geographical marginalisation that exacerbates their vulnerability in times of crisis. The fact that mountain people live in high altitude, isolated areas across passes or on steep slopes, means that their accessibility is often restricted by limited transport infrastructure and climatic conditions which reduce their access to outside assistance when it is needed. For instance, it can undermine their possibilities to deal with health problems by preventing easy and affordable access to health facilities such as a hospital. However, interviewees' accounts stressed that the development of infrastructure has facilitated a greater access to basic services for geographically or socially marginalised people, as illustrated by Dorje (M, 85, Phuktse, monk):

Two days back I fell from the stairs. I went to the hospital for treatment in Leh thanks to my grandson who took his car. They took an Xray and gave me medication. Now it is fine.

In addition to creating health, social or education facilities that enhance people's resources, the logistic and economic means of the state can also prove crucial in times of large-scale disasters. Following the floods in 2010, the two highways connecting Ladakh to other states were cut off while 11 main roads and 32 bridges were reported 'fully damaged' (TISS-LADHC, 2010). This means that many villages and valleys could only be reached by four-wheel-drive jeep or helicopters in the aftermath of the disaster. However, the strong presence of the army in Ladakh, even in remote areas, enabled rescue operations to benefit directly from military facilities and logistics such as air and road transportation, emergency clinics in outposts, military hospitals and the deployment of troops to help with the recovery process. Therefore, the relative 'isolation' of the region has to be balanced with the presence of significant military logistics. Meanwhile, the 'remoteness' of local communities (from an outsider perspective) might explain the strong solidarity between their members and also greater responsibilities for local political institutions.

5.5.2 The role of the local government

Most positive changes and improvements were attributed by interviewees to the leadership of Kushok Bakula Rinpoche (1917 – 2003; Head Lama of Ladakh, statesman and Ambassador of India in Mongolia) who, like other Ladakhi political and religious leaders before, denounced the ignorance of and the discrimination against Ladakh by a patronizing state government (Van Beek, 1999). In the 1960s, claims arose from Ladakhi people for better recognition of their distinct geographical, cultural, religious and social contexts compared with the rest of inhabitants in the state of J&K as well as greater autonomy to decide their own development. Tensions between Buddhists and Muslims in 1989 also created momentum for the political situation of Ladakhi people to be resolved and in 1995 the two Ladakh Autonomous Hill Development Councils (LAHDC) of Leh and Kargil were eventually created.

The establishment of a local government constituted of elected members has enabled Ladakhi inhabitants to be represented politically by officials who belong to their community and live in the same region. This is supposed to have reduced both the geographical, cultural and political gap between the people and their representatives and served better the interests of the community through the recognition of local knowledge and local needs. Van beek (1999: 439) writes that the LAHDC has “*considerable freedom to formulate its own development plans*”.

A third of interviewees appreciated the efforts of the local government to address the development of Ladakh. They consider that projects implemented are often a direct response to villagers’ needs and requests because the LAHDC involves communities in the decision making process. Stanzin (M, 31, Leh, travel agent) and Ishey (M, 69, Saboo, retired from the Army) respectively explained:

The government in Ladakh makes a plan every 5 years. This is now the 11th plan and they did a household survey. In every village they went and asked every house and families, what the problems are and after that they made a final proposal based on local issues. And now whatever big project happens, they always refer to that survey, which is called micro-level planning. And I think now it is really benefitting because it comes from the grassroots level.

The Hill Council carries out the work, infrastructure building, road connections and all, all this work is done in mutual cooperation after thorough discussion with the local members, common villagers, they all come to one single platform and discuss issues, you know, problems they are facing. And they address them.

This approach to micro-level planning (further discussed in Chapters 7 and 8) allows inhabitants to have their voices heard and provide inputs into the design and implementation of some of the

policies and projects. This level of proximity between the local government and inhabitants and the acknowledgement of the necessity to involve villagers in decision-making can play an important role in DRR because authorities are likely to be better informed to identify risks and address people's everyday concerns (see O'Brien et al., 2012 for a review).

On the other hand, discussions with interviewees were also highlighting (i) the lack of interest from many local inhabitants in political affairs at the council level and (ii) a lack of trust in having their problems tackled efficiently by the authorities. For instance, issues linked to corruption and nepotism among governmental employees and elected councillors were repeatedly raised by respondents. Shakspo (M, 75, Leh, retired from the army) and Kusal (M, 30, Saboo, shop owner) respectively emphasised that:

There is a big difference in their [the Hill Council members'] attitude towards common folks: if it is a rich person from a wealthy family, then their response is very quick; if it is someone of a poor background, then their response is null.

If you have any problems, it takes a long time to get processed. But if you know someone or officials in the block, then it will be done very fast.

The necessity for many inhabitants to pay or be acquainted with employees to obtain a service or a document was thoroughly discussed during informal and focus group discussions. Participants in both Leh and Saboo identified corruption as one of the major problems they have to face in their daily lives and which lies behind many other material and social challenges such as the lack of electricity or rising individualism. Below are extracts from discussions recorded in Leh and Saboo:

- *Now people have more and more money, so there is more corruption. Earlier it used to be much less, whoever was corrupt used to be content with chickens, but now people count in lakhs [a hundred thousand rupees].*
- *[...] When the work is not done [within the administration], unless and until we bribe the man the work is never done.*

- *Earlier there were non-local people in the offices but after getting the Hill Council, we had local people. It made little difference. Nowadays even our local people are corrupt, they have learned from outsiders [...]*
- *The work [within the administration] cannot be done without bribing.*
- *Who can afford to pay bribes, it is good for him. Who doesn't, it is not good for him.*
- *Even getting a job includes corruption.*
- *That is the big problem for parents because they have to pay bribes to get jobs for their kids so the poor always suffer.*
- *That's why the rich are getting richer and the poor are poorer.*

Therefore, individuals' economic resources can also have an impact on the recognition of their voice at the political level and vice versa. This underlines the link between economic and political marginalisation. The literature has shown that those having poor or weak financial, economic and social livelihoods have more difficulties to get access to decision making or get their voice heard by administrative officials and politicians which exacerbates their vulnerability (Wisner et al., 2012). Chapter 7 will also show that the corruption of officials encourages the urbanisation of hazard-prone areas which increases settlers' vulnerability.

5.5.3 The decision making process at the village level and gender inequalities

Van Beek (1999) argues that Ladakhis do not form an easily identifiable 'community' but that the common misconception of Ladakh as a homogenous society and identity explains part of the failure of the LAHDC to gain the support of locals and achieve change in development policies. In light of Van Beek's critical review of the term 'community', the analysis here refers to the political decision-making at the village level acknowledging differences existing between inhabitants of the same village and members of the same households as highlighted in previous sections.

Michaud (1996: 288) explains that "[...] *monasteries are the spiritual, political and geographical centres of their respective villages*". While they do constitute an influential authority and an institution to which many villagers refer in their daily lives for social events or when making important decisions, the political organisation at the community level is also based around the *Goba* (the village head). Appointed by villagers for a minimum of two years, renewable, the *Goba* leads together with other appointed *Goba* members, the *Gram Sabha*, the focal point of contact between the LAHDC and the village community. Gyatso (M, 52, Phuktse, *Amchi*) described the *Goba* system in Phuktse:

The Goba members go around the village and see what the problems are and what kind of work needs to be done. First they assess and then they decide with the members, then they call a meeting [with villagers] and then they ask the general consensus. If there are any objections then they discuss, and decide which focus should be taken.

Interviewees explained that every household can send a representative to attend the village meeting and therefore raise their concerns or make requests on a regular basis. A survey conducted by TATA-Institute for Social Sciences in Ladakh indicates that the *Goba* system thus ranks among the highest institutions positively appraised by local communities (TISS-LADHC, 2010a).

However, attendance at meetings does not automatically guarantee appropriate recognition of one's opinion or needs. This is particularly true regarding the participation of women. A few female interviewees stressed that their voices were not always listened or taken into consideration. Gyalpo (F, 41, Phuktse, housewife/farmer) said:

I go to the meeting but I don't say anything. Only authoritative people like the goba members take decisions so I don't say anything because it feels awkward. [Why?] Sometimes it happens that the goba tells us to keep quiet that's why I don't say anything.

There were other numerous accounts from both male and female interviewees that stressed gender disparities in decision-making to the detriment of women. For some, like Tingle (M, 37, Saboo, farmer), this is the reflection of the higher status of male within the household:

[VLM]: Who takes decision in the house?

[Tingle]: *We mutually decide and then finally the decision depends on the men. Because the men they earn more.*

So do you think if a woman earned more she would have the final say?

No, it is not like that, it is the male authority you know.

Similarly, when asked whether women's views were heard within the community, Gyalwa (M, 62, Leh, retired from the Army) replied:

If they give good views and opinions, then the community members do take them into consideration.

This implies that women views might not be acknowledged and acted upon if they do not concur with the dominant male perspective of decision-makers. Although respondents often pointed out that there are more women present in meetings, the accounts of Lhamo (F, 74, Phuktse, farmer) and Wangmo (F, 60, Phuktse, farmer/labourer) stressed the limits of women's participation in decisions and in politics:

I go to village meetings but I don't say anything. I don't know what to say and how to speak. Only a few females talk, otherwise it is mostly men who do the talking.

There are more women at the meeting but women can't take decisions, so in the end it is the male members like the goba who takes the final decision. [Why?] We can't be as successful as men because when it comes to going to Leh and seeing the Hill Council women can't do it.

Therefore, the presence of women in village gatherings does not necessarily mean that their opinions are taken into consideration or that they have equal access to power. For instance, the Goba cannot be a woman according to customs. At the level of the LADHC, there are no women elected. Out of 30

elected members, 26 seats are supposed to represent different areas of Ladakh, particularly sparsely populated and remote regions while the remaining four seats are reserved for representatives of 'minority' groups such as women and Muslims appointed directly by the governor of J&K (van Beek, 1999). Four seats out of 30 do not fairly represent the fact that half of the population is female. Moreover, Ladakhi women have not taken up these seats in practice because they do not dare enter politics and run for the elections. Some respondents advanced reasons linked to women's lack of confidence or lower communication skills such as Tsetan (F, 52, Phuktse, farmer):

Women don't know how to communicate with those who do projects.

Additionally, data suggest that women themselves might not challenge the status quo or question the male dominance in decision making. For instance, when they were asked whether women were equally represented at the political level, Thinlas (F, 42, Saboo, farmer) and Tsewang (37, Leh, farmer/guesthouse owner) respectively answered that:

There are no women members at the Hill Council but still women are well represented.

Nowadays, women are also on the top. [...] Councillors are all men but under the head, there are many women.

These accounts echo the findings in section 5.1 whereby women themselves tended to consider that their status and share of work were equal with men's. This could be explained by the willingness of respondents, both male and female, to emphasise that they value gender equality and that they want women to be considered equal to men. But this equally prevents both sexes from recognising the lack of female representation and participation at the political level. By ignoring specific gender views or roles, decisions and projects are likely to miss out on women's knowledge of their environment and community. This statement however, has to be balanced with the perceptions of several, albeit a minority of, female interviewees who considered themselves equally, if not more, 'powerful' than men because of their knowledge and gender roles. For instance, Rangdol (F, 58, Saboo, retired teacher) and Dolma (F, 73, Saboo, farmer) stressed the value of their roles:

In Ladakh, women have more decision power than men in the family because they are the ones who look after children. And also at the community level, they have more power because they are more present in the village so they know everything at family and community level.

If I am not involved in decisions then there are bad results!

Interviewees also stressed the presence of women's associations in most villages across Ladakh suggesting that there still is a space for women to participate in the political life of their community

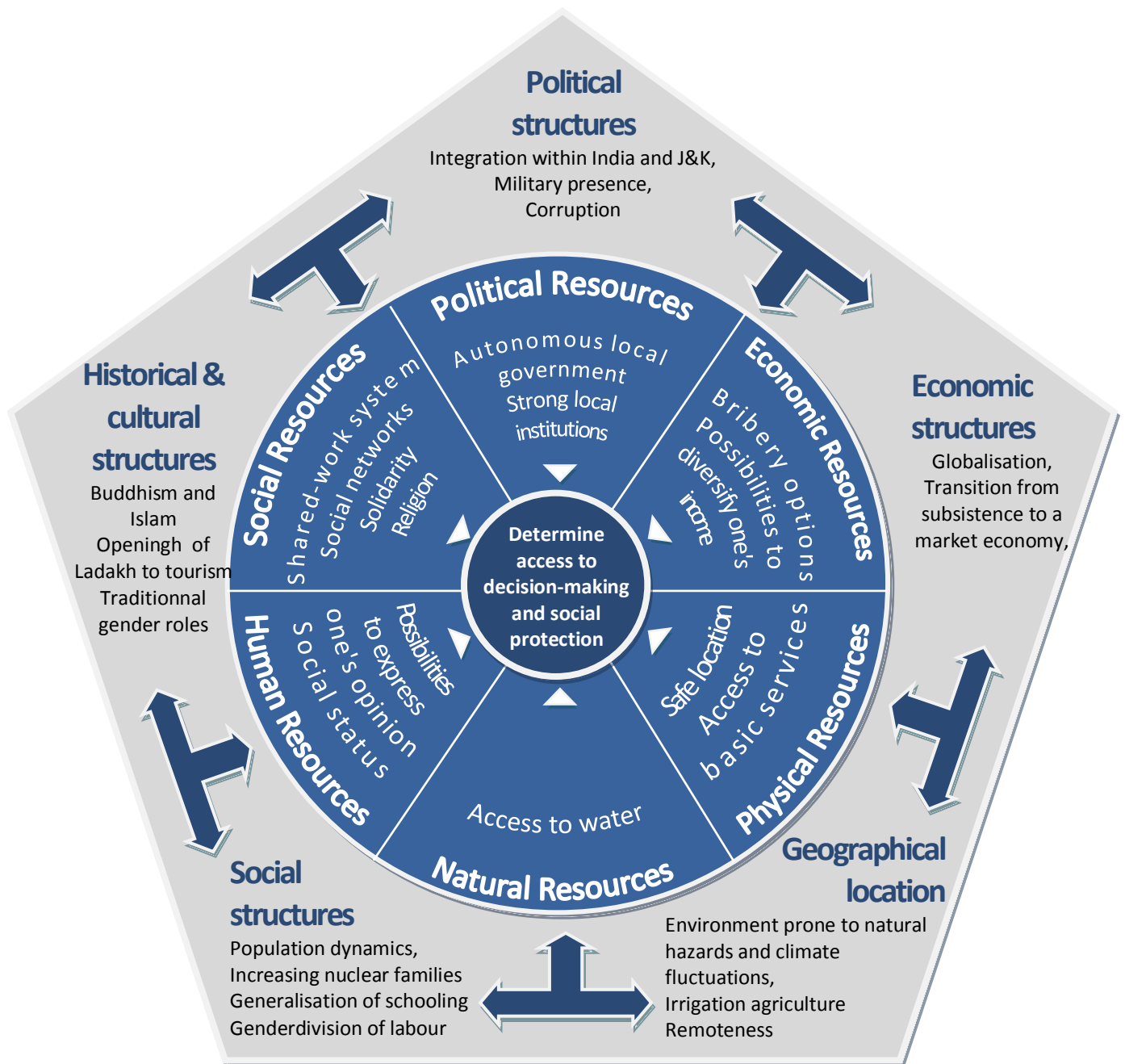
(see Figure 5.13). The Women's Alliance in Leh was particularly praised for the work of women on cultural and environmental awareness such as their famous campaign to ban the use of plastic bags in the city.

Figure 5.13 Discussion between the Chief Executive Chancellor of Leh District and Leh's inhabitants during the opening of an exhibition at the Ladakh Art and Media Organisation (Nair, 2011)



Overall, this section has highlighted that the political marginalisation of Ladakhi communities depends on the geographical scale and point of reference. Their participation in political decisions made by the central or state governments may be restricted but the autonomous status of the region favours a wider recognition of inhabitants' voices by their local representatives. However, they also face challenges linked to corruption which can undermine their access to other resources (see Figure 5.14). Finally, the marginalisation of women at the political level means that there is a risk of their particular views and problems being ignored or overlooked and therefore DRR or CCA policies and projects being rendered inadequate to their needs.

Figure 5.14 Summary of the way political resources are shaped by different structures and influence people's other resources and the resulting vulnerabilities and capacities



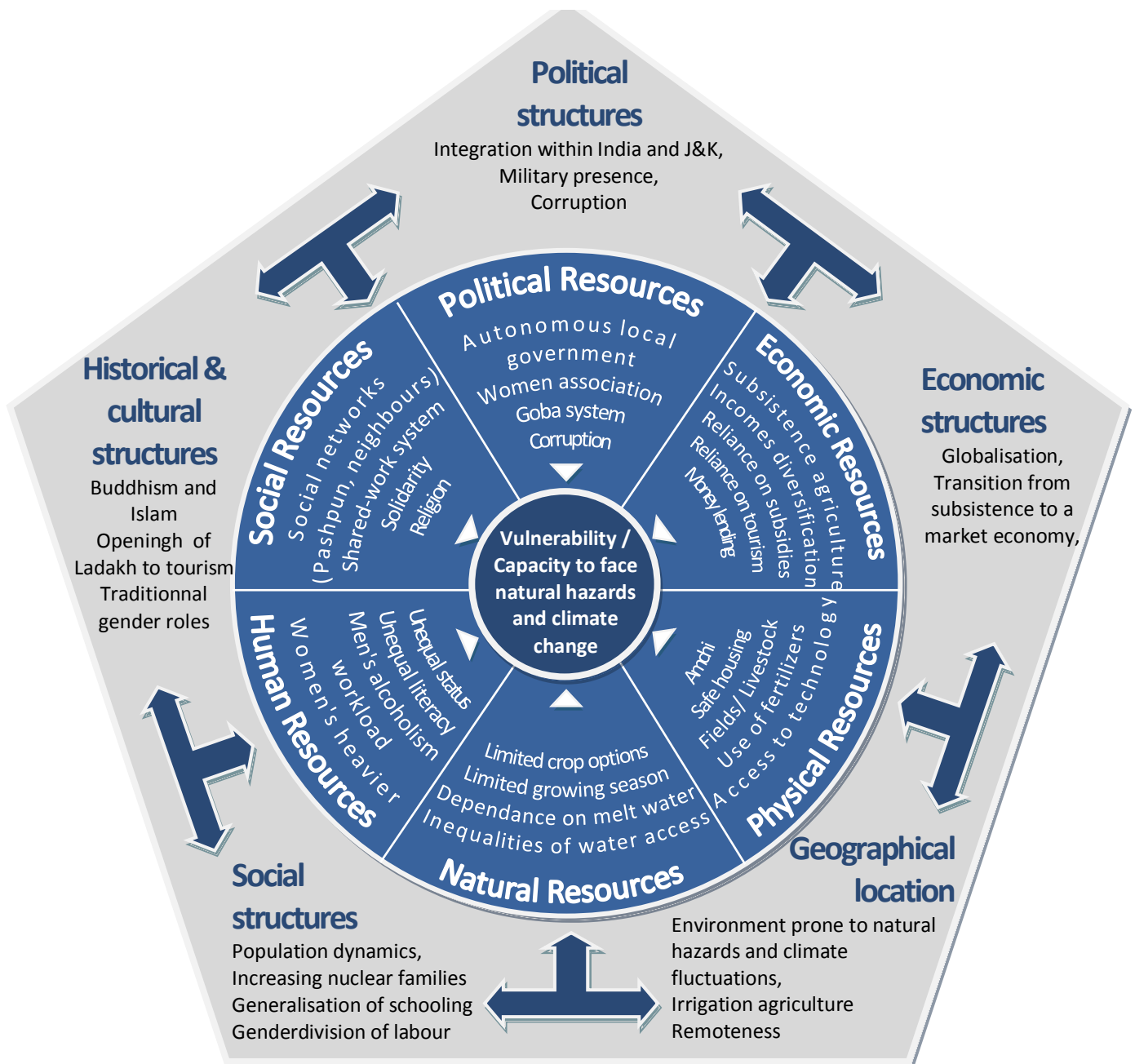
5.6 Conclusion

This assessment followed the idea that the marginalisation of people at individual, household and community levels shapes the nature, the strength and the diversity of their resources and ultimately determines their vulnerability or capacity (Gaillard et al., 2009). This chapter has drawn a profile of Ladakhi communities in terms of their vulnerabilities and capacities in the face of hazards or

environmental change and the role of gender in shaping these vulnerabilities and capacities. The resulting picture shows the interconnection between social, economic, historical, geographical and political structures that determine a lack of access to, or conversely strengthen, sufficient and strong resources, placing some people more at risk than others when facing not only hazards and environmental change but also their everyday risks.

In summary, despite physical features that usually characterise mountain communities, such as remoteness, long distances, harsh climate and expensive travel which isolates Ladakh for half the year, local communities have continually adapted to limited natural resources and relied on pastoralism and subsistence agriculture. However, increasing pressures from population growth, urbanisation, food production, tourism and polluting activities are threatening reliance on natural resources, particularly on water whose availability is a recurrent concern for local communities. The predicted fluctuation of water due to climate change is likely to aggravate the pressure on water to the detriment of people who solely rely on subsistence farming. Yet, socio-economic changes including the availability of subsidised food, the increasing reliance on wage labourers, the growing demand for manufactured goods and services, all require sufficient and secure financial income. Many households diversify their activities in order to expand the scope of their economic resources by relying on tourism-based activities or working as labourers. However, this is highly influenced by their geographical location, to the detriment of people living further out from the capital or from tourist attractions. Interviewees in Phuktse faced greater daily constraints than people living in Saboo and Leh, which exacerbates their vulnerability in times of stress like water shortages or floods. The economic marginalisation is also greater for certain social groups. The analysis has highlighted differences between the elderly and the young generation. If the latter benefit from better access to formal education and opportunities to leave Ladakh, they progressively abandon traditional farming practices and knowledge and build nuclear households separated from the rest of the family. Young people thus tend to rely on formal employment or self-employment as their main economic activity in an increasingly competitive environment. In comparison, the vulnerability of the elderly is not necessarily linked with their economic resources as many older men provided the only secure and stable income of interviewed households. This also highlights the strong gender dimension of marginalisation. Women are primarily associated with reproductive, domestic and agricultural activities which are not valued as important by half of their male counterparts. They bear heavier tasks, have fewer opportunities to access and secure sufficient incomes and are more dependent on other male household members.

Figure 5.15 Representation of structures and political resources shaping Ladakhi men's and women's vulnerabilities and capacities.



This exacerbates their vulnerability in times of shocks and stress especially women whose husbands do not have access to secure economic resources due to their education level, lack of employment opportunities, illness or alcoholism. The general discourse of both male and female interviewees highlighted differences in gender roles but considered there to be an equality of status between both sexes. Yet, findings from the field suggest that women are much more marginalised politically than men, especially those further away from the capital. This, combined with the absence of women from the position of elected political representatives within the LAHDC, means that half of the population might not have their needs and opinions acknowledged, heard and taken into

consideration for designing policies and projects regarding DRR and CCA. The marginalisation of certain individuals or groups however, has to be balanced with the close links existing between family and community members. Extended social networks of relatives, groups of neighbours and traditional agrarian activities that rely on solidarity between villagers (e.g. distribution of water, harvesting) all contribute to reinforce social, physical and economic resources of the majority of Ladakhis and counterbalance their geographical, economic and social marginalisation. This contributes to enhance their capacities in times of crisis as illustrated by the preponderant role of local communities in the aftermath of the 2010 flood who rescued affected families and helped them recover. Finally, faith plays a determinant role to strengthen the capacities of individuals because it can help them cope better with difficulties. It also shape the way Ladakhi people perceive their environment including natural hazards which will help explain the way they conceive of climate change in the next chapter.

The resulting diagram (Figure 5.15) draws a profile, albeit not exhaustive, of Ladakhi communities in terms of factors that render them vulnerable or, on the contrary, capable of facing natural hazards and the impacts of climate change. It highlights the fact that vulnerability can be experienced at the individual level but compensated by capacities at the household and community and *vice versa*. It also emphasises the interconnection of structures, beyond mountains, that both create everyday risks and shape people's resources and abilities to face environmental shocks and trends. The holistic approach followed in this assessment aimed to better comprehend the vulnerabilities and capacities of mountain people in relation to their everyday experiences. It highlights that focusing on a vulnerability approach and relying on DRR frameworks is relevant for any type of hazards including climate change, even though studies have pointed out that differences related to the nature of the threat could prevent the integration of DRR and CCA sectors. Moreover, the gender perspective highlights the importance of social determinants of vulnerability and focuses attention away from the hazard. It emphasises the way people's vulnerabilities are inherently linked to unsustainable development which stresses the importance of designing integrated responses. The profile of communities' daily constraints, thus aims to inform the analysis of policies and projects existing in Ladakh to tackle climate change and natural hazards It provides key elements to understand (i) the context of the geographical area experiencing natural hazards and the predicted impacts of climate change, (ii) challenges faced by local communities in their daily lives and their root causes, (iii) differences between and within communities in terms of vulnerability and capacities and (iv) the relevance and adequacy of interventions in regard of this context.



Chapter 6

6

ADDRESSING CLIMATE CHANGE FROM THE PERSPECTIVE OF LOCAL COMMUNITIES

Objective I.

To produce a holistic analysis of the way Ladakhi communities experience climate change and natural hazards in relation to their everyday risks using DRR frameworks and a gender perspective.

1. What are the structural factors shaping the development of mountainous communities in the South particularly Ladakh?

Chapter
4

2. What are the vulnerabilities and capacities of men and women to climate change in Ladakh, in relation to their broader marginalisation and the role of gender?

Chapter
5

3. How do Ladakhi men and women perceive and explain climate change in relation to their everyday risks and which solutions do they identify to tackle the impacts of climate change and natural hazards?

Chapter
6

The analysis of drivers of change shaping the development of local communities in Ladakh (Chapter 4) and the assessment of their vulnerabilities and capacities (Chapter 5) provide a basis to explore and understand the way they conceive and experience climate change and natural hazards. As briefly introduced in the methodology chapter, informal discussions and pilot interviews with villagers suggested that the half of them only had a vague idea of the concept of climate change while the other half did not understand what it meant. This observation conflicts with studies in the Himalayas and in Ladakh that have emphasised that the impacts of climate change are already felt on the ground. This raises the question whether there exists a conflict in terms of the language and words used by Ladakhis to describe climate change and its effects. Perhaps, the impacts of climate change might not actually constitute a major source of concern for Ladakhi inhabitants? If this was

the case, what are the main problems that people encounter in their daily lives? Moreover, the fact that many villagers seemed unaware of climate change may pose a challenge to explore opportunities for adaptation. Overall, it questions the relevance of focusing on solutions to tackle climate change when inhabitants identify other problems and risks that need to be dealt with first.

This chapter addresses these questions as a third step to address Objective I which will help to discuss the relevance of Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA)

interventions in relation to local communities' realities in the following chapters. The first section explores how climate change relates to other challenges according to local communities' perspectives and how it is understood as a concept. The second section examines solutions identified by communities to tackle the impacts of climate-related or non-climate-related environmental change. The analysis keeps a gender-sensitive approach when exploring people's views.

6.1 How does the threat of climate change relate to other everyday challenges?

Interviews were aimed at examining how climate change relates to other problems identified by Ladakhi people. This approach echoes methods of investigation described by Bhatt (1998) whereby the researcher, instead of focusing on disastrous events (e.g. floods or climate change), lets respondents set memorable events or problems in their lives. This aims to maintain the holistic assessment of Ladakhi people's vulnerabilities and capacities by exploring how the impacts of climate change and natural hazards relate to other everyday and long-term challenges. The analysis in this Chapter thus breaks away from following any particular frameworks in order to better address the complex dimension of long-term vulnerability and the multitude of social constructions of people's views of risk within the same region, the same village or even within the same household. After questions related to their daily activities, resources, gender roles and participation in decision-making processes, people were asked what their primary concerns were in their daily lives. The question was kept simple and vague to prevent influencing interviewees' answers. Answers to this question have been analysed quantitatively in order to obtain a profile of interviewees' most recurrent concerns. These are presented in Table 6.1 and result from the classification and compilation of all the answers provided during the interviews. Numbers were reformulated in percentages to grasp the ratio of interviewees mentioning a particular concern to the total number of interviewees. For instance, the first line indicates that 33.7% of people identified water pollution as one of their primary sources of worry. Additionally and in order to facilitate the interpretation of the results, answers were merged together within wider themes. Hence, the far right column represents the percentage of interviewees having identified challenges grouped into one theme out of all the answers. For example, 13.3% of interviewees' answers raised an issue related to pollution.

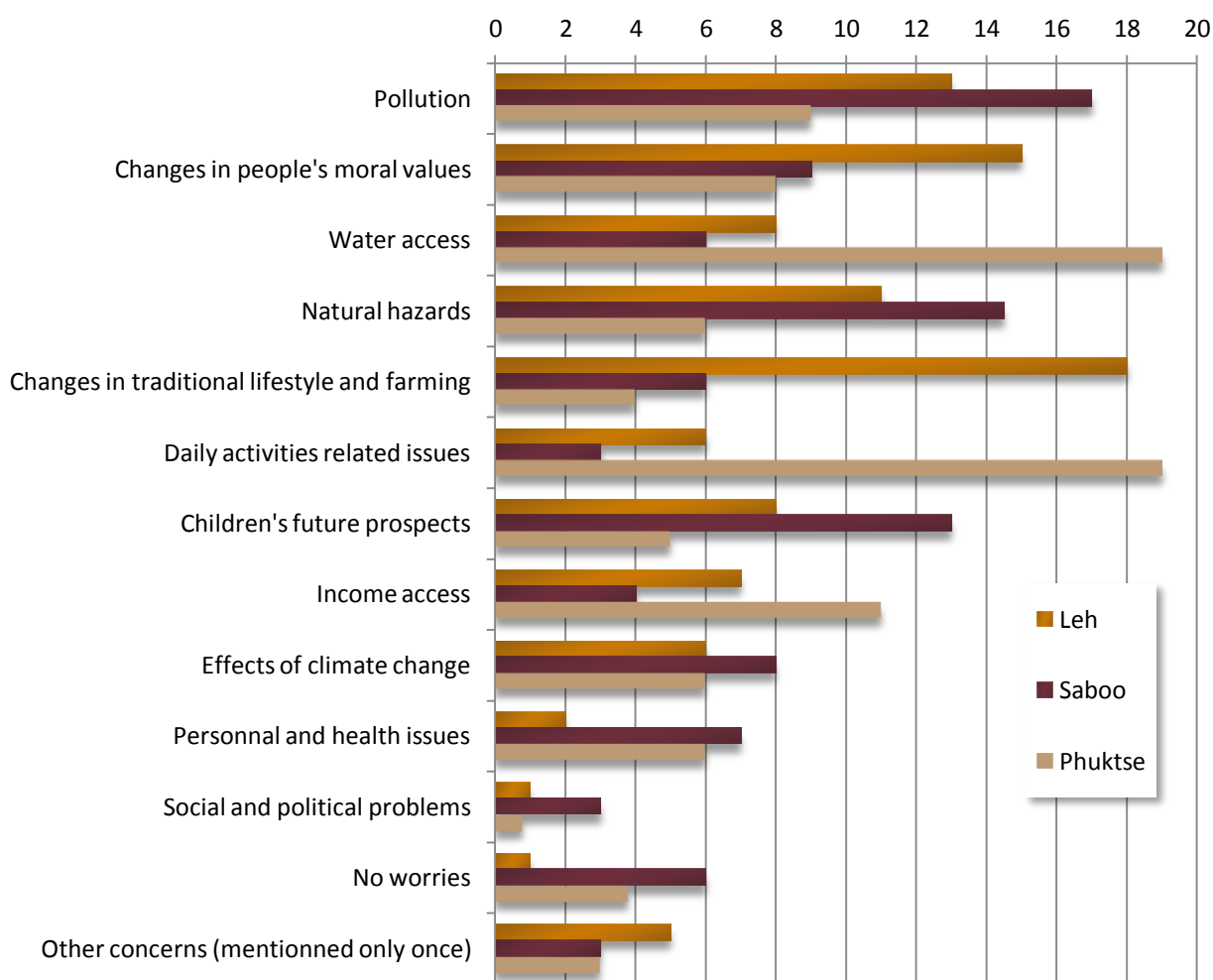
Table 6.1 Primary challenges expressed by interviewees out of the total number of interviewees and answers

THEME	CONCERNS/THREATS/RISKS IDENTIFIED BY INTERVIEWEES	Total Interviewees (%)	Total answers (%)
Pollution	Water pollution, garbage, litter in canals	33.7	13.3
	Air pollution	12.4	
	Too much traffic, vehicles	6.7	
Changes in people's moral values	Selfishness, loss of friendliness and spirituality	24.7	11.0
	People have everything but are less happy	3.4	
	Loss of culture (changes in clothing/food/respect from children)	15.7	
Water access	Water access	23.6	10.8
	Too cold temperatures which prevent the glacier to melt	10.1	
	Mismanagement of water/depletion of aquifers/higher demand	9.0	
Natural hazards	Floods/heavy rains/spring runoff causing damages	42.7	10.8
Changes in traditional lifestyle and lack of sustainability	Unsustainability of mass tourism	3.4	9.3
	Dependence on non-Ladakhi labour/migration of outside workforce	5.6	
	Loss of sustainable life-style, environmental imbalances	6.7	
	Use of chemical fertilizer	6.7	
	Dependence on subsidies	2.2	
	Loss of agriculture land/too many constructions	10.1	
	Modernisation	2.2	
Daily activities	Burden of physical work and fieldwork	11.2	8.8
	Worrying about having a good season (enough water, good yield)	4.5	
	Wolves and snow leopards threatening the cattle	6.7	
	Lack of family members for daily activities	12.4	
Children's future prospects	Children' education, marriage and future	16.9	8.5
	Lack of access to stable government job/ opportunities	9.0	
	Educated children don't know how to farm; they neglect fieldwork	9.0	
Income access	Lack of incomes, low incomes	19.1	7.1
	Everything has a cost/is expensive/higher prices	5.6	
	Lack of/ low access to livestock	3.4	
Climate change	Climate change	14.6	6.5
	Changes in the weather, melting of glaciers, rise in temperatures	11.2	
Personal issues	Personal troubles in family/trauma	9.0	5.1
	Health problems	7.9	
	Mental distress/alcoholism/drug addiction	3.4	
Political problems	Competition in politics, political struggle with J&K	4.5	1.7
	Corruption	2.2	
None	No worries	13.5	3.4
Other concerns (mentioned only once)	Poor living conditions	2.2	3.1
	Poor road connectivity	1.1	
	Death	1.1	
	Loneliness	1.1	

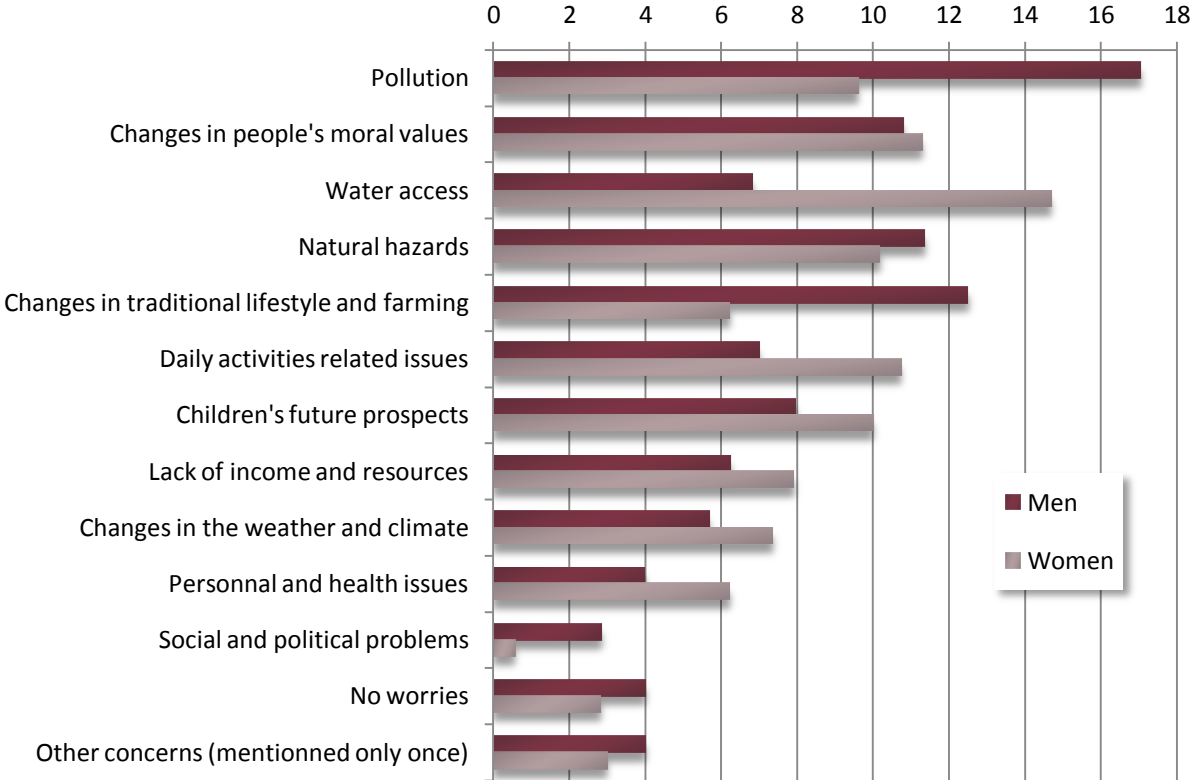
Decrease of wildlife	1.1
Terrorism	1.1
New diseases (e.g. AIDS)	1.1
Street dogs	1.1
Closing of public schools	1.1
Child care access	1.1
Family planning which reduces the number of family members	1.1

The ranking of the main themes resulting from the compilation of interviewees' answers is summarised below and disaggregated by geographical location (Graph 6.1) and gender (Graph 6.2). This initial statistical analysis shows that pollution, changes in people's moral and spiritual behaviours, access to water and natural hazards rank among the top challenges.

Graph 6.1 Ranking of people's main sources of worry (regrouped by themes) and expressed in percentage of the total number of interviewees' answers in each site study.



Graph 6.2 Ranking of men and women’s main sources of worry (regrouped by themes) and expressed in percentage of the total number of male and female answers.



The graphs above point out some disparities between opinions when disaggregating the data according to people’s gender and geographical location. Male interviewees were primarily concerned with the pollution of their environment, the occurrence of natural hazards, changes in their traditional lifestyles and the overall loss of people’s spiritual values and solidarity between community members. In contrast, the analysis of female interviewees’ answers shows that they were primarily concerned by access and/or availability of water, changes in people’s moral and spiritual values, completing their daily activities rendered more difficult by the lack of workforce or family members and natural hazards. Issues with access to water and the burden of physical work have to be correlated with the geographical location of interviewees as they were disproportionately raised by female respondents from Phuktse.

Focus group discussions (FGD) were organised to triangulate the data and further explore what constitute Ladakhi people’s main challenges. Based on the extrapolation of the most recurrent answers provided by interviewees in each site, but also on information gathered during informal discussions and participant observation during the whole period of the fieldwork, I identified a list of 25 challenges which were presented to participants of FGD organised in Leh and Saboo. These

'problems' were represented by illustrations and displayed in a random order in front of each group who were then asked to rank them from the most challenging to the least worrying (Figure 6.1).

Figure 6.1 One of the rankings produced by the women group in one of the FGD in Leh (Le Masson, 2011).



As explained in the methodology, the first objective was to present the results to participants, some of whom had been interviewed previously, and give them the opportunity to reflect on the answers and change their opinions. The second objective was to triangulate the data collected during interviews in order to capture a more precise picture of inhabitants' main daily concerns.

Findings from FGD sometimes concur with and sometimes differ from answers provided by individual interviews. A possible explanation might be the fact that FGD participants (half of them were previously interviewed) were not asked an open-ended question about challenges they face in their daily lives but they were given the choice between several visual pictures. This could have led them to put their opinion into perspective and consider their concerns in comparison with other existing challenges. Additionally, the next section will show that discussions with other participants have certainly influenced people's views and caused their perspectives to evolve.

6.1.1 Gendered perceptions of Ladakhi people's daily concerns

As mentioned in the methodology, men and women were asked to look at themes that emerged from the interviews separately before comparing their opinions together. Graph 6.2 shows that male and female interviewees did not always rank sources of worry at the same level. By maintaining a consistent gender separation first, the objective was thus for each group to discuss their own rankings before debating potential differences between men's and women's opinions and therefore be actively involved in the early stage of data analysis. Tables 6.2 and 6.3 represent the top 10 of each group's rankings in Leh and Saboo.

Table 6.2 Ranking of top ten challenges according to men (left column) and women (right column) in Leh.

Weather & temperatures changes/ Melting of glaciers	1	Rise of selfishness/ Loss of friendliness
Loss of spirituality	2	Corruption
Child care access	3	Lack of access to formal employment opportunities Children's education, marriage and future
Water access	4	Loss of spirituality
Electricity access	5	People prefer private schools for their children
Rise of selfishness/ Loss of friendliness	6	Loss of agriculture land/too many constructions
Loss of agriculture land/ Too many constructions	7	Weather & temperature changes/ Melting of glaciers Water access Floods/heavy rains
Educated children don't know how to farm and neglect fieldwork	8	Alcoholism/drug addiction
People prefer private schools for their children	9	Use of chemical fertilizer
Changes in clothing	10	Air pollution/ Too many vehicles

Table 6.3 Ranking of challenges according to men (left column) and women (right column) in Saboo.

Alcoholism/Drug addiction	1	Loss of spirituality
Lack of access to formal employment opportunities	2	Lack of incomes / High cost of living
Loss of spirituality	3	Loss of agriculture land/ Too many constructions
Educated children don't know how to farm and neglect fieldwork	4	Rise of selfishness/ Loss of friendliness
Changes in clothing	5	Water pollution/ Litter in canals
Children's education, marriage and future	6	Corruption
Corruption	7	Air pollution/ too many vehicles
Weather and temperatures changes/melting of glaciers/Climate change	8	Children's education, marriage and future
Rise of selfishness/ Loss of friendliness	9	Lack of access to formal employment opportunities
Loss of agriculture land/Too many constructions	10	Floods/ Heavy rains

Findings from the FGDs highlight that pollution is no longer cited as a major source of worry for male participants and nor are natural hazards, but the loss of spirituality and the rise of selfishness are confirmed as among their primary challenges. In Leh, men identified climate change as their main worry whereas male participants in Saboo considered alcohol and the lack of access to formal employment as more challenging. In contrast, women participants in Leh and Saboo reiterated the loss of spirituality and the rise of selfishness as their main sources of worry. They also identified corruption, the lack of formal employment and their children's future as their primary challenges in Leh while women from Saboo pointed out the lack of incomes, the loss of agricultural land and water pollution.

Groups of men and women were then asked to compare their ranking with each other generating a debate between male and female participants. This process was designed to highlight potential gender differences when identifying challenges but also to provide a space for both groups to reflect on these and explore the reasons behind any disparities. For instance, the analysis of people's vulnerabilities in Chapter 5 highlighted differences of perception between what constitutes a challenge or a normal daily activity for certain groups. In Leh, female participants considered the burden of everyday and repetitive chores to be an intrinsic part of their life that cannot be questioned and this therefore was not automatically raised as a concern. Hence, they instantly removed from the ranking of problems the pictures that illustrated 'physical work', 'domestic tasks' and 'looking after children'. In contrast, men participants in Leh cited 'looking after children' as the third most challenging issue in their daily lives because according to them:

- [Male participant] *If everybody is employed in the family and if there are not old people in the house, then that is a big problem because there is no one to look after the children.*
- [Female participant] *We have to go around a lot for social gatherings, so that is why it is difficult to look after the kids.* [Extract of group discussion]

Looking after one's children might be rendered more difficult if there are many more daily activities to deal with and fewer family members to help within the household. However and as mentioned in Chapter 5, women thought that this should not be considered or at least not denoted with the rather negative term 'problem' as it constitutes one of their primary responsibilities. This illustrates how gender roles shape different concerns for men and women and how one particular issue may be a source of worry for some or actually constitute an activity that should be more valued for others. Resulting debates between male and female participants thus influenced people's views when they were eventually asked, as one group, to identify the top five of the main problems faced by their community. The aim was to (i) observe how men and women's groups reached a consensus and (ii)

visualise whether climate change and natural hazards ranked among people’s main challenges or not. In Leh, participants agreed to remove ‘Looking after children’ from men’s ranking based on their previous debate and ultimately selected problems that were among the top six of women’s and men’s rankings. The resulting ranking is shown in Table 6.4 and is compared with the trend of interviewees’ answers in Leh.

Table 6.4. Ranking of daily challenges according to interviewees' answers (on the left) and FGD findings (on the right) in Leh.

Floods/ heavy rains/ spring runoff	1	Rise of selfishness, loss of friendliness
Water pollution, garbage, litter in canals	2	Corruption
Selfishness, loss of friendliness and spirituality	3	Electricity access
Water access	4	Lack of formal employment Children’s future
Loss of traditions (changes in clothing/food)	5	Weather changes/ Climate change Water access
Loss of agriculture land/too many constructions	6	Loss of agriculture land/too many constructions
Weather changes/ Climate change	7	Loss of spirituality
Children' education, marriage and future	8	
Use of chemical fertilizer	9	
Lack of incomes, low incomes	10	

Table 6.5. Ranking of daily challenges according to interviewees' answers (on the left) and FGD findings (on the right) in Saboo.

Floods/ heavy rains/ spring runoff	1	Loss of spirituality
Water pollution, garbage, litter in canals	2	Alcoholism
Air pollution	3	Rise of selfishness, loss of friendliness
Climate change	4	Lack of formal employment/children’s future
Selfishness, loss of friendliness and spirituality	5	Corruption
No worries	6	Children do not know how to farm
Children' education, marriage and future	7	
Water access	8	
Lack of formal employment	9	
Lack of incomes, low incomes	10	

In Saboo (see Table 6.5), debate among participants also seemed to have influenced the short-listing of their main daily challenges. For instance, the top second and third issues in women’s ranking, namely ‘High prices of goods’ and the ‘Loss of agricultural land’ were left aside. Both male and female participants agreed that ‘Corruption’, although ranked earlier at lower levels by both groups,

was a more serious concern than high prices or the shrinking of farming land because, according to them, corruption undermined any positive outcomes from other economic or physical resources:

- *Corruption is a big problem... [...]*
- *People who have money they can pay easily but people who don't have money, no matter how much they are cultivating the land, it doesn't matter, they don't have much choice.*
[Extract of group discussion]

The process of short-listing daily issues after each group had confronted and discussed their views underlines on one side that this approach remains subjective and highly dependent on individuals' contexts, opinions and participation in the discussion. On the other side, the final rankings in both Leh and Saboo are the results of a consensus among participants after they had confronted their gendered perspectives which enabled the findings to be less biased by my own judgment. Unfortunately, such bias cannot be prevented regarding data from Phuktse.

Overall, the triangulation of data from interviews and FGD highlights a first point whereby both men and women identified rising individualism and the loosening of spiritual values as their main sources of worry because all other everyday risks stem from these. Consistently raised by interviewees and FGD participants as one of their primary challenges, changes in people's social values and attitudes were, according to respondents, the root cause of cascading negative consequences such as the corruption of their local and governmental authorities, the pollution of their environment, the increasing competition over their natural resources, changes in their traditional lifestyle and lack of incomes. This is illustrated by the extract of the discussion between participants in Saboo:

- [VLM] Why is corruption a problem?
- [male] *Because people are becoming selfish.*
[female] *And why are they selfish? Because they want to succeed in life. [...]*
- [male] *Because people don't have money, so they have to become selfish.*
- [female] *Money is the biggest reason for everything.*
- [male] *If we don't have money, I will think that I don't have this, I want to have that. If we see somebody else doing something, we need to do the same thing, so there is a sort of a competition between people. There is a big ego behind it. [...]*
- [male] *We need cars these days. People who are corrupt they have money, and whoever has money they want cars. Even whoever is employed, they have money and they want cars. And everybody dispose garbage in the market. Then there is pollution and air pollution. [...]*
- [male] *The pollution is also because of the selfishness of people. He wants it for himself but he doesn't think about others.*

Participants also linked rising individualism and competition with the loosening of moral values within society such as an increasing disrespect for religious principles. When asked why they thought Ladakhi people are becoming less spiritual, participants in the FGD in Leh explained that:

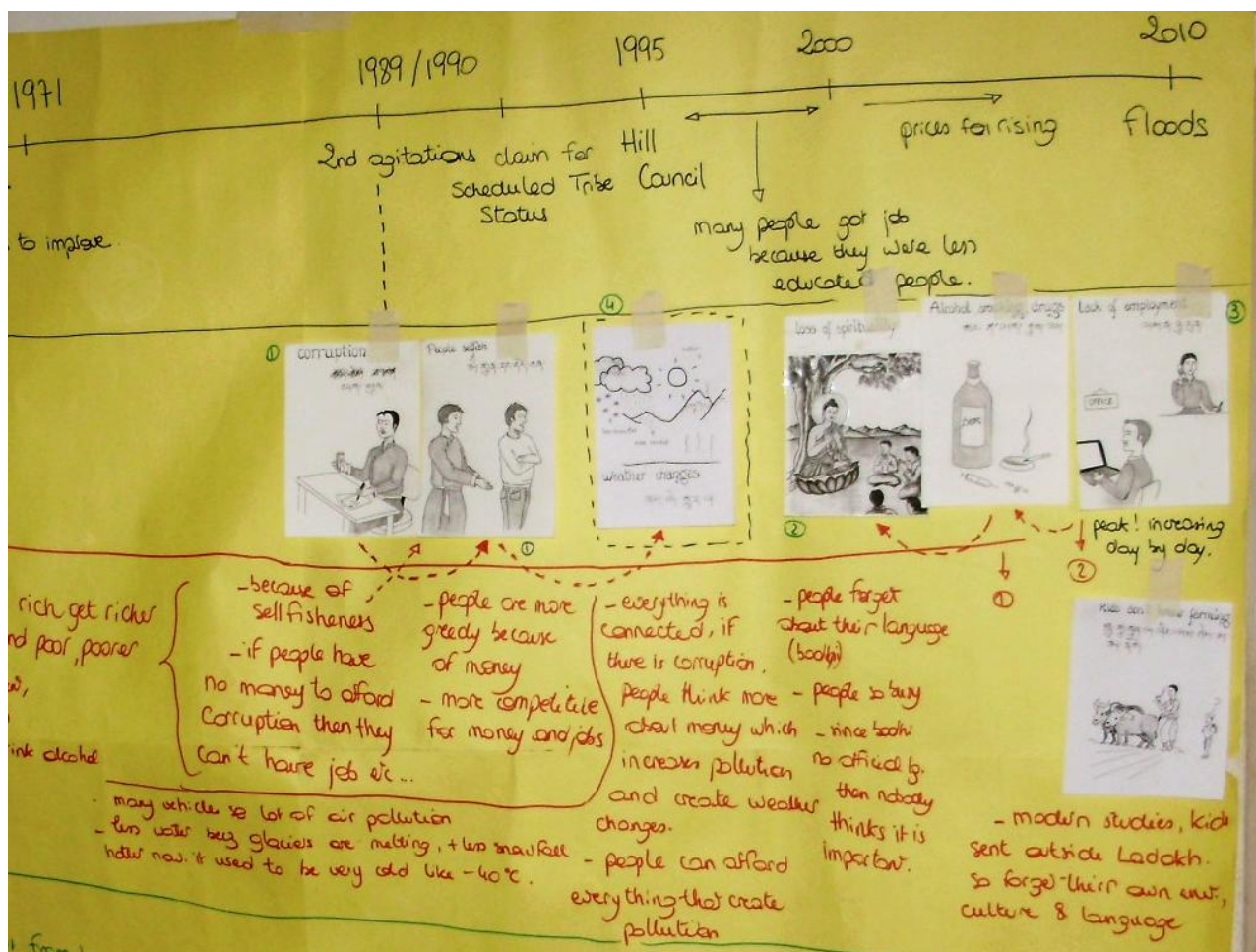
With the increase in money, there is a decrease in spiritualism. Now people are more pretentious and hypocritical about religion. People are running after money. Now the kids don't have time.

Negative changes in people's spiritual and social behaviours were also ranked among the primary problems by interviewees in Phuktse as expressed by the Goba of the village:

Nowadays, people are neglecting religious activities. According to our lunar calendar, we have specific dates when we have to perform pujas to the guardian deities but we lack a monk in the village; we have to go to far remote places so people neglect this and they are slowly giving up these practices. People are losing their moral values and their social responsibilities. They disrespect the spirits and divinities also by smoking and drinking.

FGD stressed the interconnection between all challenges even if some people raised different concerns and ranked them in different orders. Despite the variety of interviewees' perceptions (between men and women and between inhabitants of rural areas and those living in Leh), participants emphasised that every problem they identified results from or impacts on another one.

Figure 6.2 The interconnection between challenges highlighted by participants during the FGD in Saboo.



In Saboo, the previous quotes as well as Figure 6.2 highlight how the rise of individualism is thought to generate competition between community members, corruption as well as pollution. The extract below from a discussion among participants in Leh also highlights the link between different issues:

- [female] *What should we do for the lack of employment?*
- [male] *We should get back to agriculture*
- [female] *That is the only solution*
- [male] *Now the only jobs available are in the government or tourism. Now to cultivate land is an option...*
- [female] *But we don't even have the land to cultivate!*
- [male] *We have all the barren land*
- [male] *But where will you get the water from?! [...]*
- [male] *We should start joined families again! In Leh, the loss of land is happening because families are becoming nuclear*
- [female] *From one household, there are lot of people who split*
- [female] *Also because there are lots of hotels being built [...]*
- [male] *If we become a joined family again, it will help in the labour work on the field or in the house.*

This stresses the necessity to look at people's daily challenges with a holistic approach which echoes the interconnection of people's vulnerabilities and capacities already examined in chapter 5. In parallel, the analysis of interviewees' answers suggests that climate change does not rank among the most challenging issue in people's daily lives with the exception of the male group in the FGD in Leh. Table 6.1 shows that only 15% of interviewees raised climate change as a source of worry while 11% mentioned changes in the weather and temperatures as a problem. Although, this might imply that the majority of people are not primarily concerned about climate change (or have not noticed any changes related to the climate that are likely to worry them), it was still short-listed by participants of the Leh FGD based on men's initial ranking. Disparities between accounts referring to climate-related environmental changes constitute the focus of the next section.

6.1.2 Contradictory accounts regarding the perception of climate change

Questions asked during interviews were intentionally kept open to prevent leading people's answers. This was especially true regarding climate change because the objective was to determine how it relates to other daily issues and what people's perceptions about it were. Overall, opinions are not homogenous. The next sections will successively highlight that (i) for the majority of interviewees, climate change is an unknown concept or a vague idea, (ii) a minority of respondents actually perceive climate change as a positive phenomenon and (iii) climate change is still a major source of worry for most respondents because it is associated with natural hazards.

6.1.2.1 “What is Climate change?”

Interviewees who did not spontaneously raise climate change as one of their primary concerns were eventually asked if they knew about this phenomenon. In Leh and Saboo, half the female interviewees appeared unaware of climate change. They simply replied that they did not know anything about it or provided answers that showed a lack of understanding of the concept, such as Dolma (F, 73, Saboo, housewife/farmer):

I don't know about it but sometimes it is very hot or very cold.

Although, this answer could actually mean that she perceives a shift in temperature extreme, the fact that the Ladakh region is already characterised by extremely low temperatures in winter and quite high ones in summer suggests more that many interviewees replied to this question with a simple observation of their local climate and seasonal variations. Overall, 60% of female interviewees had not heard of the concept and/or did not know the phenomenon. In Phuktse, 79% of female respondents stated that they did not know what climate change was (even when providing the equivalent translation and explanation in Ladakhi). Possible explanations could be linked to their lower literacy rate and formal education level that might prevent them from accessing and understanding relevant information. In contrast, the majority of men advanced an opinion about climate change and pointed out various causes to explain the phenomenon. For some of them though, their answers revealed their actual lack of knowledge of the concept. For instance, Norgyas (M, 66, Phuktse, farmer/shepherd) said that:

This year according to astrologer predictions, there will be more wind, windstorms and rainfall but the reason behind we cannot... only those who are well educated like astrologers they can predict and explain.

The account of Urgyan (M, 23, Leh, travel agent) also illustrates that many respondents considered climate change similar to weather fluctuations and not really as a phenomenon at a geologic scale:

What can I say about climate change? It is good this year, this year is good, I hope not much hot, just normal. Everything is normal, so far so good.

On the other hand, there were some interviewees who mentioned having observed changes in their environment related to the temperatures and precipitation but who could not understand the reasons behind it. For instance, Takpa (M, 77, Saboo, Farmer) said that he noticed an increase of rainfall in summer, a decrease of snowfall in winter and an increase of floods and natural events.

However, when asked if he knew the concept of climate change he replied that he did not. This was also the case of Khabira (F, 68, Saboo, farmer):

The timing of rain, sun... everything is changing. Everything seems deregulated.

Some other respondents struggled to reconcile what they hear with what they observe such as Chorol (F, 69, Phuktse, housewife/farmer) who explained:

I heard people saying that because of the cars [emissions] it is supposed to be warmer but I feel it is actually cooler now so I don't understand why. I heard the neighbours talking about it and gossips.

This reflects the fact that the general climate change discourse reaches Ladakh but it does not mean that every inhabitant understands the concept of it and is able to link it with their daily interaction with their environment. Possible explanations can be linked with language issues and means employed to inform oneself. Chapter 5 highlighted that it is difficult for certain people, such as women or the elderly who did not receive a formal education, to access information and for those who may not have certain physical resources. Most interviewees explain that the news on TV (in Hindi) or on the radio (in Ladakhi) as well as discussions with their neighbours or relatives constitute their primary source of information. Their views thus significantly follow how climate change is being portrayed by the media or being understood by their community members. Overall, the majority of interviewees seemed rather unfamiliar with climate change as a concept, which echoes other studies (e.g. Ireland, 2012).

6.1.2.2 « Climate change is a good thing »

Although the majority of respondents did not grasp the concept of climate change or use the language and scientific knowledge around it, more than half of them were still aware of shifts in their natural environment and expressed observations of climate-related changes. This concurs with an extensive survey conducted by Behera and Vaswan (2006) at the scale of Leh district who found that 80% of households perceived a climatic or ecological change in recent decades even though they might not grasp the scientific processes. However, data from my research suggest that climate-related environmental changes, such as the warming of temperatures, are not necessarily perceived negatively but could actually resolve some of people's everyday challenges. This was particularly the case for respondents living in Phuktse, such as Norgyas (M, 66, Phuktse, farmer):

For us, the farmers, it is good, the rising of temperatures, because we get a good amount of water, the glacier melts at a fast rate so we get plenty of water for the field. We can grow more vegetables.

With the same perspective, the majority of interviewees did not consider climate change to be the main cause for water shortages. In fact, those living in Phuktse indicated that temperatures were often too cold to enable the glacier to melt which explains why they struggle to get enough water to irrigate the fields, particularly in spring. There were still contradictory accounts between men and women as to whether there is more or less water nowadays compared to 10 or 20 years ago. Men tended to consider that the amount of water had increased or remained the same. Overall, they did not raise water availability as their primary source of concern. In contrast, nine out of 13 female interviewees expressed a consistent and similar worry regarding their access to water for irrigation purposes. One of them, Yanchan (F, 67, Phuktse, farmer) explained:

Sometimes, it is really cold, there is very little water and the river dries. Earlier it never used to happen. Now, even in summer, you see the yellow [the crops turn yellow] this is because of the cold. Water is a big problem because now the fields are drying up [...] there was a lot of water before. It has been many years since the water level has gone.

- [VLM] Why do you think the water level has decreased?
- *Because there are lots of constructions going on and there are many roads, we are being unpurified.*

This contradicts scientific climate projections of a global warming of temperatures and also points out the influence of other drivers such as the higher demand for water. Based on these perceptions, the majority of women living in Phuktse who were concerned about water access and the few who heard about climate change considered it as rather a solution. Not only it would provide them with more melt water and earlier in the year, it would also create favourable temperatures for quick and more productive yields. Nilza (F, 83, Phuktse, housewife) and Phuntsog (M, 41, Phuktse, farmer) respectively expressed that:

If the weather gets warmer then there will be more water. Which is good.

If there is a rise in temperatures, we are able to have a better yield, we can produce more. So it is a good thing.

The positive impacts of climate change perceived by some villagers in terms of water availability and higher temperatures that favour agriculture show how local communities relate to climate change with other daily imperatives in the short-term. This was particularly the case in Phuktse where inhabitants primarily rely on agriculture and livestock rearing for their livelihoods, have fewer opportunities to diversify their economic resources and who reported that access to water to

guarantee their yield was their primary concern. However, although Phuktse inhabitants perceived the benefits of climate change in the short term, a few were also worried about the negative impacts in the long run, such as Sonam (M, 25, Phuktse, trekking guide):

Many roads are constructed so many vehicles are coming to remote areas and the number of vehicles is good because it contributes to increase the temperatures and the snow line melts at fast rate so we have enough water for irrigating the fields. And the rise of temperature also enables us to sow various kinds of vegetable. Earlier we were not able to because of the cold climatic conditions. But for the future generation, the temperatures will keep on rising year after year, so slowly the glacier will vanish and there will be a big scarcity of water.

Overall, the case of Phuktse illustrates some of the gaps between the scientific concept of climate change and the views of people experiencing environmental shifts on the ground. Within the same village, half of the respondents seemed to witness contradictory impacts to those predicted by scientific models. People, like Sonam, also talked about climate change as a phenomenon resulting from a higher number of vehicles in their regions even though the contribution of Ladakh to greenhouse gas is likely to be insignificant. This illustrates the tendency of many respondents to reconcile what they hear about the concept of climate change with their own experience of environmental change. Finally, for some villagers, a potential warming of temperatures would be beneficial for their daily imperatives such as collecting water and producing food. This raises potential limits for climate-related interventions if they do not acknowledge people's everyday priorities that need to be dealt with first. This also emphasises the need for a holistic approach when addressing the issue of climate change and the necessity to contextualise it at the local level.

6.1.2.3 "Climate change is a big concern"

Apart from the particular case of Phuktse, the lack of awareness and/or understanding of climate change as a scientific phenomenon did not prevent the majority of participants from worrying about it. For instance, Raheela (F, 70, Leh, retired from the government) and Palmo (F, 38, Phuktse, farmer/housewife) respectively expressed that:

Before the floods, I wasn't worried [about climate change] but now I am worried.

I heard people talking about the floods and the earthquakes that are going to happen so I worry about that.

According to Yangskit (F, 25, Leh, housewife), the floods were caused by climate change, because this is what people on TV and radio news are saying. Perhaps as a result of the media influence, the majority of interviewees automatically considered storms and floods as climate change or one of its

manifestations. When they were asked where they gained their knowledge regarding climate change from, almost every interviewee reported having heard about it in the news, on TV or on the radio. Natural hazards, mostly floods and cloudbursts, and their disastrous impacts on people's safety and livelihoods were ranked among the top four main challenges identified by interviewees. It is reasonable to think that this is influenced by the disaster that occurred in August 2010. Ishey (M, 69, Saboo, retired from the army) emphasised that:

After the floods, the cloudburst, [...] people are badly affected emotionally [...] there is a lingering fear, what will come in summer? We are worried about the future, what will be our harvest? Is there less chance of good production this year?

Respondents also related the fear of losing their loved ones and having their property and all their belongings destroyed as happened to many of them or to their relatives in 2010. They also highlighted the unpredictability and intensity of such phenomena which can ruin years of work and savings, as Tashi (M, 31, Saboo, taxi driver) described:

I am worried for my own village... Because we are on the way to development. We are having goods and roads, but within 5 minutes, it is washed away.

Hence, even if respondents did not raise climate change as one of their main daily problems, there were many accounts suggesting people's concerns about it because they linked it with extreme phenomena like the one they witnessed in 2010. This was the case of Wangyal (M, 50, Leh, farmer/guesthouse owner) and Nawang (M, 54, Phuktse, Farmer):

Now we are getting a lot of rainfall due to this climate change. It is a serious problem for Ladakh. Last year we saw this cloudburst; it never happened before.

It is a big concern. Not so much in Phuktse but in some other areas, some villages, if there is this rise in temperatures and the massive floods take place, then it creates big damage for the crops.

In parallel and among interviewees who expressed concerns regarding climate change, a minority of them understood the scientific concept and were worried about the predicted impacts that they could relate to changes in their natural environment. This was almost exclusively among male respondents such as Ajmel (M, 36, Saboo, retired from the army) and Norbu (M, 30, Leh, engineer):

I have seen the changes during my posting in the Sachien glacier area. I have seen the big decrease of the glacier. I am worried because the glacier is melting fast. Because what we have, the streams, the spring water, all are fed by the glacier water so if the size and bulk of the glacier reduces year by year, then there will be a big water crisis.

There is what we are observing and what we see in the media through TV, but what we observe is of much more concern.

However, outcomes from another FGD organised in Leh with young women also shows that they too knew and understood the scientific concept of climate change. These participants however, had all completed primary school and some of them were graduates which does suggest that the level of formal education impacts on people's opinions. However, they also perceived climate change as one dimension of global environment-related challenges including water pollution, waste and natural hazards (Figure 6.3).

They considered air pollution as a global problem but that it is also caused by tourist activities in Ladakh which encourages the use of four-wheel-drive taxis. According to them, tourism also increases the demand for water resources and creates pollution.

Despite the fact that climate change was not raised spontaneously by the majority of respondents, this illustrates how discussions during interviews were still pointing out climate-related environmental change and natural hazards linked with other anthropogenic processes. Environmental shifts and extreme phenomena were perceived as major sources of worry by the majority of interviewees because they considered these to be caused by pollution or negative social behaviours and lead to problems such as the availability and access to water. Such connections between different issues were emphasised by the FGDs and suggest that climate change is 'just' an additional challenge resulting from and impacting on others. This statement will help in understanding how climate change and natural hazards should be addressed according to local communities.

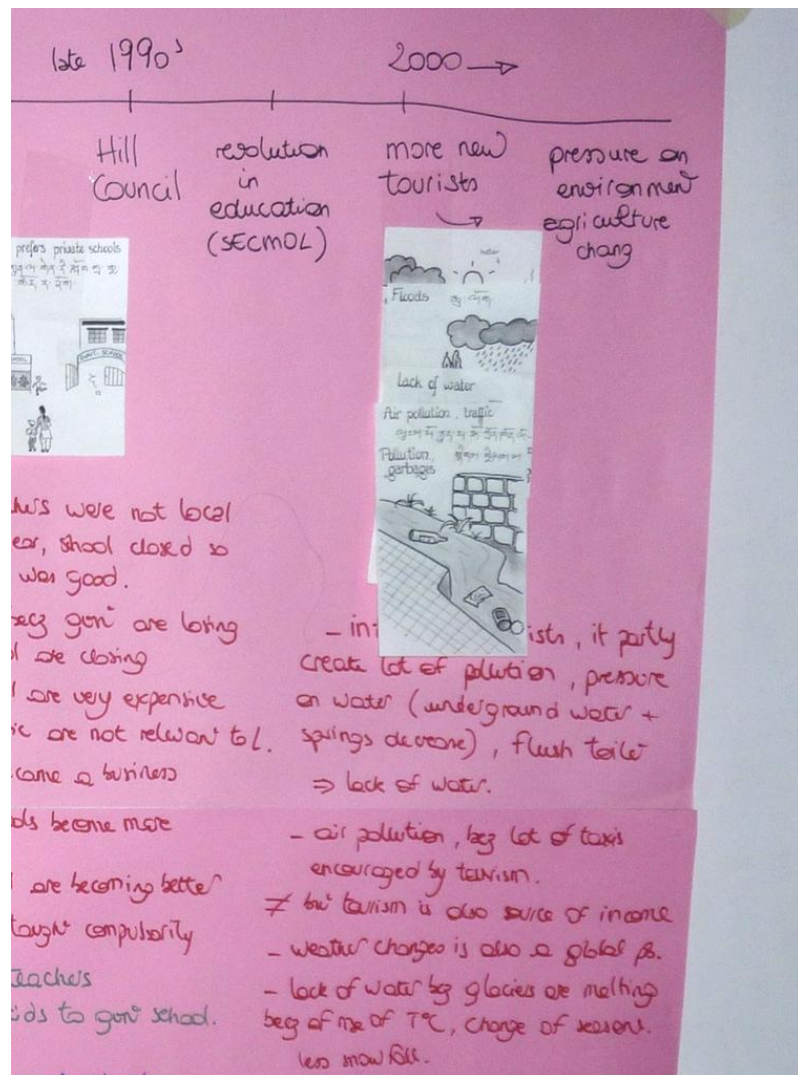


Figure 6.3. Visual support of one FGD in Leh with young women showing how they linked environmental problems (Le Masson, 2011)

6.2 Addressing climate change and natural hazards from the perspective of local communities

This section presents first the way interviewees perceived the causes of climate change and natural hazards before analysing solutions they advanced to tackle environmental challenges.

6.2.1 *Climate change as the reflection of the shift in people's spiritual and moral values*

Interviewees who described having observed climate-related environmental changes, whether they were aware and understood the concept of climate change or not, were asked if they had an idea why those changes were occurring. The objective was to explore what the root causes of the problem were according to local communities in order to examine what the solutions should be.

Approximately half the people provided explanations linked with the scientific discourse of climate change, including the rising of CO₂ emissions and the warming of temperatures. For instance, Wangshuk (M, 79, Phuktse, farmer) and Thinlas (F, 42, Saboo, housewife/farmer) respectively explained that:

According to the news, it is because of the rise of vehicular traffic and their carbon emissions and because all the CO₂ is trapped in the atmosphere which causes the rise of temperature.

And also there are too many vehicles that increase pollution and CO₂.

However, another half of the interviewees advanced rather more spiritual explanations. They considered that climate change and the floods are a 'divine' punishment and a manifestation of God's wrath and explained this anger as a consequence of humans' bad actions and shift in their moral values. For some respondents such as Diskit (F, 41, Leh, housewife) this is a direct response to a break in traditions:

It happens because we are breaking the cycle of the four elements, land, fire, water, air... Some rules are broken like staying one month in the house when mourning or 40 days after delivering a baby. Everything is broken so climate change is happening.

Interviewees were also repeatedly emphasising that the floods were the direct consequence of people's bad actions. For instance, the pollution or the destruction of natural habitats for making new houses is thought by many respondents to disturb God and the divinities scattered in the

environment that in turn show their resentment through natural calamities. This is illustrated by Lonpo's (M, 80, Leh, retired from the administration) and Tingle's (M, 37, Saboo, farmer) accounts:

When the last floods came, it was because people are becoming more aggressive, they are degrading morally, religiously. And some people sell our antiques, which are holy, to outsiders so these are the results, bad results in disguise of natural calamity.

People have less care for life and they pollute the environment. See the floods; it is because of that, because of people's bad actions.

It could be assumed that linkages between calamities, environmental shifts and the loosening of traditions and spirituality are usually made by the elderly because they have seen more societal changes throughout their lives and witnessed how their environment has evolved. However, some of the younger interviewees shared the same opinion and also explained the occurrence of extreme phenomena in terms of spiritual beliefs.

In parallel, although a few interviewees like Diskit directly linked the occurrence of natural hazards to people's bad behaviours the majority had a less straightforward point of view such as Dorje (M, 85, Phuktse, monk):

It is because we are in this black ominous time. People are selfish and self centred; they don't have this cooperative existence. They think differently. And also because people are making these roads into the mountains like tunnels or in higher reaches which is the abode of the celest and divine things, the guardian spirits have been disturbed. And this is dishonourable and because of that we have this curse in form of floods or heavy rainfall.

This might introduce a possible explanation for why the majority of interviewees and FGD participants raised pollution as well as the shift in people's moral and spiritual values as their primary concerns in their daily life. The previous section has already shown that, according to respondents, the loss of spirituality and solidarity among people is somewhat the starting point that links to a cascading chain of consequences such as corruption and the shift of their traditional lifestyle. This is best illustrated by the account of Takpa (M, 77, Saboo, farmer) one of the interviewees who did not know the concept of climate change, and his wife:

- *"It is all because of the wide gap between the poor and the rich, you know, so the rich are richer and poor are too poor. Because of that people are competing against each other and they are taking these different methods, you know, like you can say the bad and quick ways, corruption and bribery, these practices are coming in. So indirectly they are making a gap between the religious way and materialism. People are becoming more materialistic. In the past people were more religious and performing timely rituals and nothing bad happened, but this is not happening anymore so you have these bad results. Before we joined the Indian*

democratic set up, people were more in a free country, you know, we were an independent kingdom, people were more into agriculture, farming for self subsistence, they had their own production and enjoyed their own results. So when people came under India they began to get these subsidised rations and employment for those who were educated. Due to that there was a good flow of money but because of this money people neglected the farming part. Whenever a family has benefitted from government funds there is this urge that "oh if he has benefitted why not I", then comes the self-centeredness, arrogance and these negative feelings, negative emotions rise up. Then there are arguments and disputes and then you see the effect on the environment. The environment also depends on the human mind, or human mentality. [...] Also because of this income from tourism, they are earning good and quick money, you know, like these travel agents, taxis, guest houses and hotel operators. With the incoming of more wealth and the money power, people are having this ego problem; they become more selfish and they lose the moral values. They are forgetting the habits of customs and practice. There used to be more respect for the elderly and younger used to be treated with loving kindness. Now everyone is saying "I am the one, I am the one", so the balance has been broken in the society. And the floods are the consequence.

- *Changes in the climate, the cloudburst and disasters are linked to people's growing arrogance, their decreasing moral values and their greediness; they are losing their religious path and become more materialistic. This increases the number of people owning vehicles for instance and the output is too much pollution".*

This account illustrates a general perception among most interviewees of the causes that lead to worrying environmental changes and their opinion that everything is interconnected. They consider that with the loosening of spiritual and moral values, people are getting corrupt and money driven. With higher financial power, people turn away from their traditional lifestyle. They become more individualistic and they do not have to rely on their neighbours as much as they used to. They can buy more new products and services which are neither biodegradable nor environmentally friendly. People build more and bigger houses, often with non-local materials which increase their environmental and carbon footprint.

Therefore all this increases water and air pollution within their region. However, they also underline that shifts in their society reflect what is happening in the rest of the world. The deterioration of people's moral and spiritual values goes beyond Ladakh and the cascading consequences have to be comprehended not just in the area but at a global scale. That is why, according to respondents, human activities and behaviours lead to negative impacts on the environment including climate change and natural hazards-related disasters.

The interconnection between different issues highlighted in interviewees' accounts suggests the strong influence of Buddhism and teachings given by spiritual leaders such as the Dalai Lama or the Karmapa.

The previous quote from Takpa typically concurs with the general discourse of Head Lamas (See Box 6.1) which emphasises the interconnection between living beings as well as notions of selfish actions and desires that lead to environmental imbalances and destruction. These aspects were repeatedly mentioned by the majority of interviewees when they talked about climate change and/or changes in their natural environment.

Overall, respondents related to climate change in both rational and spiritual ways that are interconnected. They did not consider it as one issue per se but as one of the many consequences of other drivers of changes and as one of the causes leading to environmental shifts. Based on these findings, the next section discusses respondents' views on what approaches should be adopted and what potential solutions could be identified to tackle climate change and the occurrence of natural hazards.

6.2.2 Local communities' views on how climate change and hazards should be tackled

Interviewees who talked about climate change or mentioned climate-related environmental issues were asked what could be the potential solutions to deal with them. From the analysis of their answers, two trends can be highlighted. Firstly, the majority of interviewees considered solutions that are deeply linked with their spiritual views of the problem. Many of them explained that relying on their faith is the only way to restore the situation to 'normal'. This is illustrated by the accounts of Lonpo (M, 80, Leh, retired from the government) and Chamba (M, 90, Saboo, monk):

We have to perform timely rituals, offerings, prayers to the guardian deities in order to have a good season, like timely snowfall, timely water. That can be done. Then the rest it is nature, it is governed by nature; it is not in our hands.

All of this, it could be avoided, if people genuinely followed the pure teachings of Buddha.

Box 6.1. Extracts of discourses from Buddhist religious leaders regarding environmental issues.

"From the Buddhist perspective the root cause of the environmental degradation the world faces now is ignorance and self-centredness. Naively, we think of "I", "me" and "mine", conceiving it as autonomous and independent, but if we carefully consider all the things we need in order to live, [...] we realise that our very survival depends on factors outside ourselves. [...] If, on the other hand, we are trapped in the prison of "I" and "mine" we fail to realise this interconnectedness, and cannot see the connection between the well-being of someone far away and our own well-being". Gyalwang Karmapa addresses the Mind and Life Conference. October 20 2011, Dharamsala.

"Scientific predictions of environmental change are difficult for ordinary human beings to comprehend fully. We hear about hot temperatures and rising sea levels, [...] depletion of resources and extinction of species. Human activity everywhere is hastening to destroy key elements of the natural eco-systems all living beings depend on. [...] According to Buddhist teaching, such things happen as the result of ignorance and selfish actions, because we often fail to see the essential common relation of all beings. The earth is showing us warnings and clear indications of the vast effects and negative potential of misdirected human behaviour. [...] Therefore, I always speak of the importance of developing a genuine sense of universal responsibility. [...] All religions agree that we cannot find lasting inner satisfaction based on selfish desires and acquiring the comforts of the material things". The Dalai Lama, extract from the Environmental Protection Agency Journal, 1991.

Accounts also stressed once again the influence of spiritual leaders to help some people identifying what should be done. For instance, Ishey (M, 69, Saboo, Retired from the Army) and Thinlas (F, 42, Saboo, housewife/farmer) explained that:

These great monks, the lamas, they give us instructions, guidelines and they give us details on what are the performances and rituals that have to be performed for the welfare and harmony of people and overall peace and prosperity.

The Karmapa and the Dalai Lama are both teaching the ways.

This confirms the way some respondents conceive climate change and identify solutions according to their beliefs and what their spiritual leaders preach. The latter benefit from an immense respect among Buddhists believers (Figure 6.4) and their teachings influence many of their followers.

Figure 6.4. Gathering in Leh to welcome the arrival of the Karmapa (Nair, 2011)



For instance, Namgyal (M, 25, Leh, health student) considered the following solutions:

People are planting more and more trees [...] we can use solar energy. The point is about awareness, people have no awareness about the environment and they don't feel responsible for the environment.

This concurs with what the Dalai Lama said during one of his addresses in July 2010 when he visited Ladakh. The official report of his address (The Dalai Lama official website, 2010) states that:

His Holiness said each and every individual of the community should have awareness about the problems of global warming, which he said is related to the happiness and well-being of the whole world. Appealing to the local people to take responsibility in protecting the environment, His Holiness said people living in the Himalayan region should focus on tree plantation, which he said would add to the landscapes' greenery and bring peace and happiness of mind in the day to day life.

Secondly, another trend representing a minority of interviewees' answers suggest solutions that relate more to the scientific concept of climate change and the role of human societies to tackle it. These views were mostly those of male respondents between age 20 and 50 who stressed various solutions such as reducing CO₂ emissions and raising people's awareness. For instance, Norbu (M, 30, Leh, engineer) and Kushog (M, 70, Saboo, retired from the Army) respectively suggested:

We have to maintain our natural resources, we have to spread awareness.

- [Kushog] *We must try to minimize the burning of fossil fuels.*
- [VLM] *And when you say 'we', do you mean Ladakh or the world in general?*
- *Even Ladakh, there are so many vehicles, every houses has 2 or 3 vehicles sometimes.*

Participants of the FGD in Leh also emphasised the fact that although they can come up with solutions in the context of Ladakh, the problem should be tackled at a much wider scale because they perceived it as a global issue. Below is an extract of the FGD in Leh:

If only a few people like us do something, what will the rest of the world do about it? What difference can we make? It is about the whole population of the world. The weather changes are not only caused by Indians, but by the whole world. We can only say what we see from our own experience.

This was also emphasised by participants of the FGD in Saboo:

Each and every person should try to maintain a clean environment and assume their responsibility. But facing climate change, people can't do much about it except praying to God. The government could do a lot more but they don't because they say they don't have the money. But they are also very corrupt.

Overall, it can be stressed that none of the solutions suggested by interviewees or FGD participants related to adaptation. All strategies, whether they involved organising prayers, following religious teachings, raising people's awareness or planting more trees, focus on mitigating climate change. The objective for people remains to prevent the phenomenon from generating harmful impacts in the first place. Furthermore, they also emphasised that any realistic solution to mitigate climate change

goes beyond the reach of Ladakh. This was particularly the case of the minority of interviewees who had travelled outside Ladakh or who had a high level of formal education, such as Chondol (M, 43, Leh, civil servant) and Yangskit (F, 33, Leh, teacher):

Ladakh is nothing. But in cities in India like Delhi, Bombay, there are a lot of industries. It is on those that we should start to work first.

There should be less pollution... In the world in general because Ladakh is a small place.

Finally, the majority of respondents believed that the solutions to tackle climate change should rely on addressing the root causes of the problem i.e. the loss of spirituality and the shift in people's moral values and behaviours. The strategy has to be holistic and requires the whole society to realise the harmful impacts human activities generate on their natural environment if they continue to follow an unsustainable development path. According to those who tended to be more educated, solutions can be developed through technological interventions and changes in people's habits, but they also agreed with their less formally educated community members that a significant part of the solution is at a spiritual level. This is summarised by the account of Sonam (M, 25, Phuktse):

Physically, we have to plant more trees, but on the spiritual level, people should perform more pujas and offerings. There should be more friendly attitudes among the community. People are in this competitive mode like if someone is building a house, then their neighbour will say, I will also build an extra house.

The necessity emphasised by local communities to question the way society as a whole is developing made it difficult to talk with participants about possibilities to adapt to environmental and societal changes. There are no doubts that people and communities constantly adapt to those changes whether they mobilise their own resources to face everyday challenges, as described in Chapter 5, or embrace the development of new infrastructures and access to new services. Regarding the particular issue of climate change, many interviewees explained, on the one hand, how they can grow a wider variety of crops or benefit from a greater amount of water, to which they adapted spontaneously by developing their agrarian activities. On the other hand, most respondents were worried about climate change because it is thought to be responsible for the occurrence of natural hazards. They were also concerned that water shortages could get worse with the melting of glaciers, but most discussions pointed out other factors that lead to an increasing pressure on natural resources, regardless of a warming climate. Given these ambivalent accounts and the confusion surrounding impacts of climate change observed in Ladakh, compared to global climate projections, the notion of adaptation appeared somehow disconnected from the views of interviewees. In other words, it seemed meaningless to ask people to think of possibilities to adapt to impacts that include

extreme weather events or the scarcity of water as if it was agreed that, from now on, they did not have the choice but to cope with these. When they were asked what could or should be done to tackle climate change, respondents spontaneously raised solutions that aim to prevent these harmful impacts from happening in the first place. Focussing on adaptation would have implied a more fatalistic approach whereby people were asked to consider accommodating to floods or water scarcity. Besides, participants raised other more pressing and challenging issues in their everyday lives than climate change. The solutions they identified, i.e. altering our self-centredness and caring for the environment, aim at challenging the negative aspects of a development path that the majority are not happy with. In fact, challenging these aspects is part of the mitigation approach that aims to prevent or at least alter the phenomenon of climate change.

Finally, such solutions are all encompassed in an ideal of sustainability and the critique of modern economic development that does not ensure a suitable environment for the future generations. They were also raised by both men and women which suggests an equal pro-environment stance for both genders. However, I find that findings echo the argument of Di Chiro (2009) whereby environmental issues relate to reproductive efforts, i.e. to preserve natural resources, protect health, sustain ecosystems and nurture the next generation, which are all activities that relate more to women's socially constructed roles. The analysis highlighted how Ladakhi women claimed and took pride in their role to 'sustain daily life', by cooking, cultivating their fields and looking after their children, which contribute to nurture the future generation. Therefore, evidence from Ladakh underscores the relevance of addressing climate change from the perspective of local communities as well as with attention to gender. Local people, particularly women, might be characterised by lower levels of literacy and might be less aware of the scientific process of climate change, but the point is that gendered-positions and roles make people view and address environmental issues in ways that point out the root causes of the unsustainable management of natural resources.

6.3 Conclusion

To summarise, the analysis of interviews and FGDs suggests disparities between and within local communities in terms of what constitute their primary everyday challenges. Yet, despite differences between men and women and between inhabitants of rural areas or those living in the capital, rising individualism, increasing competition between people or the loosening of spirituality and traditions were consistently raised by participants as among their main sources of worry. People considered that these lead to a cascading chain of consequences and challenges regardless of their ranking order and this consensus was reached by both men and women participants. With this in mind, climate

change was not spontaneously raised by interviewees as a major problem. In fact, approximately a third of them, mostly women, did not know or understand what the concept meant or had only vaguely heard about it. Moreover, a minority of respondents living in Phuktse, again mostly women, actually perceived the global warming of temperatures as a positive phenomenon that would help them receive more melt-water and earlier in the year, which would make their daily activities easier. Finally, approximately a third of respondents, mostly young to middle-aged and formally educated men understood the concept and what the impacts could mean on their daily lives. This analysis has thus shown gender differences regarding everyday risks (although these need to be comprehended according to the geographical location and level of formal education), and in terms of perceptions of climate change, whereby women seemed less aware and less informed about the concept but more concerned about potential consequences in terms of access to natural resources.

Despite these differences, the majority of people, including those who were not aware of climate change, indicated that they had observed environmental changes that worried them but they equally pointed out other drivers such as pollution and increasing pressures on natural resources to explain negative changes. They also emphasised how they consider climate change and the occurrence of the floods in 2010 as interconnected. To explain the causes of climate related-changes and hazards, a third of respondents believed that these are divine punishments resulting from humans' bad actions and that relying on their faith and religion to guide their action is the only way to prevent these from happening. In contrast, another third of interviewees, mostly men, advanced solutions linked with the general scientific discourse surrounding climate change, pointing out the necessity to reduce CO₂ emissions and raise awareness among people. However, the final third of interviewees in addition to most FGD participants viewed climate change as one problem interconnected with many others. The loosening of spirituality and solidarity within society is thought to generate a lack of care for the environment which eventually results in the occurrence of natural hazards and climate change. Based on this view, people advanced solutions both on spiritual and scientific grounds. While they considered that industrialised regions elsewhere in India and in the world should be the ones reducing their CO₂ emissions, they also stressed the necessity for the whole society to realise the harmful impacts that human activities, selfish behaviours and non-spiritual ways of living have on the environment. However, this also challenges what could be done by the local government and NGOs to tackle the root causes of climate change perceived by local communities. How can organisations address issues linked to rising individualism? To what extent can they intervene in social transformations within society? At which scale should action be undertaken? Is adaptation meaningless? Such questions will be addressed later in Chapter 8.



*SAVE THE CHILDREN, THE LEH NUTRITION PROJECT
AND THE EUROPEAN COMMISSION HUMANITARIAN
OFFICE (ECHO) WORKED WITH THE COMMUNITY IN
1600 TO SUPPORT FAMILIES AFFECTED BY THE
FLOODS IN AUGUST 2010.*

Chapter 7

7

POLICIES AND INTERVENTIONS TO TACKLE CLIMATE CHANGE AND ADDRESS DISASTER RISK REDUCTION IN LADAKH

Objective II.

To explore current approaches and practices to deal with climate change and natural hazards at the grassroots level.

4. What national policies inform development, DRR and climate related interventions in Ladakh and how do they conceive gender?
5. How does the NGO sector in Ladakh address climate change, disaster risk and gender?
6. Are the DRR and CCA sectors integrated in practice in the case of Ladakh?

Chapter
7

The three previous chapters have drawn a profile of Ladakhi communities to understand how climate change and natural hazards relate to people's daily lives in light of wider drivers of change and according to differences of vulnerabilities and capacities. The analysis emphasised that climate change has to be comprehended in relation to other everyday risks faced by local communities. It also showed the relevance of using a gender-sensitive perspective to point out differences between men's and women's daily activities and roles that shape different vulnerabilities, capacities and perceptions of risk. In order to enable the comparison between communities' realities and practices to address climate change and natural

hazards, this chapter explores the ways in which authorities and Non-Governmental Organisations (NGOs) address Climate Change Adaptation (CCA), Disaster Risk Reduction (DRR) and understand gender differences in Ladakh. It will also examine to what extent CCA and DRR are integrated on the ground and include a gender perspective considering policies and projects.

The first section draws an analytical synthesis of the main policy areas that include CCA and DRR at the national, state and district levels. It explores the approaches adopted by the central, state and local authorities to tackle the impacts of natural hazards and climate-related environmental change, and the way their actions are linked across the sectors and between the different scales of intervention. Another objective is to look at the way gender is being considered by national and local policies. The second section follows a similar approach. It presents interventions of the NGO sector in

Ladakh, reviews the integration of DRR and CCA in projects and analyses the way vulnerability, capacity and gender are being conceived of in organisations' strategies. Ultimately, this serves as the basis to discuss in the following Chapter which investigates the extent to which policies and projects of authorities and NGOs appear appropriate to address local communities' needs and priorities as well as to people's views on climate change.

7.1 Main policy areas addressing CCA and DRR: constraints and opportunities

This section critically reviews how CCA and DRR are addressed in Indian policies at the national, state and district levels. One objective is to identify the main approach adopted by the Indian government to deal with the impacts of hazards and climate-related environmental change and whether it addresses CCA and DRR in an integrated manner. Another objective is to explore how gender is considered by policies and whether it is included in governmental interventions in both CCA and DRR sectors.

7.1.1 Climate change adaptation addressed at national, state and district levels

As elsewhere in the world, climate change mitigation is at the forefront of climate discussions in India while the concept of adaptation receives limited yet growing attention. The recognition that there are inevitable climate change impacts that have to be dealt with has led the Government of India (GoI) to integrate adaptation orientations into its policies. This is mainly being formulated through India's National Action Plan on Climate Change (NAPCC) prepared in 2008.

7.1.1.1 India's National Action Plan for Climate Change (NAPCC)

Through eight identified missions across different sectors, the NAPCC "*identifies measures that promote [its] development objectives while also yielding co-benefits for addressing climate change effectively*" (GoI, 2008: 2). It focuses on integrating CCA and mitigation, energy efficiency and natural resource conservation efforts within the economic development of India (See Appendix C). It also indicates that 2.6% of India's GDP is dedicated to CCA particularly in sectors of agriculture, water resources, health and sanitation, forests, coastal-zone infrastructure and extreme weather events (Ibid: 17). Although this sounds promising for the integration of climate change efforts within sustainable development strategies as it is inscribed in the main governmental policy addressing climate change, the NAPCC also clearly states that:

India's development agenda focuses on the need for rapid economic growth as an essential pre-condition to poverty eradication and improved standards of living. Meeting this agenda, which will also reduce climate —related vulnerability, requires large-scale investment of resources in infrastructure, technology and access to energy. Developing countries may lack the necessary financial and technological resources needed for this and thus have very low coping capacity to meet threats from climate changes. (Ibid:13)

This paragraph summarises the main approach of the GoI to address climate change and the way the NAPCC aims at reducing vulnerability through economic growth without questioning whether this might be one of the factors that create vulnerability in the first place. Although, the NAPCC incorporates the concept of reducing vulnerability within its strategies to tackle climate change, it is often formulated as part of top down and technological measures to tackle risks with little scope for inputs from the community level to challenge the dominant economic system:

Technology solutions are also very important for enhancing adaptive capacity and reducing vulnerability to climate change and its impacts. In this respect, international cooperation in science and technology assumes great significance. (Ibid: 49)

In terms of gender, India's NAPCC only briefly mentions women's exacerbated vulnerability in relation to the impacts of climate change: *"The impacts of climate change could prove particularly severe for women. [...] in each of the adaptation programmes, special attention should be paid to the aspects of gender"* (Ibid: 13). This is the only section where gender is acknowledged.

7.1.1.2 Jammu and Kashmir State Action Plan on Climate Change (J&K SAPCC)

In order to translate the Eight National Missions into actions, the GoI requested in 2010 that each Indian state should formulate its own State Action Plan on Climate Change (SAPCC) (Press Information Bureau India, 2011). According to Satapathy et al. (2011: 32), state action plans are coordinated by the Indian Ministry of Environment and Forests and its decentralised departments in each state, and developed by policy makers collaborating with NGO practitioners, academics, private sector representatives and local communities.

Several states have successfully undertaken the process of translating the NAPCC into SAPCC such as Arunachal Pradesh and Assam. The latter, for instance, built a draft document that presents the strategic approach for its SAPCC and sectors that have been identified as a priority to integrate CCA and mitigation (Department of Environment & Forest, Government of Assam, 2011). Arunachal Pradesh also delivered an analytical synthesis of existing policies under which concrete CCA

strategies can be proposed and enforced, as well as policies that should be formulated in order to address their SAPCC's orientations (INRM, IIMA and IISc, 2011). Both states' action plans give more recognition to the necessity to address context specific vulnerabilities. However, none of them mentions any gender sensitive strategies.

In Jammu and Kashmir (J&K) though, the state has not developed its own SAPCC yet. The Mountain Voice initiative of Climate Himalaya (www.climatehimalaya.net) explains that Himalayan states are particularly targeted by the National Mission for Sustaining the Himalayan Ecosystem (Number 5) and that J&K along with nine other states should have completed their draft action plans. However, the only available document in early 2013 is a presentation given at a conference in New Delhi in 2010 which does not provide the orientations of the state towards CCA and mitigation. The Department of Environment and Remote Sensing of J&K, which coordinates the SAPCC, indicates on its website that "*it is currently being discussed*" (J&K ENVIS Centre, 2012). According to the Daily Excelsior of the 25th of June 2012, "*the State Government [of J&K] has remained insensitive towards preparation [sic] of State Action Plan on Climate Change and missed several deadlines set-up by the Union Ministry of Environment and Forests*". It reports that this is due to the number of different stakeholders and governing bodies supposed to submit their respective department action plans for the design of the SAPCC and who have not so far brought their contribution (Daily Excelsior, 2012).

In summary, CCA is slowly being inscribed in the political agenda of India and orientations are being progressively decentralised towards the state level. Initiatives such as the Himalayan Chief Ministers' Conclave, which brought together political representatives of Indian Himalayan states and led to the Shimla Declaration (Shimla Declaration, 2009), are examples of India's political commitment to address climate change particularly in mountain areas. However, the process can also be long and ineffective in some cases, such as in J&K, which has postponed the formulation of relevant policies that could lead to concrete immediate actions. Moreover, it seems that the approach adopted to address the National Mission for Sustaining the Himalayan Ecosystem under the NAPCC follows the same scientific and technocratic perspective as the NAPCC. The Gol (2008:3) explains that:

Recognizing the importance of scientific and technological inputs required for sustaining the fragile Himalayan Ecosystem, the Ministry of Science and Technology has been charged with the nodal responsibility of coordinating this mission.

This suggests little scope for initiating the "*participatory planning process*" that was recommended by Satapathy et al. (2011: 32) on behalf of the Indian Ministry of Environment and Forest.

7.1.1.3 The absence of a local policy on climate change

At the level of Leh District, there was no sign, at the time of the fieldwork, of any policies or plans addressing CCA or mitigation. This was confirmed by TATA-Institute of Social Sciences (TISS), in charge of providing capacity building and support to the Ladakh Autonomous Hill Development Council (LAHDC) for the implementation of its development planning. According to the representative of TISS, climate change is not being addressed by the LAHDC as yet:

[VLM]: Do you know if the government has any plan regarding CC?

[TISS]: *As of now, none.*

Do you think it is because CC is really not a priority?

It is ignored. They are ignoring it.

Do you think they should...?

They should. Very soon they should.

And how do you think this is going to happen?

Because people who study climate change, they need to present the Hill Council some data and all. And at the Hill Council level, they need to take up on this [...] We are not contributing to anything into the climate so we are not doing anything, but our glacier melt and if our glacier melt, our water resources will vanish so we are going to be the victim. So, mitigation I don't think so, we won't be able to do anything about mitigation and we need to adapt to climate change.

On the one hand, the TISS representative explained that climate change is not being addressed by the local government in terms of mitigation because, realistically speaking, Ladakh cannot do anything to prevent climate change from happening. However, even if there are no mitigation strategies implemented at the scale of Ladakh, the TISS representative personally believed that CCA should be taken up by the local government to face adverse impacts, such as water shortages:

At our level, [...] we could think of saving some of our resources, for example, our ground water resources. [...] We need to adapt to climate change. Like if you have heavy rainfall, you need to improve your upstairs, [...] if you have 2010 kind of disaster with flash floods, you need to be prepared. So those are the kind of things that come along with climate change.

From this perspective, it could be underlined that the LAHDC is nonetheless continually addressing key issues such as water management or rural development, which should be linked to CCA strategies. In fact, one may argue that the lack of specific policy is a positive approach because the government does not single out CCA but places it within the larger field of development and may thus be mainstreaming actions as part of wider everyday policies. Strategies currently being pursued by the local government focus on the development of the rural economy and include, for instance, water harvesting and other water conservation measures or the construction of water reservoirs and

irrigation channels. Projects related to water have been benefitting from the Watershed Development Programme (WDP) initiated by the central government which aims at improving India's degrading and ecologically fragile environments through the participation of user groups in watershed development (Mankelow, 2003). The WDP has been implemented in Ladakh for the last two decades by the District Rural Development Agency (DRDA). Projects include the restoration and creation of irrigation canals, the building of water reservoirs to collect glacier meltwater (*zing*) and manage more efficiently the distribution of water during the sowing and growing seasons. The funding (75% of which is provided by the central Indian government and 25% by the State) is given directly to the involved communities, which aims at encouraging fund transparency and developing the ownership of the project by the community. The latter participates in the planning of the project, the implementation of activities or construction work and is in charge of carrying out the maintenance of any new assets (Mankelow, 2003). Despite the rather encouraging approach of the WDP in terms of community participation, Ninan (1998) and Mankelow (2003) who have studied projects respectively in Uttar Pradesh and Ladakh, have highlighted patterns of inequality among beneficiaries that have resulted from WDPs. Nevertheless, this constitutes an example where the government, both at state and local level, is addressing a key development issue related to water access which is linked to CCA even if it is not formulated as such.

Another example is the Micro-Level Planning (MLP) approach that has been implemented by the LAHDC in partnership with TATA-Institute of Social Sciences (TISS) and the DRDA for the design of the 5-year Perspective Plan for Leh District. This process, initiated in 2005, aims to ensure the participation of local communities in development planning based on people's needs and aspirations (TISS-LADHC, 2010a: 38). In each of 90 Halqa Panchayats (village jurisdictions) out of 93 across Leh District, three days of Gram Sahbas (village meetings) were held to carry out questionnaire surveys, participatory activities and focus group discussions with villagers and discuss key development issues including employment, agriculture, institutional representation and scenario visioning for the future (Ibid). Facilitators were young local men and women who ensured the equal participation of male and female villagers and organised, for example, gender-separated group discussions. This MLP approach is expected to guide development interventions of sectoral agencies and centrally sponsored schemes in

Box 7.1 Main principles of the MLP approach adopted by the LAHDC (Adapted from TATA-LADHC, 2010a)

- *Trusts in and builds upon people's capacities*
- *Considers people and their institutions as primary stakeholders*
- *Encourages people to analyse their development situation and to plan for their own development.*
- *Seeks and considers perspectives and plans of 'disadvantaged' sections of the society*
- *Has a broader and longer term perspective*
- *Envisages a facilitating role for Development agencies*
- *Concerned with outcomes as well as processes*
- *Is 'demand driven'*
- *Has equity and sustainability of process as key considerations*

the district such as the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) (further developed in Chapter 8). Although, CCA is not addressed in the design of the 5-year Perspective Plan, the MLP approach of the local government and its main principles (See Box 7.1) reflects a shift in the way development planning is designed at the district level. This could serve as the basis for community-based climate change adaptation whereby bottom-up strategies could balance the decentralisation process of climate change-based policies currently undertaken at the central and state levels.

In conclusion, following the enactment of India's NAPCC in 2008, national and state policies are only beginning to address CCA while J&K has yet to deliver its own SAPCC. Possibly as a result of this slow decentralisation process, there are no current plans in Leh district to formulate a policy at the district level to address climate change. However, the absence of CCA policies does not prevent the local government from undertaking development strategies that are linked to CCA anyway and that involve the participation of local communities. Finally, such a bottom-up approach to development recognises and implements gender-sensitive methodologies whereas gender is not really integrated in national CCA policies.

7.1.2 Disaster Risk Reduction addressed at the national, state and district levels

While specific climate change policies are only just beginning to be formulated at the national and state levels, CCA is also gradually being referred to by the DRR sector in India. However, this section will show that effective integration remains limited at the policy level.

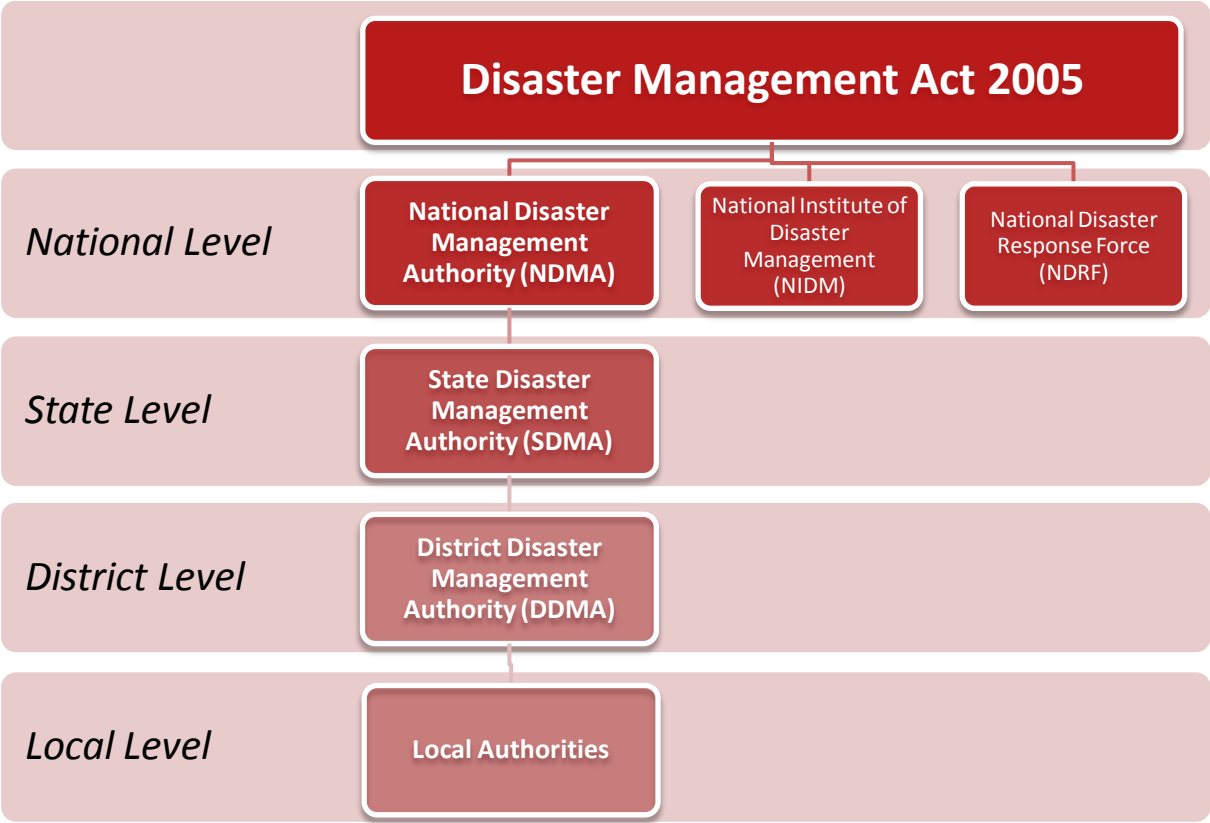
7.1.2.1 India's National Disaster Management Policies

In 2005, the country enacted the National Disaster Management Act which lays down the institutional, legal and financial frameworks for disaster management. It is considered a turning point from a relief centred approach to disasters to a more "*proactive prevention, mitigation and preparedness-driven approach*" (Ministry of Home Affairs, 2009: 1). According to former Executive Director of the National Institute for Disaster Management in India (Dhar Chakrabarti, 2011: 11):

No longer primarily focused on relief and rehabilitation efforts, policy approaches now seek holistic management of disasters that addresses pre-disaster issues of prevention, mitigation, and preparedness as well as post-disaster issues of response, recovery, and reconstruction.

Building on the 2005 Act, the National Policy on Disaster Management of 2009 draws up the institutional, legal and financial arrangements to address disaster prevention, mitigation, preparedness, response, relief and rehabilitation at every level of authority (see Figure 7.1). The policy briefly mentions CCA, under the section of “Disaster Prevention and Mitigation”: it recognises the impacts of climate change on the natural environment, human health and the rise of natural hazards and recommends that “synergies in our approach and strategies for climate change adaptation and disaster risk reduction shall be encouraged and promoted” (Ministry of Home Affairs, 2003: 18).

Figure 7.1 Main bodies of authority involved in disaster management in India at different levels (adapted from Ministry of Home Affairs, 2009)



From the analysis of the National Policy of Disaster Management of 2009, it seems that some of the recommendations of the vulnerability based approach to DRR have been integrated within India’s policy’s strategy. Yet, there are a number of contradictions that can be noted.

Firstly, the policy recognises that India’s vulnerability to disasters is reinforced by unsustainable development practices of urbanisation and industrialisation, environmental degradation, population growth and climate change (Ministry of Home Affairs, 2009: 1). This suggests that the policy does not

solely focus on natural hazards but acknowledges the contribution of vulnerability to calamitous events and points out some of the root causes of vulnerability. Yet, the policy also states that its vision is:

To build a safe and disaster resilient India by developing a holistic, proactive, multi-disaster oriented and technology driven strategy through a culture of prevention, mitigation, preparedness and response” (Ibid: 7).

This conversely suggests a predominant role for technology as it is often the case for hazard focussed strategies. Thereby, most of the measures recommended by the policy in terms of disaster prevention and mitigation are heavily relying on scientific knowledge and practices such as using GIS and remote sensing technologies to build hazard maps and vulnerability analyses. Strategies also focus on the monitoring of critical infrastructures such as dams, communication networks, power stations, water storage towers or river and coastal embankments (Ibid), which is typical of the dominant approach to DRR.

Secondly, the policy recognises that certain population groups are rendered more vulnerable in the face of disasters because of their social and economic marginalisation. It thus mentions women, along with children, elderly and disabled people, as “*exposed to higher risks*” (ibid: 20) and encourages them to be involved in decision making processes in disaster preparedness and response. Thus, the policy has identified community-based disaster preparedness as one of the strategies to adopt, recognising the crucial role of communities as first responders in times of crisis:

Community participation ensures local ownership, addresses local needs, and promotes volunteerism and mutual help to prevent and minimise damage. Therefore, the efforts of the States in this regard need to be encouraged (ibid).

The policy also recommends the adoption of a bottom-up approach for enhancing the implementation of disaster preparedness (ibid: 19) and recognises the value of indigenous knowledge for coping mechanisms (ibid: 17). However, the concrete strategies prescribed by the policy in terms of preparedness include the modernisation of forecasting and early warning systems, the strengthening and equipment of the Emergency Operations Centres and the development of communications and Information Technology (IT) support:

Communication and sharing of up-to-date information using state-of-the-art IT infrastructure remain at the heart of effective implementation of the disaster management strategy. Reliable, up-to date and faster sharing of geo-spatial information acquired from the field [...] is a pre-requisite for effective implementation of disaster management strategies (Ibid: 19).

It thus suggests that while the primary disaster preparedness measures remain heavily technocratic and centralised, communities are considered as actors to be informed and trained rather than sources of knowledge and advice that could be included in the decision making process. For instance, the policy recommends that:

As first responders to any disaster, communities will be trained in the various aspects of response such as first aid, search and rescue, management of community shelters, psycho-social counselling, distribution of relief and accessing support from government/agencies etc. (Ibid: 20).

Hence, initiatives such as the Disaster Risk Management Programme go in this direction (GoI-UNDP, 2009). A number of states, identified as being the most vulnerable regions in the country, are being assisted by UNDP, USAID and the European Union to focus their DRR strategies on awareness generation, education, training, capacity building and dissemination of warning at district, block and village levels (Ministry of Home Affairs, 2003: 3). There is also an increasing attention to gender mainstreaming and the involvement of women representatives in DRR programming (GoI-UNDP, 2009). Yet although disaster preparedness is necessary to reduce the potentially disastrous impacts of hazards, the literature review has shown that it does not fully resolve the root causes of vulnerability and disasters.

Furthermore, some of the rehabilitation strategies undertaken by the government after the 2010-floods in Ladakh illustrate a top-down post-disaster approach with little consideration for the local context. As often, when a disaster strikes the immediate and intense media coverage creates a momentum for the mobilisation of human and financial resources (Radford and Wisner, 2012). The more deadly and 'extreme' the calamity is, the more press reports it usually generates, which encourages authorities to undertake quick and visible rehabilitation projects. The timeframe was particularly constraining as families would have to be relocated before the winter months when temperatures remain well below -10 degrees Celsius. An estimated 170 families who were rendered homeless after the floods were offered metal prefabricated rooms assembled on cement stilts by the Prime Minister's Office and Indian state-owned companies (Kaur, 2011) (see Figure 7.2). They were provided along with a relief package of Rs 200,000 to construct houses, but the time period between the disaster and the winter months, combined with a shortage of labourers who died in the floods or deserted the region, prevented families from building a new house. Kaur (2011) conducted research among resettled families in Solar Colony in the suburbs of Leh and reported accounts from beneficiaries that suggest a total mismatch between the government intervention and people's context and needs. According to the interviewees, the material used for the rooms was not adapted

to the winter temperatures in Ladakh and did not provide them with sufficient insulation. Neither were they designed to enable people to use a *bhukari* (local stove) with no chimney to evacuate the smoke. Freezing temperatures combined with indoor pollution made the rooms inhospitable and led dozens of families to use the rooms as storage space or simply lock them up, rent accommodation elsewhere or move in temporarily with relatives (Ibid).

Figure 7.2. Prefabricated rooms provided to homeless families after the floods in 2010 (Le Masson, 2011)



7.1.2.2 J&K State Disaster Management Policy

As recommended by the National Disaster Management Authority (NDMA) under the Disaster Management Act of 2005, each Indian state should have formulated its own Disaster Management policy. The J&K State Disaster Management Authority (SDMA) approved a three-tier draft disaster management policy in February 2012 (Daijiworld, 2012) which lays down its legal and financial framework to mainstream disaster management into development planning before, during and after a disaster and at the state level.

The state policy follows the vision and objectives of the national policy in terms of implementing a pro-active strategy that focuses as much on preventing, mitigating and preparing for a disaster as on post-disaster response. The J&K SDMA, which has yet to be set up as *“a continuing autonomous institution”* (Department of Revenue, Relief and Rehabilitation, 2011: 9), acknowledges the roles of, and promotes cooperation between, several institutional stakeholders including the State departments, the Central Government agencies, local authorities such as Urban Local Bodies (ULBs) and Panchayati Raj Institutions (PRIs), Fire and Emergency Services, the Army, NGOs and multilateral aid agencies, the private sector and the community. Moreover, it views disaster management *“as a long-term process that involves the creation of DRR and response capacity in the State”* (Ibid: 12). The policy thus focuses on linking DRR with sustainable development and recommends that *“all developmental activities shall be sensitive towards disaster risk reduction”* (Ibid: 15).

On one hand, the State policy appears to give a wider attention to the community level and accentuates its willingness to involve communities in all phases of disaster management:

Experiences from past disasters indicate that reaching out to the affected community within the critical period following a disaster is a major challenge [...] Communities being the first responders have more contextual familiarity with the local hazards and the available resources. They are also in a better position to plan and execute activities related to disaster management at the local level (Ibid: 18).

The policy thus promotes the participation of civil society organisations and local community groups in DRR activities, led by local authorities and assisted by aid agencies, including the identification of hazards and vulnerability as well as in relief operations such as preliminary damage and needs assessments and rescue efforts (Ibid: 20). Moreover, the policy envisages *“leveraging and capitalizing the existing social capital and traditional wisdom in management of disasters”* (Ibid:18) and urges community based disaster preparedness activities to ensure the appropriate participation of most vulnerable groups such as women, children, elderly and disabled persons (Ibid). Furthermore, in a region highly prone to earthquakes, landslides and hydro-climatic hazards, the state policy points out some of the root causes of its territorial vulnerability independently from natural phenomena. It recognises that recent disaster events in J&K have highlighted unplanned development practices leading to enhanced socio-economic and physical vulnerabilities as well as *“the lack of well-established institutional mechanisms and techno-legal regime”* (Ibid: 8). Therefore, by emphasising some of the root causes of disasters the policy could encourage the implementation of strategies towards the long term reduction of people’s vulnerability.

On the other hand, the state policy appears to follow the dominant approach of the national policy when formulating concrete measures of action. It recommends a similar reliance on scientific studies and equipment to measure and predict hazards so that awareness could be spread and preparedness strategies could be implemented. The latter consist of hazard and vulnerability risk assessments based on GIS technology, the strengthening of lifeline infrastructure, the development of early warning systems and the transfer of disaster-resistant construction technology. These measures often require financial means and scientific expertise that might not fit with the resources of each district.

Finally, climate change is only briefly addressed by the state policy which considers it, along with environmental degradation, as having increased the risk of natural hazards in J&K (Ibid: 8). The policy thus states that “*measures to address issues arising out of global warming [...] shall be given highest priority in the risk reduction activities*”.

7.1.2.3 Leh District's Disaster Management Plan 2011-12

Following the decentralisation process of the National Disaster Management Policy of 2009 and perhaps resulting from the deadly floods of 2010, local authorities in Leh District came up with the District Disaster Management Plan (DDMP) in 2011. The Deputy Commissioner of Leh who is also the Chairman of the District Disaster Management Authority, indicates that this plan has followed the guidelines of the National and State Disaster Management policies (Deputy Commissioner Office, 2011). In this regard, the DDMP (i) provides an assessment of the main hazards that may occur in the district; (ii) lays down the institutional mechanism for disaster management at district and block levels; and (iii) recommends strategies to adopt in terms of prevention, mitigation, recovery and reconstruction and a database of contacts at the district level.

Analysis of the DDMP reveals that despite the positive initiative of addressing DRR at the level of the district, the approach is in line with the government and state policies i.e. very much hazard-oriented with little scope to address the root causes of disasters. For instance, the chapter labelled “*Hazard, risk, vulnerability and capacity analysis*” provides essentially a description of hazards occurring in the region with a focus on the impacts of the flood of 2010. Under the section “*Vulnerable places*” (Ibid: 16), the DDMP does list some of the most flood prone areas but it does not indicate the reasons why these are more vulnerable than others e.g. the density of population living in these areas, their socioeconomic characteristics or the incentive factors leading people to settle in hazard prone areas. Although the plan draws a profile of the district, it is a succession of statistics and tables listing Leh's

demographic, climatic, administrative, socio-economic characteristics as well as agriculture and health infrastructures. This does not help to analyse and visualise who is more likely to be affected by the occurrence of hazards and especially why.

Likewise, the *“Capacity analysis”* section mostly identifies potential shelters and lists the infrastructure and equipment that can be used from each department. However, it seems disconnected from any recognition of people’s own capacities that proved crucial during the emergency of 2010. One of the objectives of the plan is *“To make the society able to act very fast to manage the loss caused by disaster”* (Ibid: 7) but the relief operations conducted after the flood were already characterised by the quick mobilisation and cooperation of local communities. The J&K Disaster Management Plan uses this as an example, stating that *“The traditional village-level institutions through the village-head played a crucial role in the recovery of the affected areas”* (Department of Revenue, Relief and Rehabilitation, 2011: 7). Based on this observation, it seems that the Plan recommends strategies that do not rely on people’s own capacities and participation to provide effective and timely relief.

In consequence, the majority of measures recommended by the DDMP to deal with risk focus on the prevention and control of different hazards such as *“construction of Checkdams/other structures”*, *“Drainage correction”* and *“Avalanche control structure”* (Deputy Commissioner Office, 2011: 54). However, such measures might not always protect people’s lives and goods but instead create a false impression of security. For instance, Figure 7.3 shows the embankments that were built along one of the major rivers in Leh, before the events of 2010. Yet, these did not prevent the road, several houses, fields and gardens, all located a little downstream, to be completely washed away (see Figure 7.4).

Figure 7.3. View of the river in Chanspa, one of the upper areas of Leh, and the embankments damaged by the floods of 2010 (Le Masson, 2011)



Figure 7.4. Remains of the road downstream along the same river one month after the floods (Le Masson, 2010)



Some of the identified preparedness activities also appear a little vague. For instance, the Plan recommends in the case of flash floods and during the pre-disaster period the *“identification of vulnerable points”* which should lead to the *“stocking of the sand bags”* and *“altering [sic] people near highly vulnerable pocket”* (Deputy Commissioner Office, 2011: 46). However, this does not explain how these vulnerable points will be identified and based on which criteria; who will identify these points and stock the sand bags and the meaning of *“altering [sic] people near highly vulnerable pocket”*. Does it mean asking people to move out from their house or simply evacuating them when the flood occurs? In the latter case, who will conduct the evacuation and where should people be directed? If the document meant ‘alerting’, it then relates to early warning strategies advocated by the DDMP. Based on *“early forecasting”* (Ibid: 54) conducted by the Indian Meteorological Department and the creation of *“awareness with the target [sic] groups”* (Ibid: 58), preparedness measures consist of *“warning people about the impending danger and to leave for safer places”* (Ibid). On the one hand, weather forecasts may do little to inform the population in advance of the occurrence of an extremely localised phenomenon like a cloudburst. On the other hand, the absence of an early warning system in 2010, did not prevent most people from escaping their homes and run uphill, which questions the necessity to *“make them aware”* of actions to undertake. The identification of flood-prone areas, however, could be undertaken in advance as part of urban planning, but this is not mentioned in the DDMP.

More surprisingly, the DDMP also refers to strategies that seem to have been designed for other regions in India. For example, it encourages the Block Development Officer to acquire resources such as boats from the Fisheries Department (Ibid: 88) and *“deployment of boat [sic] in the most vulnerable areas”* (Ibid: 89). Given the absence of fisheries in or close to Leh, this suggests that the DDMP relied on institutional frameworks developed in other regions in India while little attention has been paid to the local context and realities.

Finally, while the role of local communities in disaster preparedness and response is more or less ignored or underestimated, there is no mention of any gender sensitive strategies throughout the DDMP. People are being considered as a homogenous group that has to be educated, made aware of the risks and trained to react quickly in case of an emergency. For instance, one of the medium term measures to be adopted to tackle earthquakes is *“Getting community involved in the process of disaster mitigation by providing them proper education and awareness”* (Ibid: 56). Increasing the awareness of local communities or for instance, requiring that *“In high risk areas, all buildings should incorporate earthquake resistant features”* (Ibid: 55) does not explain how a household that lives

below the poverty line will have the financial means to invest in making its house earthquake resistant.

On the other hand, there are signs of progress toward adopting a more community_based DRR approach in the district. The local government in Ladakh is in the process of reviewing its DDMP to better focus on the integration of local communities (Spalbar, 2012). According to the Chief Executive Councillor of the LADHC (Spalbar, 2012a: 2):

[We] would like to adopt an approach in which community is at the centre and involved in all the stages of their recovery and development. LAHDC Leh recognises the role of family, neighbourhood and community as the first to respond in a disaster management structure.

In this perspective the programme objectives include “conducting a comprehensive Hazard, Vulnerability and Capacity Assessment exercise” (Ibid) to formulate a DRR framework at Block and District level and DRR plans at village level. The local government is also willing to adopt a participatory approach involving the community in all stages of disaster planning (preparedness, mitigation, relief and recovery), including “its most marginalised and vulnerable members” (Spalbar, 2012: 7). This statement is encouraging but has yet to be confirmed in the next DDMP for Leh in 2013 onwards. Relying on local knowledge, as has long been recommended by research studies, could help authorities to focus on measures to reduce people’s vulnerability in the long term. For instance, when I interviewed the *Goba* of Leh about the causes of the 2010 disaster, he pointed out the area of the capital where the flood struck and said:

This area used to be the natural valley, where after torrential rains the water would flow. But because the road has been built, then people think if there is a road, there are business opportunities. So they build along there, villagers and outsiders, you know. But people from here know it is an ominous place so they didn’t settle there.

One year after the flood, houses and buildings that were destroyed in this area were being rebuilt in the exact same locations (see Figure 7.5).

Figure 7.5. The first picture shows buildings that were destroyed by the floods in August 2010 and tents of people whose houses were washed away, while the lower picture was taken a year later and shows the reconstruction of the buildings in the same place (Source: Le Masson 2010, 2011)



I asked one respondent close to the LADHC, why the authorities were letting people resettle in the same place instead of controlling urban planning as part of a disaster preparedness strategy. He explained:

The problem is people are not listening to the administration. And the administration, the politicians, they look after their bank. There are people who will bank for them, influential people, you know. After the flash floods, people got lot of money to construct these things. There is not a strong political will and the administration is also very very weak compared to

these people who are more influential and a lot of black money must be involved into it you know, bribing some people and doing it.

This echoes the internal processes that exacerbate people's vulnerability independently from hazards and on which DRR efforts should concentrate.

In conclusion, the way vulnerability is conceived by policies at each level of decision making remains strongly influenced by the dominant approach to disasters. The national disaster management policy of India, despite having shifted from a relief-centred approach to a more pro-active, holistic strategy to mainstream DRR within development planning, remains focussed on centralised technocratic measures. These aim at dealing with hazards, the vulnerability of infrastructures or the lack of awareness of the exposed populations, rather than tackling the root causes of people's vulnerability and drawing from local contexts and knowledge of coping mechanisms. The same approach is being encouraged in J&K although a wider recognition of communities' roles is presented in the State policy. This is also the case at the district level where authorities are willing but have yet to apply community-based DRR strategies. Moreover the integration of CCA within disaster management policies at each level is quite limited, even non-existent, at state and district levels. Finally, in terms of gender, policies include a brief acknowledgment of the particular vulnerability of certain groups including women but there is no real gender sensitive approach being mentioned in any of the policies addressing CCA or DRR at either national, state or district levels.

7.2 Practices towards CCA, DRR and gender in the development and NGO sector

As highlighted in the literature review, development efforts from governments are often supplemented by Non-Governmental Organisations' (NGO) projects especially in the global South. Whereas the previous section focussed on policies, approaches and interventions of the Indian government, this section explores strategies undertaken by NGOs to tackle climate change and the impacts of natural hazards in Ladakh. It also critically reviews the way gender is being addressed and integrated in NGOs' policies and practice.

7.2.1 How is climate change addressed by the NGO sector?

Since the 1970's when the first NGOs were set up in Leh, Ladakh's development sector has steadily expanded and is now comprised of more than 20 permanent local, national and international organisations (see Figure 7.6).

Figure 7.6. List of organisations working in Ladakh that were interviewed and their primary objectives

Foreign or international organisations	Organisation #1	<ul style="list-style-type: none"> • Work on child protection and education access • Participated in disaster relief
	Organisation #2	<ul style="list-style-type: none"> • Address climate change mitigation and adaptation • Promote renewable energies and energy efficiency • Improve rural livelihoods
	Organisation #3	<ul style="list-style-type: none"> • Promote the conservation of high altitude wetlands • Study climate change impacts • Encourage the reduction of tourism footprint
National organisations	Organisation #4	<ul style="list-style-type: none"> • Capacity building of the local government • Support to the local government for the design and implementation of programmes
	Organisation #5	<ul style="list-style-type: none"> • Conduct post-flood reconstruction response • Construct safe and versatile community shelters • Train local labourers and value local resources
	Organisation #6	<ul style="list-style-type: none"> • Conducted flood relief activities • Undertake post-flood reconstruction projects
	Organisation #7	<ul style="list-style-type: none"> • Raise the status of rural women • Strengthen local culture and spiritual values • Support indigenous farming system & knowledge
Ladakhi-based organisations	Organisation #8	<ul style="list-style-type: none"> • Support ecological & sustainable rural development • Improve rural livelihoods • Promote renewable energies
	Organisation #9	<ul style="list-style-type: none"> • Promote education reforms • Organise youth and exchange camps • Promote solar energy and ecotourism
	Organisation #10	<ul style="list-style-type: none"> • Sustain ecological and sustainable farming • Raise awareness about health issues • Encourage the preservation of culture and tradition
	Organisation #11	<ul style="list-style-type: none"> • Support sustainable rural development (agriculture, child welfare, food and nutrition) • Promote human rights, empower communities
	Organisation #12	<ul style="list-style-type: none"> • Advocate for disabled people's rights • Improve disabled people's livelihoods
	Organisation #13	<ul style="list-style-type: none"> • Work on rural population capacity building • Improve rural infrastructure • Raise awareness on women's health issues
	Organisation #14	<ul style="list-style-type: none"> • Promote Ladakh's cultural heritage • Promote diversity through arts and media

While early projects targeted food insecurity and malnutrition, NGOs' action progressively placed the emphasis on education and the preservation of Ladakhi culture and traditions threatened by the increasing interactions with Indians and foreigners. Today, most NGOs are primarily addressing the development of sustainable rural livelihoods and the protection of the environment. Climate change-related issues have also been progressively integrated within NGOs' strategies of action in Ladakh. Especially for the past five years, many of the main projects being implemented in the district are linked with climate change in one way or another.

7.2.1.1 Passive solar architecture, mitigation and carbon credit

Building on the Passive Solar Houses (PSH) developed by the local NGO LEDeG, the French based NGO GERES initiated, in 2008, its four-year project for the dissemination of energy-efficient buildings. Combining passive solar architecture and thermal insulation, the project supports the construction or the conversion of private houses and community buildings with energy efficiency measures using locally available materials. Ultimately, this aims at enhancing the livelihoods of rural inhabitants by improving their living conditions particularly in winter (increase of indoor temperatures, reduction of inhabitants' exposure to smoke emissions from the stove and reduction of risks associated with indoor pollution such as respiratory diseases). Other objectives include the alleviation of energy vulnerability (households require less fuel such as wood or cow dung) and the development of indoor income generation activities in winter encouraged by warmer habitats (GERES, 2007: 4).

One of the major outcomes of this project is to provide Ladakhi inhabitants with "*access to reliable, sustainable and affordable energy*" while reducing the pressure on local resources (preventing desertification) and more generally on the environment (reducing carbon emissions) (Ibid: 4). In this regard, the project addresses climate change primarily from a mitigation point of view: "*it participates to the effort to mitigate the pressure on natural sources thanks to the reduction of biomass used for heating and cooking purposes*" (GERES, 2011: 3). Through the reduction of current and future GHG emissions, "*the project is part of the voluntary emissions reductions market*" (GERES, 2007: 9) and almost a quarter of the project costs are sought from the sale of carbon credits (Ibid: 21). The other sources of funding come from the European Commission and several French and Swiss Foundations as well as other private donors.

Although GERES is the coordinator of the project, activities in Leh district are being implemented in partnership with five local NGOs, LEDeG, LNP, SECMOL, LEHO and ECOSPHERE (the latter based in Himachal Pradesh) in distinct geographical areas (divided by blocks). Part of the project is to

reinforce local NGOs technical, organisational and advocacy capacities (GERES, 2011: 3). Local partners are thus responsible for conducting field visits; selecting appropriate sites or buildings where passive solar technology can be used (not everyone's house or land has the right orientation and the necessary amount of sun exposure); organising meetings with villagers to present the project and supporting those who are willing to transform or build a new house.

Figure 7.7. One inhabitant from Saboo shows his pilot PSH, built with the help of a local NGO to assess the benefits of the building (Le Masson, 2011)



One representative of international organisation #2 explained:

The role of partners is to go to villages to create awareness among villagers about PSH and then those interested come to the NGO to make a request. Two masons are also trained in each village.

The training of local skilled labour (the objective is to train 100 masons and carpenters and 15 rural engineers) and the distribution of construction materials in each village cluster aims at facilitating the use of passive solar techniques and encouraging the demand for PSH (see Figure 7.7).

On the one hand, based on some of beneficiaries' accounts, the project can be praised for its holistic approach to improve people's livelihoods. Every interviewee who had a PSH agreed that it provided them with a warmer energy efficient house, such as Palmo (F, 38, Phuktse, housewife/farmer):

The room is far warmer, we only use the fire in the evening, not during the day. I also spend less time collecting fuel.

One of the representatives of local organisation #11 in charge of leading the PSH project in the region where Phuktse is located confirmed:

When we ask people how much they use fuel before and now, they say at least 50% of fuel consumption is reduced. Because 10 or 15 years ago, people used to go in the mountains and chop the wood from trees.

It therefore reduces the pressure on surrounding resources such as bushes and trees. It also allows people to save more cow dung and use it as manure and avoid compensating with chemical fertilizers. In addition to enhancing people's natural resources, having a PSH saves time spent collecting fuel and enables people to undertake other activities. Gyatso (M, 52, Phuktse) explained :

It is good because first we can save on the fuel and we can also work inside the house in winter and do all the handiwork.

This gain of time can also enhance people's human capital. Women, children and the elderly are those who spend the most time indoors and around the stove, and therefore are the main beneficiaries of increased indoor temperatures and reduced air pollution. Moreover, as the main fuel collectors, women who live in PSH spend less time collecting wood or cow dung. The project thus relies on this time gained to encourage the creation of Women's Self Help Groups (SHG) whereby women have more time and a more comfortable space to undertake income generation activities. The gain of time also enables them to spend more time socialising with their relatives and neighbours. Finally, to have more spare time can also encourage women to get more involved in village meetings which could increase their political capital. Therefore, although it is not advertised as such, the project contributes to reducing people's vulnerabilities, especially since targeted beneficiaries are the most marginalised rural inhabitants living below the poverty line (GERES, 2011: 1).

On the other hand, although the majority of respondents from Saboo and Phuktse were aware of the project and its potential benefits, they also highlighted that the cost of using this technology prevented them from considering retrofitting their existing houses or building themselves a new PSH.

NGOs explain that the project requires people to bear part of the cost of the construction, although they provide a financial or material contribution. As it also depends on the geographical location and on the income of the household, this contribution can vary between 50 and 100% of the total cost for those with limited economic resources and living in very remote areas. One representative of international organisation #2 further explained:

Building a PSH does cost 20% extra than a common house but if the NGO provides the 20% extra minimum, the acceptance of such idea is quite high.

Some villagers such as Tashi (M, 31, Saboo) did not seem to be aware of the support provided by the project:

It is a good idea but it is a little bit expensive you know, for like ordinary people it is not affordable [...] It is more ecological, sustainable and good for the environment, but it depends on one's situation. We cannot say everyone can have it, like people who are poor.

Moreover, accounts of interviewees also report that the project does not seem to be always implemented in the way designed by NGOs. In Phuktse, many villagers explain that after the field visits and meetings with LNP, a lottery is organised by the village representatives to select those who will benefit from the PSH project. Lhamo (F, 74, Phuktse) says:

Last spring they did this lottery because now everybody wants this PSH, but they do the lottery to choose who will have one.

NGOs explained that this is not the approach they encourage. They target beneficiaries based on household surveys and according to technical criteria (the suitability of their house or location to use passive solar technology) and socio-economic criteria (their economic capital).

Many villagers interviewed in Phuktse did have a positive opinion of the PSH, partly because the necessary materials such as window glass and frame, bags of sands for insulation purposes are provided and the cost of hiring masons is covered. For instance, Chorol (F, 62, Phuktse) said that:

It is nice because they give the windows for free, they give money and they put the walls up for free. I heard that they give all this.

However, the remaining cost has to be born by the household and in a village like Phuktse, only a minority of families have the economic resources to afford the extension of their houses even less the construction of a new house. For instance, the *Goba* of Phuktse has been provided with a window frame and a small contribution for the cost of insulation but he explained that he had yet to

gather the necessary amount of money and other resources such as mud for the walls to build himself a new house. Dawa (M, 58, Phuktse) also said that:

LNP gave the window frames for free. They gave 300 rupees for the masonry job so it is the equivalent of 1 day of work and also 200 rupees which is the cost of 2 bags of hay. We have to buy the glass ourselves and double glass. They gave directly to 7 houses; 4 people built it and 3 did not.

Despite the contribution of NGOs, particularly to the most marginalised areas and economically vulnerable households, there is still a limit to the number of people that can participate in the project and this may affect the take-up of PSH across the region and in the long run. Given the limited scope for duplication, the project's main outcome is less the attenuation of CO₂ emissions and more the enhancement of beneficiaries' livelihoods. The way the PSH project addresses climate change and is perceived by local communities will be further discussed in Chapter 8.

7.2.1.2 Making communities aware of climate change

Part of the PSH project and funding includes a major component on climate change awareness. One representative of international organisation #2 explained that:

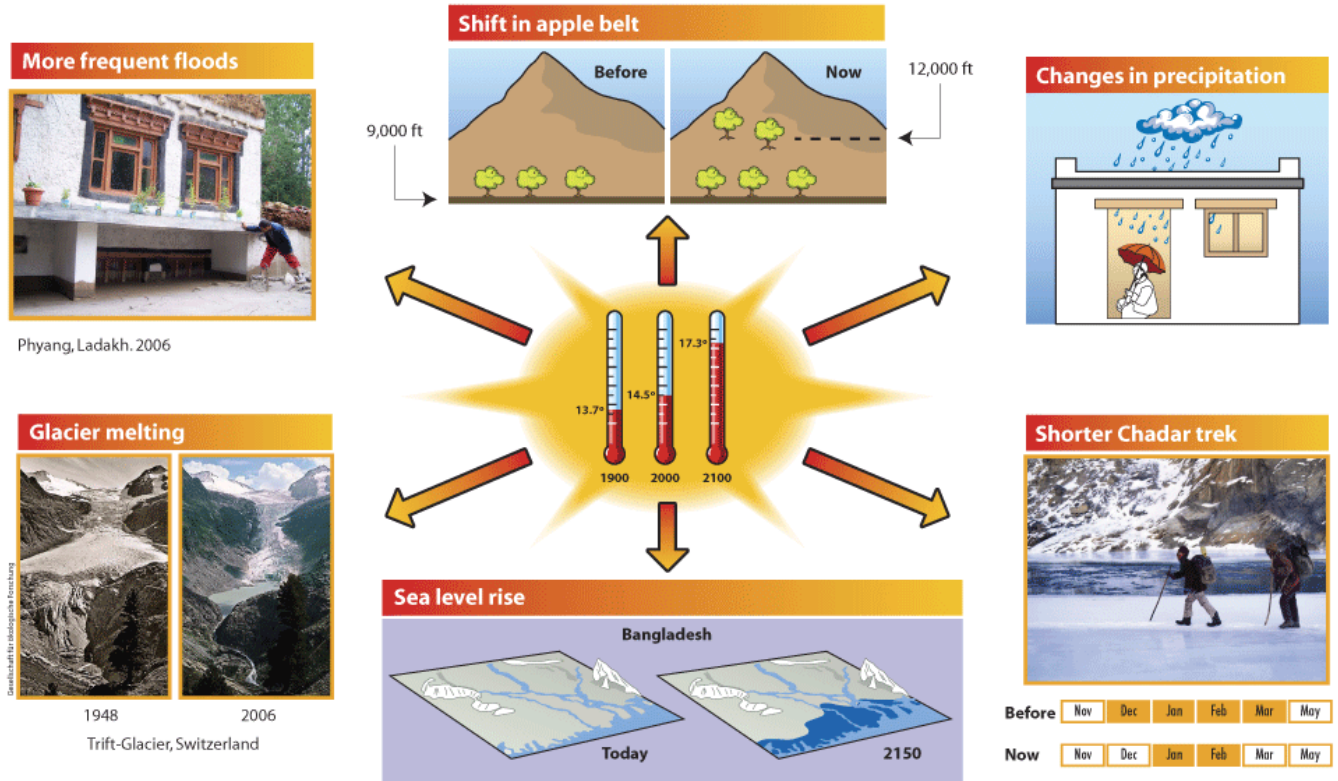
Climate change is not the major concern of villagers, especially since it is not visible. The most visible impact is glacier melting but they don't see the impacts in their everyday life. So people are not taking it seriously.

The fact that climate change does not appear to be a main source of concerns will be further explored in Chapter 8. Nevertheless, the network of NGOs has targeted 100 schools across Ladakh in which to conduct awareness campaigns with teachers, pupils and villagers on the concept of climate change. Using visual materials including posters and a film, they are particularly focussing on students to whom to explain the process of mitigation of CO₂ emissions. Moreover, the dissemination of radio and TV programmes, leaflets and posters (see Figure 7.8) is expected to generate demand for PSH technology and mass awareness of climate change mitigation. One of the representatives of local organisation #9 explained:

We were the first people to make a climate change film about Ladakh and it has been broadcast on local TV. We also take it around in awareness raising sessions. [...] Following the flood, the issue of climate change is a very big topic in Ladakh and we have been going around schools raising awareness about this and PSH. We speak about greenhouse gas and try to tell people not to burn so much or use their vehicles for the emissions. People should use government buses.

Impacts of Climate Change

གནམ་ལྗང་འགྱུར་བའི་ཁྲོད།



The awareness campaign illustrated by the Figures above shows an emphasis on a mitigation approach whereby local communities are encouraged to adopt a low carbon dioxide lifestyle. In parallel, the occurrence of more extreme weather events such as heavy rains and floods are considered and explained as impacts of climate change.

7.2.1.3 Adaptation and artificial glaciers

While climate change is mainly being addressed in Leh district with mitigation strategies and awareness campaigns through the PSH project, adaptation remains a limited component of most NGOs' approaches to address climate change in Ladakh. Currently, there is no project advertised as CCA being developed and the topic generates diverse opinions.

On one hand, some local NGO representatives consider that any projects being conducted in Ladakh have their limits when compared to the scale and impacts of climate change. For instance, one senior representative of organisation #11 considered that the impacts of climate change are already visible in Ladakh especially regarding the shrinking of glaciers:

Whenever we talk about climate change people say “yes, yes but we need to conduct some scientific research kind of thing”. Well..., do it, you know, but the fact is we are losing our glaciers! So now what will we do? They say adaptation, you know, they talk of mitigation, you know, but if all the glaciers are gone, can you live in the desert without a drop of water? So, in the long run adaptation won't work. So what do you do, either escape or get extinct! In Ladakh's context, I think...I may sound very pessimistic but the fact is that yes, we are losing our glaciers.

A senior representative of organisation #10 was also sceptical about any solutions to tackle climate change in Ladakh:

Climate change is not an issue that can be tackled in Ladakh. It is a global problem. But we can use Ladakh as an example to say come and see what is happening to show the impacts of climate change.

In parallel, the concept of adaptation seemed to be unclear to a few local aid workers, such as with a respondent from local organisation #11:

[VLM]: How do think climate change could be tackled in Ladakh?

[Local organisation #11]: *We can contribute... something like if you grow more vegetables so that in that case we won't import so many things with the trucks or airplanes and the pollution we can stop. PSH saves fuel too.*

Do you think there are projects that can be done in terms of climate change adaptation? Can you explain?

Because for example what you said is more about mitigation like reducing CO₂ emissions; what about adaptation? Like if climate change is happening, what are the ways Ladakhi people can cope with a changing climate?

[Silence]

Nevertheless, CCA remains an approach that some organisations like GERES are willing to explore. Based on their survey regarding Ladakhi people's perceptions about the impacts of climate change, the NGO is continuously exploring and testing strategies linked with house design, developing new cropping patterns and water management (GERES, 2011:3; Interview). One particular project however, has actually been advertised at times as a possible CCA strategy: “*Artificial glaciers constitute one of the major solutions under the project*” (GERES 2011: 3).

Mainly attributed to the work of a local Ladakhi engineer, Chewang Norphel from LNP, the idea of building artificial glaciers has been inspired by water conservation techniques developed by local rural communities. As climatic conditions only allow one yield per year in the short summer period, crops need to be sown in early spring in order to have sufficient time to fully mature. However, the temperatures in April and May are still too low to enable glaciers, located at higher altitudes than the village, to melt sufficiently and provide enough water for the irrigation of seeds (Norphel, 2009).

Therefore, by creating a network of dams and water channels between the natural glacier and the village, the water gets diverted to form shallow pools that freeze in winter. As this artificial glacier is located at a lower altitude than the natural one, it melts earlier in the year and contributes to increase the stream flow for the sowing season with water that would have otherwise gone 'to waste' (Ibid).

Since 1995, 10 artificial glaciers have been built, mostly through LNP and funded by the Watershed Development Programme. Some have generated success stories with widespread media attention (e.g. "Ice Man vs. Global Warming", Shrager, 2008; "Glaciers of change", Kalyani, 2008). A few of interviewees among the villagers also positively appraised the idea of artificial glaciers, such as Thupstan (M, 30, Leh, travel agent):

There is one man called the Ice man. He has done some amazing work in the villages. And I have seen his project, what he has done, through one reporter who interviewed him. Artificial glacier it is called. So it was a very successful project in Sakti and Nang. In these two villages, people are very happy.

However, there are many people, in fact, the majority of inhabitants and NGO representatives interviewed, who consider that artificial glaciers are not the panacea to tackle water shortages in Ladakh.

Artificial glaciers have been developed as an alternative option to the common water tanks or cement reservoirs (*zing*) which can be five times more expensive than an artificial glacier (Shrager, 2008) and also as an alternative project to dams which are considered by the engineer Norphel as a source of environmental and social problems (Joshi, 2001). However, artificial glaciers cannot be created at the top of every Ladakhi village. There are certain requirements that need to be met such as the geographical orientation of the village, the amount of shadow along the main stream, the timing of sunrise and sunset or the amount of water in the stream during winter (Norphel, 2009). All these parameters can limit the duplication of this project across the region. The glacier built in Saboo, for instance, has not been a success due to issues of implementation. According to Kushog (M, 70, Saboo, retired from the administration):

It is not successful. Because it was constructed at a low altitude. So it is melting very quickly. When the water is required, there is no water.

Hence, out of the ten artificial glaciers only six are functioning. The other ones were destroyed by excessive runoff in summer or simply lacked maintenance. The retaining walls as well as the water

channels need to be constantly monitored and maintained and this component is supposed to be carried out by the villagers themselves. However, some NGOs report that feedback from beneficiary communities was not positive and that most villagers were reluctant to undertake the maintenance of the glacier. One representative of local organisation #11 explained:

It is a useful idea but we can't create artificial glaciers everywhere and also to maintain it, it is a big problem for the community. Because in the peak winter they have to go visit and clear the channel from any blocks and it is not nearby, it is very far so they need to trek so that is a problem.

The same respondent stressed the importance of involving the community within the planning process:

People should be interested. So once it is there [the interest] then it is easy. The construction is not much difficult because there is money but the maintenance part, this is the problem. [...] Without the villagers' participation it is not sustainable.

Interviews with Saboo villagers revealed that many of them, particularly women, were unaware of the existence of the artificial glacier, while most of those who knew it considered the project unsuccessful and unhelpful. According to Padma (F, 44, Saboo, Farmer):

It has been made 2 or 3 times but it was not successful. Because people had to go there to divert water [from the channels]. And it melts too quickly. So it is not very good.

In Phuktse, opinions were ambivalent. Half the interviewees were not really aware of the project or were confused about it: some thought it had been built 15 years ago, others remembered that it was four years back. Neither were they sure who initiated the project; whether it was the government, the 'Ice man', the village committee or foreign engineers. A few interviewees such as Gyalson (M, 37, Phuktse, carpenter) were happy with the impacts of the artificial glacier:

A good amount of glacier has been formed. There is a big improvement with plenty of water in the spring time when we require the water the most for watering the fields. It is a good idea.

However, the results suggest that it was mostly men who expressed positive comments whereas the majority of women, those mostly in charge of collecting water and irrigating the fields, either had not noticed any changes with the water (half the female interviewees did not even know about the artificial glacier) or they reported that it had benefitted them not necessarily in terms of water provision but for providing them with labour work. For instance, Gyalpo (F, 41, Phuktse, housewife/farmer/labourer) explained:

We went to work as labours [to build the retaining walls and water channels] and also every year we are hired to help maintain the dams; that is how it has helped a lot. I heard people saying that the flow is better but I haven't seen those changes myself.

Conversely, a few interviewees were clearly against the project and considered that it has created more problems than benefits. A group of three women whom we interviewed as they were watering their fields reported that:

It doesn't help because it melts too soon. Rather it creates a lot of troubles because a lot of pasture land has been covered. [...] The Goba said that an artificial glacier will bring money because there will be more water so we agreed, but actually it doesn't work.

Konchok's (M, 69, Phuktse, farmer) account summarised well the ambivalent perception of villagers towards artificial glaciers:

There is not much difference before and after the artificial glacier. If there is a good amount of snowfall in winter, then there is a good amount of water in summer. At the initial stage, people are happy and they think 'oh there will be plenty of water in spring and summer!' but after some time there is not so much benefit, so people are more reluctant and more disheartened by this project.

In addition to limits to the project highlighted by villagers, the relevance of building artificial glaciers to address predicted rising temperatures will be further discussed in Chapter 8.

To conclude, the main strategies to address climate change in Leh district are focussed on a mitigation approach through the construction of PSH and awareness campaigns designed by NGOs. Potential adaptation strategies are being explored by organisations but the construction of artificial glaciers for instance proved limited and no other CCA measures have been identified yet.

7.2.2 Approaches and practices with regard to disaster risk reduction

Despite the extent of the damage after the 2010 disaster, natural hazards are not a novelty in Ladakh, as suggested in the introduction to this thesis. In 2000, for instance, flash floods washed away an entire settlement in a village on the banks of the Indus River (Ladakh Studies, 2000). In August 2006, several villages were hit by torrential rains and flash floods that killed dozens of people, injured several hundred, damaged standing crops, infrastructure, irrigation canals and houses (Khan and van Beek, 2007). In a physical context prone to recurrent natural hazards, particularly floods, DRR measures are necessary to prevent these from becoming disastrous.

7.2.2.1 Lessons learned from the 2010 flood for disaster risk preparedness

As introduced in Chapter 1, the immediate response to the 2010 flood was characterised by a strong cooperation between the local authorities, the Army, international and local NGOs who coordinated their efforts and relied on immediate needs assessment (TISS-LADHC, 2010). At the beginning of the rehabilitation process though, the time period combined with the shortages of labour did not allow the rebuilding of houses for most affected families before the winter months. Whereas the central government offered a quick albeit costly solution to fix the problems of hundreds families by providing prefabricated rooms that turned out to be inhospitable, local NGOs supported the most vulnerable households by paying for their temporary rented accommodation or providing them with bhukaris and fuel wood to help them through the winter months (Kaur, 2011). In fact, many affected families temporarily returned to their native villages, took rented accommodation or were hosted by their relatives and neighbours. In the mean time, organisations supervised and co-funded the building of new traditional mud-brick houses adapted to the Ladakhi climate throughout the following months. The majority of NGOs involved in the rehabilitation thus relied on local Ladakhi communities' strong social resources in the short-term while privileging long-term reconstruction strategies even if the process took longer. Besides, many of these new houses integrate earthquake resistance and use passive solar techniques (LEDeG, 2011; Kaur, 2011).

As documented in the literature, disasters are often a catalyst to mobilise communities and authorities to undertake DRR strategies (Anderson and Woodrow, 1998). The consequences of the 2010 flood resulted in a wider recognition for DRR in Ladakh. At the time of the fieldwork, one representative of international organisation #2 highlighted that *"The government should have a special service for DRR and CCA, which does not exist so far."* In parallel, LNP was also organising a workshop on disaster management. His director explained:

Now everyone feels there must be some sort of disaster management or preparedness. We are going to invite the Hill Council, district administrators, and Government functionaries. Then, gradually we will be able to do more on DRR.

The workshop, supported by Save the Children, was held on the 24th and 25th of June 2011 and aimed to improve participants' understanding of DRR, Global and National DRR frameworks and hazard and vulnerability mapping. According to the representative of international organisation #1 who joined the workshop, participants agreed that an early warning system was one key area that must be improved but that scientific expertise needed to be added to traditional knowledge, so far overlooked. Strategies also needed to build upon the Hyogo Framework for Action. Despite these

acknowledgements, the district came up with its Disaster Management Plan for Leh with the limitations highlighted in the previous section in terms of top-down strategies that focus on building local communities' awareness.

In contrast, many NGOs that have been positively appraised for their relief response have integrated disaster preparedness within their projects. Save the Children has planned to undertake key DRR strategies when designing the construction and the running of new schools, including participatory vulnerability capacity analysis, village disaster management plans and school safety planning. The earthquake-resistant new houses built by LEDeG, and supported by SEEDS India, are another example of the building of traditional houses integrating risk safety techniques and using locally available materials as well as local labourers. Most NGOs stressed the necessity for preparedness or rehabilitation projects to be in harmony with the local context, as emphasised by one representative of local organisation #11:

Whatever is relevant to the local context, not like when somebody is coming and saying it needs a concrete structure... nobody can afford such measures... That is not our objective. Generally people they can't do it. It should be affordable. How to use the local available materials so that we can sustain them.

However, in order to minimize the risk of being affected by any natural hazards (mostly floods and earthquakes) in the future, NGOs try to increase people's awareness of hazard prone locations or alternative building techniques as emphasised by the same representative:

Once we explain these things, you know, floods, the structure of houses, the location, then we can reduce the mortality. [...] If we plant trees in the river, then it will damage their homes, so if you say water needs to go easily it will reduce the damage. And also they should not build the houses along the streams it should be in safer places.

Despite the benefits of awareness campaigns, this approach also means that NGOs might not address the root causes of the disaster because they do not address the reasons why some people settle in flood prone areas in the first place. The relevance of DRR strategies compared to communities' views, vulnerabilities and capacities will be further discussed in Chapter 8.

7.2.2.2 How are the disaster's causes perceived and explained by NGOs ?

NGO representatives are careful to avoid labelling the occurrence of the flood as a consequence of climate change, as illustrated by respondents from international and local organisations #2 and #11:

We cannot blame climate change for everything that is happening in Ladakh. Because changes are not local changes, they are mostly global.

You see there are lots of signs of erosion in valleys here, so maybe there were big floods also in the past, so we can't say it is linked with climate change. It is a natural phenomenon.

In terms of explaining the disaster's resulting damages, a few aid workers focussed on the characteristics of the hazard, a tendency illustrated by the interview with another respondent from international organisation #2:

As soon as the flood happened, people started speculating about the cause of the flood and so many different reasons came up, you know, the more trees, more tourists, human intervention, everything possible was suggested, but no one can really pin point the reason why the flood occurred. So some sort of scientific monitoring needs to be done.

[VLM]: Why do you think the flood caused so much damage?

That was because of sand, because the rain fell in one area and came down dragging a lot of sand, boulders, trees, everything and it just kept crashing everything in its path.

How can you explain that so many people died and so many houses were destroyed? Do you think it is just because of the power of the cloudburst and flood?

Yeah, I think so. I mean this is just quite a bit of speculation, but I mean if it is water there is a way of getting out of it, but when you are caught in slush, in mud and trees and entangled in things, even if you are alive you will probably be stuck, you probably won't make it.

This point of view considers the disaster in 2010 as being caused by the hazard in itself, which explains why the majority of NGOs' representatives identified disaster risk preparedness strategies that do not conceive of the vulnerability of communities in terms of their marginalisation or access to resources, but which remain focussed on the hazards. This is illustrated by the interview with the representative of national organisation #4:

[VLM]: What do you think should be the main priority for action to avoid a disaster such as the one in 2010?

[National organization #4]: Avoid such disaster... I really don't know but there are some scientific kind of things, like as of now we really don't have any data and any sophisticated equipment to measure things saying that there will be a flood, heavy rainfall or snowfall, so that could be arranged with help from the outside [...]. We need to study those floods, we need to know the characteristics of those floods and then go for a little bit of awareness kind of programme and then think of strategies you know. You have to have some kind of disaster management programme and statistics. As of now we don't have a department, we don't have anything.

This echoes the Disaster Management Plan for Leh district (DDMP) which advocate DRR measures based on technology and scientific expertise. It also combines with others accounts from NGO workers which underlined a top-down approach to disaster preparedness where they point out the

necessity to increase people's awareness on measures to be applied in times of crisis. This is illustrated by one of the senior representatives of local organisation #11:

We have to mobilize people so that they help each other [...] and then, if the flood comes, they need to know where to go. [...] Maybe there are some people in the villages that can do morale boosting, you know, so that people don't feel distress.

This seems disconnected with what was highlighted by official reports (Department of Revenue, Relief and Rehabilitation, 2011: 7; TISS-LADHC, 2010) and with accounts of villagers affected by the floods who stressed that their neighbours were the first people that came and rescued them when the flood struck. Leh and Saboo inhabitants also explained that their first reaction was to run uphill and seek refuge on higher grounds and near religious landmarks such as the Shanti Stupa or a monastery. Moreover, as highlighted previously, most Ladakhi households benefit from strong social resources (acknowledged by many NGOs for rehabilitation efforts) which means that many of those rendered homeless and who suffered from trauma were instantly provided help, a shelter and moral comfort by their neighbours and relatives. Others also relied on the emotional support provided by monks in their village. All this illustrates that awareness campaigns to inform actions to undertake during a crisis seem meaningless in relation to the inhabitants' capacities. This will be further discussed in Chapter 8.

Overall, and despite examples of relevant post-disaster responses implemented by NGOs, DRR practices before the occurrence of a crisis seem to replicate the same top-down, hazard-focussed and technocratic measures already criticised in the DRR literature for having failed to render communities safer (Hewitt, 1983; Wisner et al., 2004).

7.2.3 Approaches and practices with regard to gender

The analysis of the way and the extent to which gender is being addressed in NGOs' approaches and interventions is based on the study of organisations' documentation and on interviews conducted with one or several of their representatives. The triangulation of these two research methods points out differences between the discourse and practices.

Firstly, the results of interviews show that in many organisations the discourse of senior representatives differs from that of their staff. This is especially true when comparing a man at the top of the hierarchy with a female staff member as illustrated by representatives from local organisations #8, #9 and #11 (see Table 7.1).

Table 7.1 Examples of answers provided by NGO representatives in Ladakh regarding the integration of gender in their approaches

NGO	Quotes from senior representatives	Quotes from other staff members
#8	<i>In Ladakh women are equal to men they have the same rights in decision making and do an equal share of the work. (male)</i>	<i>More work should be done in Leh towards helping women and overall it is necessary to focus on women because they have fewer opportunities. (female)</i>
#9	<i>There is no real difference between men and women. We simply promote education and learning to both men and women. (male)</i>	<i>Everybody thinks there is gender equality in Ladakh but there is actually a gender discrimination against women. When you look at the council, when you go deeper, you find many issues linked to male domination at the political level and also in terms of job access. We should create campaigns targeting especially girls to make them realise and understand. (female)</i>
#11	<i>Women are more empowered in many villages. There is no disparity. [...] It is not my opinion, it is a fact you know, you can't deny it. Does your organisation have a specific gender policy or a women's empowerment ideal in their projects? No, look, since, there is no gender bias we don't think it is important to give importance to that issue. (male)</i>	<i>Men have more opportunities for jobs. There is gender equality in daily life in the city, but in villages women don't have so much power and decision making. Even if the father or the husband is away, women wait for them before deciding anything, like for spending money, they need permission. (female)</i>

When they were asked whether gender aspects were being addressed under their projects, the majority of NGOs' senior representatives provided a similar answer: there are no gender disparities in Ladakh and therefore no real need to address gender issues. This view was also shared by female senior representatives as in the cases of international organisation #2 and local organisation #10:

Gender is not a big issue in Ladakh compared to other parts of India thanks to Buddhism.

Women's status in Ladakh is much better. When we go to villages we don't think that we should focus on women. [...] Men and women are equal.

Conversely, almost every coordinator or project officer interviewed stressed the importance of targeting women in their interventions because they are more marginalised than men (See Table 7.6). This could be explained by the fact that staff members were mostly women but quotes above show that the gender of the respondent might not be the reason. In the case of local organisation #10, where the female president insisted that gender equality exists in Ladakh (see quote above), her male counterpart within the organisation stressed that:

Women still have problems in Ladakh. We have this democratic system but there are no women in practice. It should be half-half. Because half of the population is women. [...] We definitely need more activities that empower women.

The lack of representation of women in decision-making processes was also highlighted by the female president of local organisation #7. However, their programmes clearly target the empowerment of women:

Most projects and governmental programmes are not gender balanced. There is a big gender gap at the governmental level. At the moment, there are 2 seats for women at the council. If women stand up at the election, they are most welcomed, but women are shy and they are not enough educated so they don't dare enter in politics.

This constitutes the sole example where a senior representative acknowledged the necessity to address gender biases and the under-representation of women's voices in Ladakh.

Secondly, there seems to be a gap between interviewees' discourse underestimating gender differences between Ladakhi men and women and organisations' actual practices. Despite the statement of senior representatives that gender does not need to be addressed in Ladakh, literally every organisation's documentation that presents their current activities includes a component on women's empowerment (See Table 7.2).

Table 7.2 How gender is addressed through some of NGOs' objectives and activities in Ladakh

NGO ²	Objectives	Activities
LEHO	<i>"To encourage and to give equal gender justice" (LEHO, 2010)</i>	Training of women's Self Help Groups to enable them to develop income generation activities, earn cash and improve their livelihoods. Activities include making and selling handicrafts, producing local fruit juices, developing homestays, growing and selling vegetables using solar greenhouses.
LNP	<i>"To empower communities and individuals to participate in decision making process" Purposes: [...] "women's issues" (NGOs in India, 2010)</i>	
LEDeG	<i>"To empower women and to strengthen their local institution" (LEDeG, 2009)</i>	
GERES	<i>"To empower Ladakhi rural women" (GERES, 2007)</i>	
SECMOL	<i>"To achieve 50% of women and girls attendance [at school]"</i>	Campaigns and classes on cultural awareness.
RDY	<i>"To advance rural women's health education To provide a safe and comfortable environment for women to learn about women's reproductive health, hygiene and maternity" (RDY, 2011)</i>	Women's Health programme: organising monthly women-only workshops across Ladakh.

² NGOs are being named here as the information included in the table is extracted from their website and official documentation.

<p>Women's Alliance of Ladakh</p>	<p><i>"To raise the status of rural women and to strengthen local culture and agriculture"</i> (Women's Alliance website)</p>	<p>Informing women on local varieties of grains and vegetables and campaigns about the hazards of pesticides and chemical fertilizers. Regular handicraft courses for rural women as a means of generating cash income while remaining farmers. A handicraft shop to promote products made by farming women, thereby supporting a self-reliant local economy.</p>
<p>Save the Children</p>	<p><i>"[...] To ensure a quality education for all children, regardless of their gender, class, caste, ethnicity and religion</i> (Save the Children India Website)</p>	<p>Promoting quality inclusive education in government schools and strengthening the capacities of existing government schools. Involving parents and communities in education planning. Awareness campaigns against corporal punishment.</p>

In fact, interviewees easily advertised their projects such as the creation of Self Help Groups (SHG) (see Table 7.7) and stressed their contribution towards improving women's economic and social status. One of the coordinators of local organisation #11 highlighted that:

Women don't earn much income but they have a lot of activities to do, so we try to improve their economic status because we have seen that whatever incomes it goes to men's pockets.

This raises the question of whether it is possible to promote the emancipation of women based on income-generating activities without challenging power structures within the household. What guarantees that women will control the money that they make? Nevertheless, the creation of SHG was positively evaluated by the majority of both male and female interviewees among local communities. Women who were members of one of these groups stressed the benefits in terms of money-making, but especially for the opportunity to socialise. Thinlas (F, 42, Saboo, housewife), for instance, explained:

[VLM]: Do you like being member of this group?

[Thinlas]: *Yes a lot.*

Why?

Because I meet other women and we socialise. I also earn money by selling carpets in the village.

Why do you think the SHG are only formed with women?

To help women to be less backward.

Do you think women need the groups?

Yes they do.

This account also stresses the tendency of the majority of interviewees, both men and women, to consider women as being less 'advanced' than men, primarily because they have lower literacy

levels, and because the majority of them are not involved in productive activities. However, to encourage women to get involved in income-generating activities neglects their heavier workloads, social responsibilities and limited spare time highlighted in the vulnerability/capacity assessment. This was the case for many female interviewees, particularly in Phuktse, who stressed that they could not join a group because of their daily duties. Palmo (F, 38, Phuktse, housewife/farmer) explained:

Some people come, maybe LNP, and tell us to make carpets. But I can't join the SHG because there is nobody to stay in the house to do the work and look after the house if I go away.

This also suggests that in many cases, the creation of SHG is a top-down project that does not necessarily appear commensurate with women's needs. Moreover, promoting the empowerment of women by encouraging them to generate income replicates the idea that the improvement of one's social status reflects one's ability to engage in productive activities. This goes against the views of local women themselves who emphasised in this research the necessity for men and people in general to value their reproductive roles and gender-specific activities. To look after children, cook meals, empty the toilets and spread manure on fields does not create cash-income but these are fundamental daily activities that sustain families and they are too often taken for granted or undervalued. Hay (1997:192), who used a gender perspective to explore the division of labour, the allocation of resources and processes of power among Ladakhi households, emphasised that *"modernisation was shown to increase women's workload, diminish their mobility, curtail their decision making and access to resources, and subject them to restrictive and foreign gender norms and ideals"*. Interventions such as the creation of SHG, despite their positive outcomes in improving women's access to resources and ultimately those of their entire families, subject women to being valued for the money they are making rather than for their everyday workloads and responsibilities. As argued by Harcourt (1994: 19), *"modernisation and development, by placing value on paid productive work and on acquiring resources, have failed to value some of the more fundamentally healthy and creative practices [...] which retain a high value of the feminine in society"* (Harcourt, 1994: 19). The conceptualisation of women as poor, subordinate and unproductive justifies development efforts to help women become economically productive (Apffel-Marglin and Simon, 1994) but fails to address local women's own views and desires, and conflicts with daily challenges faced by women including their heavier workload and social responsibilities. The case of Ladakh only illustrates once more the dominant ideology of development criticised for the past few decades by feminist researchers for converting natural and human resources into creating wealth rather than respecting the necessary equilibrium between human communities and their life-support environments (Harcourt, 1994).

Additionally, one of the coordinators of local organisation #9 highlighted that although the SHG provide rural women with more opportunities to generate income, this project does not address problems faced by women living in Leh. She said that:

There are more problems about gender in Leh than in rural areas. Women find themselves unemployed living in rented flat. [...] Educated women actually find it less attractive to work in a SHG because they expect to have a job in an office. More work should be done in Leh towards helping women and overall it is necessary to focus on women because they have fewer opportunities.

Despite these accounts and gender-sensitive development projects, gender was not considered by NGO practitioners to be important in the design of climate-related or DRR strategies. Moreover, a few NGO practitioners, especially men, seemed reluctant to link their approach with any recognition that gender differences exist in Ladakh. This is illustrated by the senior representative of local organisation #11:

Here, as you know, we don't have any gender bias or we don't feel that women are something, you know, different than men. Generally there is no gender issue at all.

[VLM]: Are there any projects that you feel benefit women more than they benefit men?

Yes, there are. In the villages we have projects on women's empowerment, through which we organise women's groups. There are no male groups, only women groups. So we provide them with a lot of support such as vocational training.

Since you said there is no gender bias in Ladakh, why do you think some of those projects are specifically with women?

No, no, it is not specific. When I talked about organising groups, even the males can form into groups. But you know, because women are confined to their villages and homes, so this is the only way to supplement their income, you know, to get some support and empower themselves, to learn something vocational so they can earn and gain confidence.

The reluctance of many people to acknowledge that there exist differences between men and women, even in Ladakh, might be explained by their worry that this could be misinterpreted as intolerance, sexism or misogyny. On the one hand, this does not stop NGOs implementing projects that address the particular problems of individuals according to their gender (e.g. women's lower economic resources). The construction of PSH, for instance, benefits women by improving their health status and reducing their workload. However, on the other hand, assuming that men and women are equal in their status, roles and needs might prevent NGOs from evaluating the impacts of their projects (those that do not target women specifically) from a gender perspective. This might also prevent them from conducting gender-sensitive needs assessment with the risk of designing projects that might not be appropriate to women's specific needs, vulnerabilities and capacities when addressing environmental shocks and trends. This will be further discussed in Chapter 8.

7.3 Conclusion

From the review of policies, interventions and projects to address climate change and tackle the impacts of natural hazards, several points emerge. First, climate change adaptation has only recently been addressed by national Indian policies, no SAPCC has yet been formulated in the state of J&K and there are no current plans in Leh district to come up with climate-related strategies. At the district level, climate change is addressed by the NGO sector mostly through mitigation (PSH) and awareness campaigns while the building of artificial glaciers is advanced as a potential adaptation strategy.

Secondly, DRR policies at national, state and district levels remain strongly influenced by the dominant approach to disasters that focusses on hazards-centred prevention measures and top-down post-disaster interventions. Strategies are centralised and follow the national framework with limited opportunities to develop interventions that draw from local contexts and acknowledge indigenous coping mechanisms. A wider recognition of communities' roles is offered by the State policy and district authorities but concrete community-based DRR strategies have yet to be implemented by both authorities and NGOs. Vulnerability is mostly conceived in terms of infrastructure's susceptibility to hazards, while populations at risk should be made aware of their hazardous location or unsafe living conditions. Neither authorities nor the NGO sector in Ladakh have formulated DRR strategies that address people's vulnerability in terms of their social and economic marginalisation, despite lessons learned from the 2010 disaster and the recognition of communities' capacities by many local NGOs for rehabilitation projects.

Thirdly, gender remains a marginal component of CCA and DRR policies at each level. Policies include a brief acknowledgment of the particular vulnerability of certain groups including women, but there is no real gender-sensitive approach being mentioned in any of the policies addressing CCA or DRR at national, state and district levels. In contrast, development NGOs in Ladakh do implement projects to promote and support women's empowerment. However, the majority of NGO practitioners at the top of their organisational hierarchies do not acknowledge the need to address gender differences when designing or implementing their strategies; moreover, actual practices can be questioned for their relevance to women's realities and needs. These findings will contribute to a discussion, in the following chapter, of the relevance of authorities' and organisations' interventions to address climate change and disaster risks in the context of local communities' vulnerabilities and capacities. The next chapter will also explore in more depth how practices to address climate-related changes, natural hazards or gender relate to the realities and opinions of villagers, alongside their everyday challenges.



Chapter 8

8

THE RELEVANCE OF CLIMATE CHANGE-RELATED INTERVENTIONS TO COMMUNITIES' REALITIES

Objective III

To identify and explain any disjunctures between approaches inscribed in climate-related interventions, DRR strategies and beneficiaries' realities.

7. To what extent do interventions in Ladakh address vulnerability, gender inequality and local communities' opinions and priorities?
8. What are the limits constraining the effectiveness and relevance of interventions to address environmental shocks and trends, and what recommendations can stem from these?

The previous chapter critically reviewed the main governmental policies addressing climate change adaptation (CCA) and disaster risk reduction (DRR) which inform the interventions of central, state and district authorities in both sectors in Ladakh. Chapter 7 also analysed the main projects implemented by Non-Governmental Organisations (NGO) to address natural hazards and climate-related environmental change in the region. The analysis revealed that (i) DRR strategies mainly still adopt a hazard-centred approach to disaster preparedness, (ii) climate efforts focus on mitigation, (iii) there is no integration between the sectors and (iv) gender is not really acknowledged as an important theme to consider, even though NGOs in Ladakh address gender in other areas of their work.

This chapter aims to address the third and final objective of this thesis which is to discuss the relevance of DRR and climate-related approaches of authorities and NGOs to the gender-disaggregated views and realities of local communities. To do this, this chapter draws on discussions with residents from Ladakhi communities in relation to drivers of change shaping the development of their society (Chapter 4), the gender assessment of their vulnerabilities and capacities (Chapter 5) and the way climate change relates to other everyday challenges (Chapter 6), and compares this profile with the critical review of the main policies and projects being implemented in the region (Chapter 7).

The first section discusses discrepancies between authorities' and NGOs' practices and beneficiaries' realities by exploring how interventions relate to the views, vulnerabilities and gender differences of local communities with regard to climate change and other everyday challenges they face. The discussion will then explore the limits constraining the effectiveness and relevance of interventions, based on these findings, and draws up several recommendations to inform DRR/CCA policy makers and development practitioners.

8.1 Critical discussion of the relevance of interventions to address climate change and DRR

Interviews conducted with villagers explored how people evaluated the work of authorities and projects conducted by NGOs in Ladakh. The findings were further examined through FGDs in Leh and Saboo to compare solutions suggested by participants to tackle problems they had identified with interventions of governmental institutions and NGOs. At the time of the fieldwork, climate change was not addressed by the local government, but a few projects implemented by foreign and local NGOs were specifically related to the issue. These included the building of Passive Solar Houses (PSH), the organisation of awareness campaigns and the creation of artificial glaciers, as presented and analysed in Chapter 7. In the next section, these projects are further discussed in terms of their relevance to addressing climate-related environmental issues and natural hazards in relation to local communities' views and realities.

8.1.1 The relevance of mitigation at the local level?

First, as described in Chapter 7, the building of PSH addresses climate change primarily from a mitigation point of view, as it aims to contribute to the reduction of CO₂ emissions by minimising the use of biomass for heating and cooking purposes. The overall opinion of interviewees about PSH was extremely positive because it provides occupants with a warmer habitat, a less polluted indoor environment, reduced consumption of fuel and a gain of free time. However, the previous chapter introduced some limitations to the scaling up of the project linked to the cost of the construction and the reliance on NGO funding which might not be indefinite. One representative of international organisation #2 stressed that:

The objective is to withdraw at some point. Otherwise, we will continue to bring money and the government will not invest, if we carry on financing. Ladakhi communities have been used to be self-sufficient so it is not easy to come up with the idea of the PSH in which we bring expertise and finance. The government is active on solar energy and agriculture greenhouse

but PSH technology is not implemented because those buildings are costly and the benefits are not visible automatically, so there is less interest.

This account underlines the fact that the PSH project remains a top-down strategy designed by NGOs and presented to local communities which might limit the duplication of the project if organisations stop implementing it.

On the one hand, the mitigation approach of PSH concurs with communities' views that climate change impacts should be tackled at the root causes, by for instance reducing CO₂ emissions, preserving natural resources and promoting a lifestyle more in harmony with the environment. The organisation of campaigns to raise awareness about climate change among Ladakhi communities also goes in this direction. Campaign messages emphasised the mitigation aspect whereby local communities are encouraged to adopt a lower carbon lifestyle. This concurs with communities' views that people in Ladakh, and elsewhere, should adopt a development path that cares more for the environment and creates less pollution. This also addresses some of the solutions highlighted by interviewees regarding the need to inform Ladakhi people about the concept of climate change. For instance, the female participants of one FGD conducted in Leh considered that:

- *Awareness campaigns should be organised to explain the causes and the effects of climate change.*
- *We can also encourage the minimal use of non-recyclable products*

On the other hand, a mitigation approach in the context of Ladakh can be questioned. One could presume for instance that the level of Ladakhi people's carbon emissions is quite low already. Moreover, the PSH project's main outcomes are less the attenuation of CO₂ emissions and more the enhancement of beneficiaries' livelihoods. Interviewees praised the project for its visible benefits in terms of comfort and well-being, but none of them mentioned the PSH technology as a potential strategy that could be developed to tackle climate change. This could be explained by the scope of the project, whereby 1,000 PSH across Ladakh, estimated to save 2,800 tonnes of CO₂ yearly (GERES, 2007), seems insignificant compared, for instance, to the 220 millions of tonnes of carbon that the world-leading steel company Arcelor Mittal produces every year (Carus, 2012). Even though local communities indicated that they, too, had to rethink the way Ladaki society is following economic development, and despite the positive approach of mitigation to tackle climate change at the root causes of the phenomenon, there is a scale dimension that raises the question of how much effort one can ask from local communities, and from NGOs working on the ground, while giant companies make huge profits from the emissions trading scheme. For instance, between 2008 and 2011, Arcelor

Mittal has accumulated an excess of more than 129 millions of tonnes of CO₂ as carbon credits which the company does not need and was donated by European countries (Lawson, 2012). With each emission permit valued at six Euros per tonne, Arcelor Mittal could make a profit of 774 million Euros by selling its excess credits on the market (Ibid). In contrast, NGOs such as GERES in Ladakh, develop strategies to help local communities in the South to meet their immediate and basic needs *'with comparatively low carbon methods that will, on the one hand, reduce emissions from current levels and on the other avoid future emissions as countries develop'* (GERES, 2011a: 6). By designing projects to reduce CO₂ emissions, NGOs can then qualify and benefit from the carbon trading market funding which in turns finances development projects that are meaningful in regard to the realities of local communities. However, by selling on the market carbon credits that the project has contributed to save, it participates in the process that provides countries or companies the opportunity to buy the right to pollute and produce CO₂ emissions that small scale projects aimed to tackle in the first place. In parallel, local communities are asked to contribute to the project by adopting an imported technology (even though PSH appear locally appropriate) and investing in the building or transformation of their house which many respondents seemed hesitant or reluctant to do as shown in the previous chapter. This echoes the international debate surrounding the justice dimension of mitigation and whether efforts should be undertaken at the local level by local communities that have contributed the least to global GHG emissions. One could argue that small-scale projects are part of the solution to tackle climate change and they can serve as examples of best practices. But projects such as the building of PSH appear more useful as development initiatives to improve the well-being of households rather than mitigation efforts undermined by unsustainable practices of multinational companies and industrialised countries at the global scale.

8.1.2 Tackling the root causes of risks and therefore of unsustainable development

As mentioned in Chapter 7, the awareness campaign designed by the network of NGOs in Ladakh explains to people that the occurrence of more extreme weather events, such as heavy rains and floods, are among the impacts of climate change. Although this has also been advanced by scientific studies, there is a risk that people who do not fully grasp the scientific concept of climate change will consider that living a low carbon lifestyle will avoid natural hazards-related disasters illustrated by Tingle (M, 37, Saboo, farmer):

People have less care for life and they pollute the environment. See the floods, it is because of that.

The previous chapter showed that the majority of interviewees identified pollution as a primary source of worry and considered the degradation of their natural resources to be one of the factors leading to natural hazards and disasters. Awareness campaigns explaining that climate change is likely to increase extreme weather events contribute to the understanding of local people that reducing pollution will alleviate disasters. Fighting air pollution through climate change mitigation could indeed prevent negative impacts from striking and affecting the most marginalised communities. However, to mitigate climate change does not tackle the factors that lead to natural hazards, that have always occurred, to generate damage. Therefore there is a risk of distracting DRR strategies from tackling the root causes of disasters. Empirical evidence from Ladakh thus supports the theoretical analysis of Kelman and Gaillard (2008) whereby climate change appears as a convenient scapegoat to explain the disastrous impacts of disasters.

Such root causes were pointed out by organisations themselves. Despite the tendency of the majority of them to identify disaster preparedness measures that reflect a hazard-centred approach, accounts from a few NGO representatives highlighted causes linked with the social dimension of disasters:

[International organisation #2]: *More than 40 villages were affected by the floods but there were no loss of life. In villages, houses are built away from streams to provide more security. In comparison, deadly damages happened in the urban area, because riverbeds have shrunk.*

[Local organisation #8]: *The cloudburst was unprecedented but people have long been building in areas they shouldn't, areas that used to be known for flood risks. But with our unplanned and unregulated urban and rural growth, people from outside build on this land.*

[Local organisation #11]: *In Saboo, families are separating so there are more houses. And if people have more land then they just build on it, they don't realise it might be a flood prone area.*

[VLM]: Do they need government permission to build?

No, in the villages nothing. Even in the city, there are some rules but nobody will apply them. [...] If there is [barren] land then people create their own land. Maybe they just give some money, I don't know, so that is a big problem. There is no such government sanction.

Therefore, answers provided by NGOs clearly underscore that although human societies cannot do anything to prevent a cloudburst from striking, there are factors that explain the resulting damages that can be tackled. This consists of addressing the reasons why people are settling in flood prone areas. Is it only because they are ignorant? Will awareness campaigns prevent people from settling in hazard-prone areas? Chapters 4 and 5 have highlighted how the geographical and socioeconomic processes occurring in Ladakh encourage many families to migrate from rural areas to settle in the urban area of Leh. They are often attracted by wider livelihood prospects including opportunities for

work, higher wages, health care, education for their children, better communication infrastructure and access to more diverse food items and manufactured goods. In order to settle in the capital, migrants either have to rent a place to live or grab a piece of available land and build their own house. However, given the high level of population growth especially in the capital, land is a precious resource sought-after by building developers or converted by local families to build new houses for their children or for accommodating tourists. This means the only available and affordable land is often barren areas in hazard-prone locations. The last quote also indicates that people are ready to pay bribes in order to by-pass land-zoning regulations. Therefore, DRR strategies which remain focussed on the hazard or on the potential or proven ignorance of communities do not recognise the social and economic structures that contribute to make people more at risk. Yet, the literature review has highlighted the limit of DRR approaches that do not address the social construction of disasters (e.g. Hewitt and Metha, 2012; Wisner et al., 2012).

On the one hand, by acknowledging that these causes depend upon wider societal structures linked to macro-economic processes or population dynamics, one can question what can be done by NGOs to tackle the vulnerability of certain groups. On the other hand, projects that NGOs have been conducting in Ladakh for the last two decades to improve rural inhabitants' livelihoods clearly contribute to reducing people's long-term vulnerability by enhancing their access to resources. Consequently, they could be valued as DRR strategies. These include the building of PSH that enhance households' human, physical, natural and economic resources and therefore contribute to reducing people's vulnerability to shocks. For instance, living in a PSH provides household members with a warm dwelling and saves them money otherwise spent on fuel. This enhances people's economic resources and constitutes one incentive for them to remain in their villages rather than migrating to the outskirts of Leh and settling in hazard-prone areas. Chapter 7 has also shown that the majority of NGOs as well as local authorities address the greater economic marginalisation of women by helping them to set up income-generation activities through the creation of Self-Help Groups (SHG). Although the analysis has shown the limits of this approach in terms of women's empowerment, it still contributes to improving their economic resources and therefore enhances their capacities to help them cope during periods of economic stress or shocks. This is another example that illustrates how a development project can be valued as a DRR or CCA strategy because it provides people with means to alleviate their vulnerability. Even though one could question what NGOs or local authorities can do to tackle the wider structures and macro-economic factors leading to vulnerability, they still have a key role to play to address some of the daily constraints that people face. These include, for instance, fighting the corruption of administrative officials highlighted by the majority of villagers as one of their primary daily challenges. By recognising and punishing bribery

practices, authorities would prevent the possibilities for individuals to bypass urban regulations and build hotels, businesses and houses in areas where they should not. However, this has to be accompanied by effective and informed urban planning on the one hand and policies that tackle poverty-led migrations and unsustainable tourism practices on the other, not only at the local but also at the country level.

8.1.3 Do we need to design climate change adaptation?

The third strategy described in Chapter 7 was the building of artificial glaciers as a technique of water conservation. This project generated ambivalent opinions from interviewees, the majority of whom praised the idea but pointed out issues of implementation that rendered the project unsuccessful and unhelpful. Accounts also suggested that the building of artificial glaciers is another project that helps people more in terms of improving their livelihoods generally rather than addressing specific climate change impacts. Interviewees in Phuktse explained, for instance, how the building of the retaining walls for the glacier provided them with wage employment for a certain period of time. Moreover, artificial glaciers constitute a solution to resolve the problems of water shortages in spring due to cold weather in villages like Phuktse, if they are well implemented and maintained.

However, although one can find newspaper headlines such as “*A Himalayan Village Builds Artificial Glaciers to Survive Global Warming*” (Vince, 2010) or “[...] *fighting global warming by building artificial glaciers in Ladakh*” (Kalyani, 2008), this project does not constitute a strategy to adapt to a global warming of temperatures. First, it actually tackles problems linked with cooler temperatures. Second, it will not resolve the predicted water shortages because it still depends on water from natural glaciers upstream, which are predicted to melt away (see Than, 2012 for a review), and on snowfall, which has been decreasing. The representative of national organisation #4 highlighted this issue:

There is too much media attention, too much of people thinking ‘Woow artificial glacier’... The thing is, the main glacier at the top is melting then what will you do with your artificial glacier you know? It might be a solution for drought prone areas especially in the spring season but it is not a solution for climate change.

Therefore, most local NGO representatives agreed that an artificial glacier “*is not a long term solution*” (local organisation #10) but is simply “*a project to get water in early spring to irrigate*” (local organisation #11). The majority of interviewees who advanced strategies to address climate change shared the same view and did not identify the building of artificial glaciers as a solution.

Finally, the account of Khabira (F, 60, Saboo, farmer) stressed that this project should not distract authorities' and NGOs' attention from other factors that prevent equal sharing and the sustainable use of natural resources:

[VLM]: Do you think the artificial glacier could resolve the water shortages?

[Khabira]: *No, because villagers upstream are still controlling the water with many dams. Only if there is overflow then we get water, otherwise, we don't receive any glacier meltwater.*

This shows that any particular projects that aim to tackle a specific issue such as water shortages could be rendered useless if the interconnection of root causes leading to the problem is not fully comprehended. In other words, the global warming of temperatures could exacerbate water scarcity, but the reasons that explain why certain people are likely to suffer remain the same reasons that prevent people from achieving sustainable development and make them more likely to be affected by natural hazards. Such reasons are linked with the lack of resources that exacerbate people's marginalisation and vulnerability to stresses and shocks as assessed in Chapter 5. Projects that specifically address climate change in a manner disconnected from everyday constraints faced by local communities can neglect the need to reduce their social vulnerability and draw on their capacities.

When exploring potential solutions for adaptation with a few NGO representatives, their accounts stressed that climate change remains an issue that has to be considered, but they emphasised the interconnection with other drivers that are as problematic if not worse:

[VLM]: What do you think could be the idea of climate change adaptation in Ladakh?

[International organisation #2]: *Everybody we have spoken to has stated water will be an extremely big problem in the near future, in fact it already is a problem with Leh becoming more and more urban, people are consuming more water, there are more and more restaurants, more hotels that offer western toilets that are flush toilets. So consumption of water has increased. [...] So in terms of climate change adaptation, I think exploring water conservation techniques should be at the top of the list.*

The water issue was a recurrent topic in interviews with both villagers and NGO practitioners such as highlighted by a representative of local organisation #11:

[KN]: In the future, how do you foresee the problems in Ladakh? What do you think will be the main problems?

[Local organisation #11]: *Water.*

Why?

Because the glacier is shrinking and people now in cities they go to get the ground water. Before we only used the local [dry] toilet and whatever the waste, we used to always reuse it for the fields.

Both of the above accounts emphasise that reducing levels of water due to climate change is an additional factor that worsens the already existing problem of increasing water consumption and waste. Overall, this concurs with the disaster literature which has continually stressed that global attention to disasters and long-term climate change should not distract the action of governments and organisations from current everyday local challenges (Hewitt, 1983; Wisner et al., 2004; Kelman and Gaillard, 2008; 2010). However, far from diminishing the significance of climate change for development, replacing the attention on daily constraints entails designing climate and disaster related policies and practices that appear more in adequation with local communities' realities.

Moreover, to consider adaptation strategies to address negative environmental changes appears minimally relevant to the views of local communities who considered that (i) they are not those primary responsible for increasing GHG emissions which emphasises the dimensions of scale and justice (e.g. Polack, 2008) and (ii) environmental change also results from other anthropogenic activities such as air and water pollution and the depletion of natural resources, which should not be tolerated in the first place and therefore be prevented rather than being adapted to. This raises the question of whether one should encourage adaptation to a development path that local communities are not happy with. In fact, none of local inhabitants who were interviewed mentioned any solutions linked to adaptation. This could be explained by the fact that adaptation may not appear realistic when considering the predicted long-term impacts of climate change in Ladakh. Chapter 4 showed that studies advance a possible increase of water shortages and the multiplication of droughts. As a response, authorities and some organisations suggest the development of water lifting projects to benefit from the water from the Indus. This was mentioned by the representative of local organisation #11:

[VLM]: What do you think can be done to resolve this water problem?

[Local organisation #11]: Proper use, because we can't get it again. And then there is some of this water that goes to waste. Because until now we are only dependent on the streams and glacier water so few villages are benefiting from the water from the Indus so maybe in the future we might benefit from this water lifting project and it can be developed.

However, to rely on costly technological measures such as pumping the water from the Indus (which produces CO₂ emissions) appears disconnected from the local context and a perspective of sustainability. As emphasised by Behera and Vaswan (2007: 6): "*Ladakhis have traditionally not relied on the Indus for irrigation due to its low depth, the low quality of its water and the great difficulty of*

lifting its water without the use of polluting, energy inefficient, mechanized pumps". This echoes the emphasis placed on technology highlighted in the literature review whereby certain adaptation strategies create pollution which conflicts with the mitigation approach to climate change. Such strategies also mean adapting the availability of natural resources to the society's needs rather than modifying the society's functioning to limited and fragile resources. Moreover, they also fail to resolve the problem in the long-run since the Indus is also fed by surrounding glaciers. This recalls the account of the director of local organisation #11 (Chapter 7, page 263), who questioned what could be done once there will be no water left: "*either escape or get extinct?*" The report conducted by GERES to document the impacts of climate change in Ladakh indicated for instance that an entire village in the Zaskar range migrated downstream as the glacier they were relying upon completely melted (Angmo and Heiniger, 2009). This questions whether the only adaptation option for Ladakhi people would be to migrate to lowland areas. This stresses the urgency to tackle the emissions of CO₂ by those who produce them the most, while addressing the factors that lead to the over-consumption of water.

In the meantime, the already existing environmental changes, including climate variations, that are common in mountainous regions are continually addressed by local communities themselves as well as by development projects from the government or NGOs, and therefore could be valued as strategies to adapt to climate change. For instance, Ladakhi communities, recently assisted by government and NGO funding, have long created small ponds along the main water streams in order to collect water and distribute it to farmers at a time when they need it the most. This technique of water conservation also contributes to alleviate people's difficulties in times of water shortages and can be labelled as a strategy of adaptation to water fluctuations. Hence, and talking about development projects undertaken by its organisation, the representative of local organisation #13 explained that "*It has been 10 years since we do climate change adaptation*". The majority of development practices, including the building of water ponds, the setting up of solar greenhouses to enable people to grow more vegetables particularly in the winter or the creation of Self Help Groups to train women with handicraft skills and provide them with opportunities to generate more income, were all praised by interviewees. These also target the most marginalised groups, i.e. those with fewer financial resources such as subsistence farmers, or lesser political power such as women. These projects enable people to diversify their access to resources and therefore to widen their options and opportunities to deal with environmental extremes or trends. Given such outcomes, development projects that contribute to enhancing people's capacities could be valued either as DRR or CCA strategies, even though they are not advertised as such.

Since causes of marginalisation and vulnerability are inherently linked with development issues and remain the same in the context of both climate change and disaster risk, strategies in terms of CCA, DRR or development all tend towards the same objectives i.e. addressing people's everyday risks and development challenges. Given the limits and challenges encountered in climate-related strategies, it appears irrelevant to advocate for NGOs and the government to address climate change impacts through adaptation to its specific physical manifestations. This concurs with findings from Schipper (2004: 202) who writes that: *"it is more effective to view adaptation to climate change as a paradigm for development, where adaptation is fostered by a process of sustainable development and vulnerability reduction, rather than by explicit adaptation policies"*. Based on the research findings, this thesis argues that NGOs and the government authorities should continue to implement development projects in order to address DRR and climate change rather than focus on specific DRR and climate-related interventions.

8.2 Implications for development interventions

This section highlights how projects that improve people's livelihood access appear in line with what NGO representatives consider the priorities for action in Ladakh. The discussion also focuses on the micro-level planning (MLP) strategy developed by the Ladakhi local authorities in partnership with TATA-Institute of Social Sciences (TISS), introduced in Chapters 5 and 7, to highlight the way development practices can efficiently address the root causes of everyday risks.

8.2.1 *Less is more... Should we remain focused on development projects?*

The empirical evidence provided in this thesis confirms the lack of integration between efforts to address natural hazards, climate change and the overall imperatives for sustainable development despite their similar root causes. By considering the views of local communities when assessing the relevance of interventions, the discussion highlights the irrelevance of approaches that remain focussed on the physical processes of disasters and climate change. This is also illustrated when analysing the views of organisations working in Ladakh regarding what areas should be considered as their priority for action. NGO representatives were asked their views on the most relevant interventions to implement in Ladakh to tackle existing and/or future challenges, regardless of funding imperatives. Here are their answers:

[Local organisation #9]: *We need to focus more on sustainability, like our old ways. Now, we are not, we are having a western boom. People's job options are not farming now but tourism*

and services; this will not help Ladakh. Farming communities and commitments should not disappear; we cannot sustain ourselves on imports. People are not relying on cooperation now, it is more individual. Families used to be closer and more diversified in their work, livestock, farming, crafting. Now people are ignoring these activities that will keep us alive long after the tourists have gone. We must maintain agriculture. [...] But we must stop running after more, more, more... if not, things will change for the worse. [...] How best to preserve Ladakh is a big challenge, Ladakh could be a model for all India if we can work at it properly. [...] Modernisation and education are necessary but we should not lose the community to the individual.

[International organisation #2]: *I would start to work on the urban areas. I think that is very important because they are, sort of, the nodal points for everything that is happening: internet came here, dish TV came here and then it went to the remote areas. This is sort of the opinion maker for the entire region so I would concentrate on this place. A very, very simple thing that I have noticed and I would love to see changed is the pollution control of the cars. None of them follow pollution control, simple things. Also, I don't think there is a proper garbage disposal system in place here. As far as I know, they just bring the garbage to a place and dump it, so that is something that in the next 10 years could be disastrous.*

[Local organisation #11]: *To improve the living standards in the remote areas. In the villages, people have very less. There is also the unemployment of youth nowadays [...] the children are going to school and go out and then in the villages there are only few men but mostly old men and then most people leave their village and then there are these changes in the whole system. [...]*

These accounts stress that people working towards improving the well-being of local communities are also well aware of the root causes of unsustainable development that correspond to the priorities for action identified by villagers: maintaining cooperation and solidarity between and within communities, reducing air pollution, sorting the dumping of garbage and improving standards of living in rural areas. The last section also showed how projects that focus on improving people's access to resources appear more relevant to addressing environmental shocks and trends than specific DRR or climate-related strategies analysed in the previous chapter. Schipper (2004: 201) explains that development activities that reduce risk and vulnerability "*will ultimately provide the necessary structures for an effective adaptation process that will then overcome challenges posed by poverty and globalisation*". Similarly, to strengthen people's livelihoods implies reducing their vulnerability to risk while enhancing their ability to adapt to climate change.

In contrast, and despite synergies between objectives from DRR and CCA strategies acknowledged in theory, as described in Chapter 2, this research has highlighted how DRR and climate-related efforts are not integrated in practice and appear disconnected from (i) lessons learned in the DRR community to address the social dimensions of disasters and climate change, (ii) international policies advocating the mainstreaming of adaptation and/or vulnerability reduction, and (iii) the

realities of communities on the ground. Therefore, the empirical evidence of this research supports the theoretical argument of Schipper (2009) presented in Chapter 2 who questions what benefits could bring a better integration of DRR and CCA if efforts remain disconnected from vulnerability. Authors such as Kelman and Gaillard (2008, 2010) argue that climate change-related strategies should build from existing and strong DRR frameworks, particularly community-based initiatives that value local perspectives and aim to sustainably reduce risks. The case of Ladakh nuances this statement and shows that DRR approaches adopted by local authorities and most NGOs remain, so far, top-down and hazard-centred and therefore, unlikely to frame adequate climate change-related interventions. It is only recently that the local government, drawing from its micro-level planning approach to development, recognised the benefits of implementing community-based DRR. The next section will show that building upon development approaches already adopted by local authorities thus appears more relevant to the local context and more effective to address communities' views, vulnerabilities and capacities than current DRR strategies. They match with priorities highlighted by NGO practitioners and they overall contribute to addressing the wider structures that create risks and environmental challenges in the first place.

8.2.2 The example of the micro-level planning approach to development

Based on the collaboration between the LADHC and TISS, an extensive survey was conducted in every village across Ladakh to implement the MLP approach to development following a methodology explained in Chapter 7. This approach aims to help the government focus on key areas where more work should be done according to local communities' views, needs and aspirations (TISS-LADHC, 2010a). Villagers were thus consulted at the outset of the design of the next 5-year perspective plan for Leh District. As part of this survey, people were asked what their vision for the development of their region was and their answers were quantitatively ranked (see Table 8.1).

Table 8.1 Ranking of communities' visions for the future (TISS-LADHC, 2010a)

Rank	Priorities
1	Good quality education for every child
2	All villages/ hamlets well provided with six basic facilities (safe drinking water, road, phone, school, health care, power and LPG)
3	Economic development with agriculture as the foundation
4	Unity, solidarity and harmony among people
5	Respect for and preservation of culture and tradition
6	Safe and clean environment
7	Full employment and opportunity for everyone to excel

8	Our village to be an important tourist destination with good facilities for tourists
9	Food processing industry and marketing of agricultural products as the trust area
10	Holistic and quality health care system at village level
11	Our village to become a green region with all barren land brought under cultivation
12	A society free from corruption and favouritism / Dedicated, honest and deserving people as public representatives working in the best interest of Ladakh and its people
13	Development without discrimination on the basis of wealth, gender, social status or religion
14	Religious places/sites well preserved
15	All development agencies working sincerely and responding effectively to people's needs
16	Elderly people taken care of properly

Results show that Ladakhi people are primarily concerned with the education of their children and access to basic services which accentuates the importance of acknowledging people's daily constraints for interventions to be helpful and meaningful. By helping villagers to better access water, energy, health care, transport infrastructure, education and financial income, interventions would contribute to enhance the capacities of marginalised inhabitants and therefore reduce their vulnerability when facing risks and longer-term changes linked to the climate.

The TISS-LADHC report (2010a) also considers that this visioning exercise also reflects the fact that Ladakhi people face a changing society. For instance, despite the increasing productivity of agriculture and the diversification of land-based products, imports of commodities including those that could be produced locally have also increased. This explains why the majority of villagers asked to be more consulted in order to focus on the diversification of key farm inputs (e.g. seeds, fertilizers, tools) and the development of skills related to the cultivation of cash-crops and marketing. In parallel, the report stresses that:

While the proportion of our young people enrolled at primary and middle school levels is well above 95%, the number of graduates and post graduates constitute less than 5%. And while unemployment among educated youth [...] is on the rise, the District needs thousands of skilled workers from outside during the summer season. Experts suggest that Ladakh is capable of producing everything. However, the above examples seem to suggest that we are not adequately producing what our own market demands and/or we are producing what our market does not want! Thus, we seem to have a case of 'misplaced priorities' reflecting on a planning process removed from ground realities as well as a lack of policy framework. (Ibid: 7)

This statement, alongside the MLP approach, reflects an important shift in the way development is being considered and addressed by the local government. Here, the necessity to involve local communities in the planning process as well as acknowledging their realities and needs is given priority. This concurs with community-based approaches that have been advocated by the

development, DRR or CCA sectors to foster meaningful initiatives which rely on inputs from the grassroots level and the participation of the primary beneficiaries. This also illustrates the fact that while DRR strategies and certain climate-related measures remain top-down, focused on physical processes and somewhat disconnected from communities' realities, such an approach to development matches lessons documented in the literature in terms of integration and appears appropriate in regard to the local context.

One of the outcomes of the MLP approach is to guide development interventions of sectoral agencies and centrally sponsored schemes in the district such as the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) as mentioned in Chapter 7. This Act *“aims at enhancing the livelihood security of people in rural areas by guaranteeing hundred days of wage-employment in a financial year to a rural household whose adult members volunteer to do unskilled manual work”* (Gol, 2005). The TISS-LADHC report (2010a) states that almost all households in Ladakh entitled to employment under the MGNREGA have asked to benefit from this scheme, because it provides them with opportunities to generate income where they live, and because the scheme also allows villagers to identify what work should be done in priority for the development of their own village. Out of eight categories of permissible work under the MGNREGA, the majority of villages have identified the development of agricultural infrastructure and rural connectivity as the most important categories (Ibid). In Phuktse, people prioritised the renovation of water channels and the construction of new roads. The improvement of road infrastructure was also considered a priority in Saboo, along with improvement of irrigation and the construction of a new artificial glacier. The scheme thus allows villagers to engage with work at the community level and tackle some of the issues that they have themselves identified. This illustrates some of the positive outcomes advocated by community-based approaches which have the potential to address the root causes of development problems including factors that exacerbate people's vulnerability to hazards or longer-term environmental changes.

Additionally, the MLP process initiated a participatory analysis of institutions in Leh District to help authorities and NGOs draw a broader picture of village development scenarios (Ibid: 37). Institutional analysis was conducted based on Venn diagrams and revealed that institutions 'internal' to the village, particularly the Goba members, schools, *Gompas* and *Masjid* (Monasteries and Mosque), the Women Association and the *Churpon* (the traditional water management system) were ranked higher by villagers than external institutions. Among the latter, Medical Aid Centres and some governmental departments and programmes were also ranked higher than NGOs. Based on this analysis, the report which informs the development strategy of Leh District acknowledges the *“pivotal role for village community and its institutions in planning and implementation of the*

programme” (Ibid: 37). By recognising the role of existing and traditional institutions, the MLP approach adopted by the authorities enables them to design development strategies that build upon the participation and capacities of local communities. In contrast, the District Disaster Management Plan for Leh is characterised by a top-down, technocratic, hazard-focussed and post-event approach to disaster. By drawing more on the development sector and the positive outcomes of the MLP, local authorities could use this expertise and experience to design more relevant DRR and climate-related strategies. At the same time, the example of the MLP will serve as the basis to highlight potential limits of development projects conducted by both the government and the NGO sector and to draw recommendations to inform interventions at the local level.

8.3 Limits identified and recommendations to inform NGO and authorities interventions

The literature review has shown that a limited but growing number of theoretical studies explore the reasons that potentially explain the lack of integration between the DRR, CCA and development sectors (e.g. O’Brien et al., 2006; Schipper and Pelling, 2006; O’Brien et al., 2008; Schipper, 2009; Romieu et al., 2010). The next section draws from my own findings to identify the limits that could prevent an effective synergy between similar objectives in practice, despite lessons already learned in theory. In other words, what are the factors that could limit the effectiveness and relevance of climate or DRR-related strategies as well as development projects in Ladakh and what recommendations stem from these?

8.3.1 The lack of cooperation between the NGO sector and local authorities: drawing on similar objectives and linking expertise

One of the primary constraints for the scaling up of most projects highlighted by interviews was the apparent lack of dialogue between the NGO sector and the authorities. On one hand, many NGO representatives complained that the LAHDC is not building upon their expertise and projects. One representative of international organisation #2 expressed that:

NGOs have a good exposure but at the end of the project, it is the end of the story. There is no follow up from the government.

Another representative of international organisation #2 also highlighted issues of communication and differences in ways of working between NGOs and the authorities, and also between NGOs themselves:

Communication is a very big problem because we are people who come from the city or the West and we are used to doing things really fast but the Ladakhis take it more relaxed and they have their own pace of doing things, which obviously there is nothing wrong with, but that can create a rift between us and them, you know. Also in terms of communication [...] there is quite a big gap because deadlines are not met and when you say something they will be like "Ok, ok", but actually they are not so convinced in their own minds.

On the other hand, the representative of national organisation #4, close to the LAHDC, explained that if the government does not follow up NGO projects, it is because NGOs do not involve them at any stage of their work.

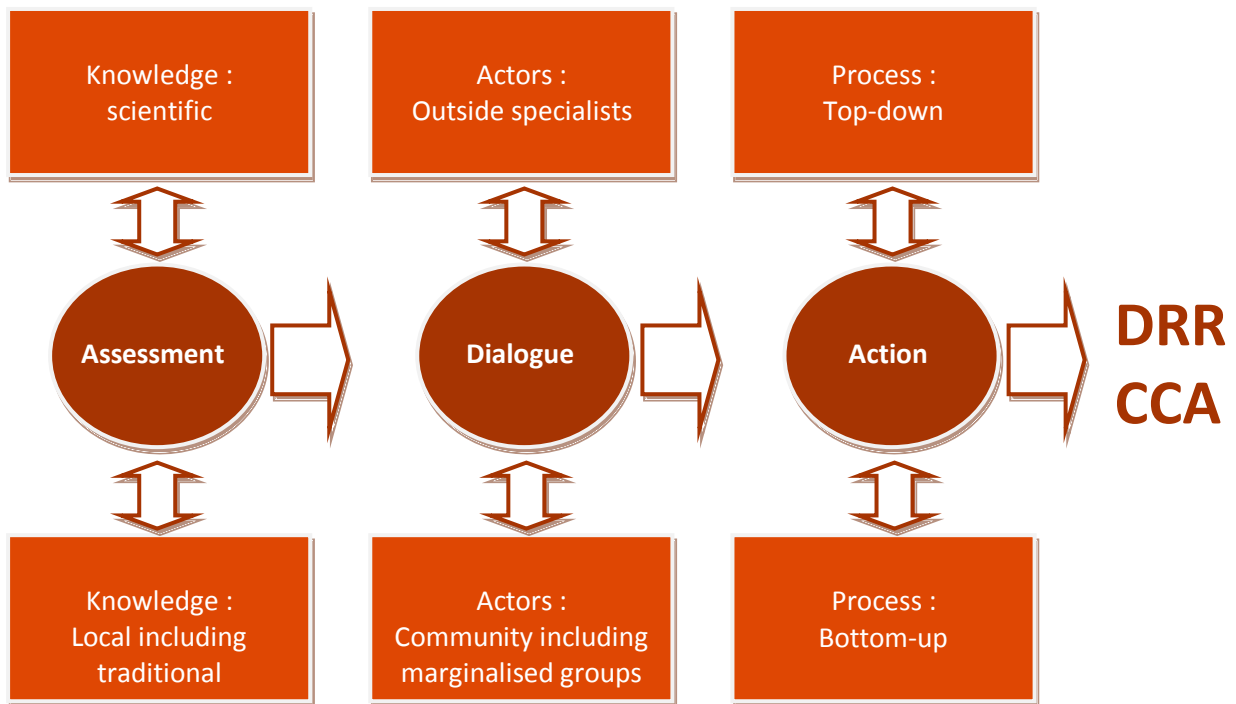
The NGO sector is doing well. But I realised that it really needs to work with the Hill Council. As of now, they are doing their individual programmes something like they are running their own shop. [...] The main drawback is that they are not open to the government. They are here to satisfy their own funding agency, to keep their funding agency happy, that's it.

This respondent also agreed with issues linked with communication and differences of working strategies:

At the end, what you are achieving, you need to work with the Hill Council so that you can disseminate your ideas through the government... And the government has a lot of money, money is not an issue; idea is an issue, technology is an issue and at the government side, people are a little reserved to work with civil society. Because the NGO sector is little different, they are more professional, they are more committed to the work. Here they are committed people but it is the system, you have to follow the system, somebody is sitting in Srinagar and somebody is sitting in Delhi, they decide you know. [...] And if having like one or two meetings with the government and then you think you can give a toolkit to the government, I don't think so. You really need to work very closely with them, show them ideas, show them areas, then you could achieve something.

These accounts illustrate the rift between the expertise and functioning of NGOs, both local and international, and the way the local government works and copes with the centralisation process of the political system. Yet, there is a real opportunity to integrate the knowledge and the experience of NGOs for implementing innovative projects such as the building of PSH, into the work of authorities who have begun to rely on community-based approaches. In doing so, approaches would combine both scientific expertise and local knowledge in an effort to foster the capacity building of the local government, the primary institution to represent the interests of the population. This echoes what is being already advocated in the disaster literature (e.g. Gaillard and Mercer, 2013; Wisner et al, 2012) and illustrated in Figure 8.1.

Figure 8.1. The integration of top-down and bottom-up processes (Wisner et al., 2012)



Factors potentially preventing the integration of NGOs' and authorities' efforts do not appear linked with funding sources as highlighted previously and confirmed by most NGOs, such as one representative of international organisation #2:

See the funding is there, the funding is not difficult to get. I think the EU is coming out with projects related to climate change adaptation in this next 4 years or so. So I really don't see funding being a problem.

However, this reflects more that access to funding is usually a prerequisite among other drivers leading NGO projects. Another representative from international organisation #2 explained:

Before, our first projects were focussing on income generation, and then on winter livelihoods and now on climate change adaptation. Nowadays, lots of funding is available for climate change so there is a lot of potential for building some projects.

This suggests sources of funding might still drive NGOs to focus on a particular sector such as climate change and invest a lot of money in it for a certain period of time. However, without collaboration with the government, previous accounts suggest that there is a risk the NGO will supplant the work and the responsibility of local authorities which undermines local governance. Yet, the institutional analyses conducted in the TISS-LADHC project have shown that communities primarily trust and/or

relate to their local political institutions in preference to NGOs, even local ones (TISS-LADHC, 2010a). This is further illustrated by the account of Gyatso (M, 52, Phuktse, Amchi):

There are 2 working bodies: the government and the NGOs. NGOs are not eternal. NGOs are here for some years and after that they will go. For the government, it is their duty so you can rely on government projects. For instance, we have this SEWA school; it is done by a group of well wishers, who collect the funds from foreign countries and fund here. And they proposed to upgrade the school until 10th grade. But if they do it that way, then all the children will leave the government school and go in the SEWA school because they give good uniforms and meals, so the government school might close but this SEWA school may also close in the future because the NGO is not eternal, it is a short term project. So we strongly opposed and we said they can continue until 5th grade but after 5th students have to come back to the government school.

Given the synergies between the objectives of NGOs' and authorities' interventions, one could question whether NGOs should actually and systematically implement their projects through or at the very least in collaboration with the government rather than intervene independently. Such a recommendation supports Winchester (2000), who argues that NGOs in India should work in partnership with the government to achieve lasting socio-economic changes to benefit the poorest. Laubin et al. (2011) have also stressed the necessity for climate-related projects to involve local institutions in both vulnerability assessments and the implementation of strategies. Otherwise, there is a risk of undermining efforts from the local authorities and maintaining the fragmentation between different approaches and practices.

8.3.2 The tendency to maintain top-down approaches: combining outside expertise with local knowledge

Despite the positive approach linked to the MLP implemented by the government and TISS, the last chapter and previous sections have underlined the tendency of interventions to remain top-down; particularly projects that aim to specifically tackle disaster risk or climate change. This is further emphasised by one representative of organisation #2:

[VLM]: Is climate change a big issue in Ladakh on which NGOs should focus?
[International organisation #2]: *This is not a key topic in Ladakh but it is for us.*

Several accounts from NGO practitioners underlined a way of designing and implementing projects that are driven by the organisation's objectives rather than the demand from communities such as the senior representative of local organisation #11:

[Local organisation #11]: *Villagers are the key, you know, the main stakeholders. Unless they...we involve them, actually the demand comes from them you know.*

[KN]: When you go to villages and you question them for what their needs are, what are the most common issues that they raise and see as problems?

Normally, since we have specific projects, you know, we don't talk about general issues and problems, you know. Mainly we talk about projects we have, you know, there may be some issues, problems, demands etc. that we try to address but ...no, no

This account suggests that although organisations acknowledge the role of communities and the necessity to involve them in their projects, interventions are not necessarily demand-driven or designed according to needs assessments (this has to be balanced with the rehabilitation process in 2010 which appeared based on needs assessments). Another representative of international organisation #2 illustrates this ambivalent approach whereby organisations emphasise that they are working in collaboration with local communities for the implementation phase but not necessarily at the beginning when designing their project:

The way we have conducted the PSH project, we don't just go and say 'Hey, accept this', we have kept in mind Ladakhi culture, we are doing everything in consultation with the local people. So we are not imposing something on them, we are saying 'hey, this is something new and what do you think?' Obviously we are getting feedback from them and every year there have been improvements and changes, [...] because we are doing it for the villagers, not for ourselves, so if they do not accept it that means the project has failed. So we have to keep in mind their preferences and improve our technology, so I think the villagers do have a very big role in the work that we do.

Using the example of artificial glaciers, the same interviewee explained:

It is a very good solution but the problem is the villagers are not accepting it so easily because there is very high maintenance involved, especially throughout the winter, which obviously the villagers are reluctant to do. Though also another thing is that they have also become ... pampered, they have become used to people coming and helping them and they expect that if we come and put a glacier up for them, then we are expected to maintain it also. I mean there is only so much we can do. I mean if we were to take up a large scale project like constructing artificial glaciers, a very big aspect of that would have to be awareness because as of now we only have perceived benefits of the artificial glacier but we need to convince the villagers based on successful case studies.

This account underlines first the dimension of 'convincing' beneficiaries of the benefits of NGOs' particular projects which reflects a top-down approach. Second, it raises the problem linked with 'creating' demand rather than addressing existing demands. By implementing projects with high visibility and media attention advertising the positive outcomes of top-down innovative strategies, NGOs contribute to foster ideas that did not necessarily come from villagers and might not relate to their priorities or those of the local government. However, this also questions the role of innovation;

innovative ideas such as the passive solar technology appears appropriate to the local context and needs, uses locally available materials, improves the livelihoods of marginalised households and fosters an approach to architecture that is environmentally friendly. Should such ideas be questioned or not implemented because they were not developed by villagers themselves? The interview with the representative of international organisation #2 further explored this question:

[VLM] Do you think villagers can have an input into their own adaptive strategies or will they be driven from an NGO background?

I am really not sure. I think they are doing things in a certain manner and they are not going to come up with something new on their own. I am not sure of this but it is how I perceive it, because also literacy is a problem, I don't think there would be so much innovation just from the villages. [...] It is very difficult to convince people because it is the same thing that happens with anything you try and introduce that is new. There will be a problem, a resistance to accept it. For example in the PSH project there are people who are reluctant and criticise it for whatever reasons, but there are also a lot of families that have appreciated the benefits and that is why they accept PSH or they come up on their own and say 'We want a PSH' and that will happen with artificial glaciers eventually but it is a slow process. You are battling a mindset, they are used to living their lives in the same way for the last century or so and suddenly someone comes in and says 'Hey, there is a new way of doing things!', it is going to take time.

On the one hand, this emphasises again the idea of 'convincing' which tends to go against a development that would be based on local communities' own terms. It also devalues the views of villagers because they are illiterate and therefore allegedly ignorant of innovative solutions. Overall, this appears inappropriate with community-based approaches that recognise the capacities and knowledge of communities and aim to draw from these to come up with strategies combining both scientific expertise and local insights. On the other hand, one can consider that given the constantly changing context of Ladakh and the world in general, the role of NGOs is to accompany local communities to adapt by bringing and offering their expertise to foster innovation. As highlighted by the representative of national organisation #4, the objective is not for Ladakhi people to maintain an ancestral way of life disconnected from the rest of their country:

People say that Ladakh has to remain isolated, Ladakh has to preserve the culture, wear that clothes, eat same food like tsampa and whatever, but that doesn't work you know. You can't keep a small community away from the world, and then you become something like a zoo. You can't do it. You need to go along with the world.

However, this process of 'accompanying' communities has to occur 'upstream' when designing projects and when prioritising areas of interventions based on villagers' views and needs. This approach is already followed by the MLP strategy of the local government and by several organisations. The senior representative of local organisation #9 for instance, explained:

We like to give people ownership of the projects therefore, if we take the case of micro-hydropower, we work in collaboration with the locals and they have to contribute 25 – 30% of the cost. We help them form a committee and then we have a proper handover ceremony. After that the locals are responsible for running the unit. They have an operator and they collect monthly taxes which are saved in case of need for repair, then they contact us and pay for us to come out and fix it. They can run it during the day for their needs and income generating activities such as flour grinding or sawing. We focus on local resources and needs and try and help with the value addition. Our programming is very location specific. We do an in depth needs assessment on the villages we work in, looking at their potentials and constraints.

This example also emphasises the dimension of economic contribution required from local communities. The majority of projects ask people to contribute financially or physically to the projects to ensure their feasibility and local ownership. This also results from the uncertainty of NGOs' continued presence in the region such as highlighted by the representative of international organisation #2:

The contribution we gave in the early years was a lot but it is decreasing and now it is going to be completely off, no contribution. We have to move out and convince them of the technology, we have to say that 'we are not going to give you money but we are going to provide you with a lot of other things to make it easier to construct the PSH.

Hence, artificial glaciers require people to maintain them in winter; PSH require households to provide the insulation or mud bricks for building walls; the organisation of Self Help Groups asks women to pay a membership fee and bring the raw materials; and communities also pay part of the cost of hydro-power units. Such involvement of local beneficiaries requires their participation in the planning of the project in order to ensure sustainability. If communities have not been consulted and have not contributed to the design of projects in the first place, or if strategies do not address people's priorities and everyday constraints, people may indeed be reluctant to contribute financially or physically to the effort. In this case, innovative ideas and NGOs initiatives are likely to remain meaningless and/or short-term solutions.

This only emphasises what has been already advanced in countless studies before on the necessity to address local needs based on vulnerability and capacity assessments (e.g. Twigg and Bhatt, 1998; Chambers, 2007). Methods exist, not only in academia, but in the NGO sector as well, and there is now an extensive number of studies that have documented successful examples. The recommendation here, to foster approaches integrating a bottom-up dimension and relying on needs, vulnerability and capacity assessments, only repeats what has been stressed before in the development and DRR sectors (e.g. Copans, 1975; Wisner et al., 1991; Chambers, 1995). To explain

the disjuncture between the theory and practice, Laubin et al. (2011) conducted an analytical survey among the French NGO sector. Their report highlights that (i) on average, three quarters of NGO representatives consider that the complexity of vulnerability and capacity assessments challenge the design and implementation of adaptation strategies, (ii) more than half of NGO practitioners wish to receive appropriate training on vulnerability assessments and (iii) only a small minority have already used existing methods of conducting assessments. This raises the challenge linked with the appropriation of existing methods and toolkits by NGOs practitioners. Laubin et al. (2011) also warn that there is a risk with methods that rely on community-based approaches for adaptation that climate change becomes a scapegoat for environmental problems faced by communities, whereas other factors such as inappropriate natural resources management should equally be recognised³.

On the contrary, this research has shown that by exploring and integrating the views of local communities in the assessment of their everyday risks, climate change or natural hazards become considered more as an indicator of deeper and more concerning challenges for development and the improvement of people's well-being.

8.3.3 The issue of development projects that remain short-term driven: ensuring sustainability for relevant and long-term solutions

Early recommendations from previous studies to foster appropriate adaptation strategies (e.g. O'Brien et al., 2008; O'Brien et al., 2008a; Laubin, 2011) concur with the DRR community on the need to integrate efforts within development. This research agrees that this appears as a *sine qua non* condition to ensure the relevance of projects, but I argue that 'sustainability' is also a prerequisite. In the case of Ladakh, the MLP approach stresses the "*need to bridge existing gaps between people's need and development responses*" (TISS-LADHC, 2010a). However, despite the positive outcomes of the development approach followed by local authorities, a few shortcomings may undermine the sustainability of any long-term solutions to tackle environmental shocks and trends.

Firstly, the development of income-generating activities for women contributes to improve their livelihoods but it relies on the marketing and selling of local handicraft among tourists. It means the success of Self Help Groups and their durability is highly dependent on the demand from tourism. Yet, this research has highlighted that local communities were worried about the sustainability of

³ « Ces outils, qui reposent souvent sur une approche communautaire, prennent le risque de faire du changement climatique le bouc émissaire de toutes les difficultés d'un territoire. Pourtant, les problèmes environnementaux locaux sont aussi souvent le fait d'une mauvaise gestion des ressources naturelles » (Laubin et al., 2011: 28)

tourism. The last disaster in 2010 showed everybody how tourist arrivals can abruptly end and leave the growing number of people who rely on tourism-based activities without any means of generating incomes for several months. Therefore, encouraging women to create products to eventually sell them is a strategy that gambles on the lasting development of tourism in Ladakh, despite the limits of this prospect highlighted in Chapter 4. Moreover, encouraging the marketing and selling of local handicraft and food products that were traditionally used for self-subsistence coincides with the economic development path that Ladakh now follows. There is a risk however, that this generates increasing production of raw materials, for instance cash-crops such as wool, whereas the analysis of communities' vulnerabilities and capacities showed that many households are suffering from a decrease of their physical resources including their livestock. This echoes the dilemma linked with innovative ideas that create new and/or higher demand to keep up with the current dominant development model, whereas one could question whether this is the path societies should follow.

Secondly, the TISS-LADHC report advocates, for instance, the conversion of more land under cultivation, the introduction of cash-crops, the increase of production per hectare and the improvement of agricultural productivity. This is supposed to help rural villagers to strengthen their livelihoods and diversify their income. It also addresses one of the priorities identified by people in their ranking through the MLP whereby economic development should be based on agriculture and also that more barren land should be brought under cultivation (See Table 8.1). However, this does not take into consideration the resulting pressures on natural resources such as water, which is already scarce in many villages. Neither does this consider current and predicted changes in temperatures that make the water fluctuate and therefore prevent it from sustaining growing agricultural production. This is an example where the implementation of certain development projects might enhance people's economic resources in the short term but reduce their natural resources in the long run and therefore exacerbate their vulnerability. One could advance that this is why CCA is required as a different sector so that strategies take climate variability into consideration. I argue that development projects should focus on sustainability first as people's access to water is already undermined by higher demand resulting from economic activities. As for the global debate on climate change, this is not about 'only' reducing GHG emissions so that it may prevent temperatures from rising by more than a couple of degrees and may allow society to carry on as usual; this is about addressing current development practices that already create inequalities and disasters regardless of climate change. The conversion of more land as desired by local people also illustrates that NGOs and/or scientific expertise have a concrete role to play. By considering wider structures that sometimes remained beyond the reach of local communities, NGOs or outside initiatives and inputs can widen the scope of solutions and integrate a holistic approach as long as it

involves the participation of the primary affected people and potential beneficiaries (Chambers, 2007; Le Masson et al., 2009).

Thirdly, the conversion of more land into agricultural fields means that people convert pieces of barren land that were traditionally left unused for different reasons including the risk of flooding. The white patches on the photograph in Figure 8.2 show some of the fields in Phuktse which were covered with mud and sediments during previous flashfloods.

Figure 7.0.2. View of some of the fields in Phuktse that have been covered by mud during previous flashfloods (Le Masson, 2011)



It also shows that these fields and houses are located directly in the path of a dried riverbed or 'corridor' draining storm water, and thus are highly prone to flashfloods. Various social and economic incentives coupled with uncontrolled land-use planning, especially when it does not rely on local knowledge to point out areas to avoid, can lead people to create fields or build their houses in hazard-prone places (Cannon, 2008). Such areas are numerous in Ladakh given the physical and environmental characteristics of the region, while social and economic processes highlighted in Chapters 4 and 5 lead an increasing number of people to migrate to, settle in and/or use flood-prone places to address their everyday priorities. For instance, participants of the first FGD in Leh indicated

that the loss of agricultural land was one of their primary challenges. Their discussion below illustrates their strategy to deal with this problem:

- [VLM] *What do you do when you need more agricultural land?*
- [Woman] *We take barren land on the hills.*
- [Old man] *Even all the barren is taken so it is very difficult.*
- [Interpreter] *Where do you take the barren land?*
- [Man] *The nearest place to your house, you can take it. There is always a barren land around your house or your land, and you can extend the boundary, that is how you take it.*

To tackle the propensity of fields and urbanised areas to be prone to floods, the TISS-LADHC report advocates their protection through flood-control measures which concurs with the hazard-centred approach of the District Disaster Management Plan. However, the literature review and empirical findings from Chapter 7 showed that such measures cannot always guarantee to protect people and infrastructure against damages. Besides, this does not appear a realistic strategy given the magnitude of certain flooding episodes (see Figure 8.3) which would require enormous infrastructure.

Figure 7. 3 North view of the main riverbed in Saboo. The top of the sediment layer on the top left corner indicates the height of the flooding episode seven months earlier (Le Masson, 2011)



The fact that hazards can occur in extremely remote areas also raises the cost that such constructions would generate. Finally, this approach reproduces the dominant response to disasters which does not address any of the social factors highlighted in this analysis and emphasises that lessons from the DRR literature have not been learned.

Fourthly, the improvement of road connectivity, considered as a key development issue by villagers alongside the mechanisation of farming practices, promoted by the MLP to reduce the drudgery of

fieldwork (TISS-LADHC, 2010a), generates an increase in power-generated equipment and vehicles. Yet, solutions advanced by interviewees to tackle climate change pointed out the necessity to limit the number of vehicles, even in Ladakh, in order to reduce the emissions of CO₂. This perspective was also stressed by the awareness campaign on climate change conducted in the district. Far from suggesting that Ladakhi farmers should not benefit from technological progress that could help them reduce their workload, this raises the dilemma between local communities' everyday priorities and the promotion of certain modern technologies and practices that are considered harmful for the environment and therefore unsustainable in the long run. This also emphasises once again the key notion of sustainability regarding adaptation strategies which may not be in accordance with objectives of GHG mitigation. This thesis stresses that the government and NGOs should keep implementing development projects that address the needs of local communities and which actually respond in a more relevant manner to environmental shocks and trends rather than specific DRR and CCA strategies. But they have to ensure a perspective of sustainability from the onset of interventions. Implementing development projects is meaningless if they follow the dominant economic growth-based development model that creates vulnerability in the first place. This overall resonates with the disaster literature that has long stressed the need to promote sustainable development and alleviate poverty in efforts to reduce vulnerability to disaster risks (e.g. Anderson and Woodrow, 1998; Lewis, 1999).

8.3.4 The risk of mainstreaming gender within unsustainable development: challenging dominant discourse and practice

As suggested in Chapter 7, promoting the empowerment of women by encouraging them to generate income replicates the idea that the improvement of one's social status is a reflection of one's ability to engage in productive activities. Local women welcome the opportunity to earn income but they also emphasised, as highlighted in Chapter 5, the need to value their reproductive roles and specific gender activities. The necessity for projects to focus on sustainability and acknowledge the value of other forms of 'development' echoes the words of Bella Abzug in Dankelman (2010: 15): "*Women do not want to be mainstreamed into a polluted stream: they want the stream to be clear and healthy*". Despite development projects that address gender differences in Ladakh, the analysis in Chapter 7 highlighted the lack of recognition from NGO practitioners of gender-specific vulnerabilities and capacities in the face of environmental shocks and trends. Laubin et al. (2011) argue that since development NGOs have long included the gender dimension in their interventions, they have theoretically a legitimate and primary role to recognise and address differences between men and women in the context of climate change through advocacy, awareness

and concrete actions at the grassroots level. Yet, their survey among the French NGO sector has revealed that only a third of practitioners considered reducing the vulnerability of the most marginalised groups as a key objective for CCA. Evidence from Ladakh echoes the literature and studies that have shown the lack of institutional recognition of linkages between gender and the environment. Külcür (2012) for instance found that UK-based environmental NGOs did not consider gender as a relevant theme to include in their approach and interventions.

In order to make women and gender issues more 'visible', Laubin et al. (2011) indicate that participatory approaches enable marginalised groups, such as women, to get involved in topics and projects in which their own actions will benefit their entire community. This is not a ground-breaking statement but it highlights that despite the recognition of the necessity to involve women and other politically, economically or socially marginalised groups and the existence of methods to do so, there is still a gap between the theory and practice. Recommendations already exist to foster the involvement of women within development, DRR and climate-related decisions and projects (e.g. Mitchell et al., 2007; Christensen et al., 2009; Dankelman, 2010). Yet, practices on the ground do not systematically recognise the importance of gender.

Laubin et al. (2011) also suggest that in order to enable the most marginalised voices to express themselves and be heard, projects should separate those groups. Based on this research process and findings, I agree that the initial separation of men and women is relevant to (i) enable interviewees and group participants to express their own views while reducing the risk of these views being overlooked or hidden due to domination and power structures and (ii) point out differences of opinion between men and women. However, evidence that justifies the integration of women within development and environmental decision-making already exists (Buckingham, 2010). I argue that unless and until differences are confronted by both women but especially men, the process of highlighting differences separately for the sake of confidentiality might not foster any recognition among both dominant and dominated groups that gender does matter. I do not deny that confidentiality is a requirement for the participation of secluded groups but I raise the limit of a separation process that does not necessarily challenge structures of domination mainly exerted by men. This echoes the distinction that Freire (1993) draws between the 'oppressed' and 'the oppressors' although he did not use these terms in relation to women and men. Nevertheless, according to Freire (1993: 65), social realities built by human beings can be transformed as long as oppressed and oppressors unveil processes of domination through dialogue and action:

Critical and liberating dialogue, which presupposes action, must be carried on with the oppressed at whatever the stage of their struggle for liberation. [...] Attempting to liberate the oppressed without their reflective participation in the act of liberation is to treat them as objects which must be saved from a burning building; it is to lead them into the populist pitfall and transform them into masses which can be manipulated.

For instance, when conducting FGD with villagers, women's and men's groups were first discussing the topic among themselves but they were eventually asked to confront their opinions, observe potential points of divergence and decide on a final ranking of their main everyday challenges as a mixed group. As explained in Chapter 6, this automatically generated a debate enabling both participants and the researcher to recognise differences of points of view between men and women. But beyond the importance of highlighting differences, it provided a platform for women and men to voice their particular views and defend them on an equal footing. Eventually, participants extracted points of convergence which they used to reach a consensus and draw a representative picture of their main everyday challenges. Therefore, this process did not just separate men and women to guarantee their equal participation but voluntarily put them together on the same platform to reach decisions that are mutually constructed despite differences. To apply Freire's (1993: 66) words in regard to gender: "[I]t is necessary to trust in the oppressed and in their ability to reason. Whoever lacks this trust will fail to initiate (or will abandon) dialogue, reflection, and communication, and will fall into using slogans, communiques, monologues, and instructions". I argue that bringing together men and women in DRR and CCA decisions is a prerequisite to foster more gender recognition at the community level that could eventually challenge the male-dominant discourse at the political level in the context of development and environmental change.

8.4 Conclusion

This chapter has drawn on the analysis of the views of local communities and NGO representatives in order to examine the relevance of governmental programmes and NGO projects supposed to address climate-related environmental issues and natural hazards. It revealed that the main outcomes of climate-related projects such as the building of PSH and artificial glaciers are less the attenuation of CO₂ emissions or the adaptation to climate change and more the enhancement of beneficiaries' livelihoods. Whereas interviewees did not point out these strategies to tackle climate change, they did raise the necessity to conduct awareness campaigns, which have been organised by NGOs, and praised the majority of development projects. Since the latter contribute to enhancing people's livelihoods and therefore reducing their vulnerability and addressing their everyday challenges, they could be valued as DRR or CCA strategies even though the majority of them are not advertised as

such. This is especially true as causes of marginalisation and vulnerability are inherently linked with development issues and remain the same in the context of both climate change and disaster risk. This thesis argues that the NGO sector should focus on development projects that improve people's livelihood access in order to better address DRR, climate change and gender. Particularly when analysing DRR approaches and interventions from the government at every level, these remain, for now, disconnected from the ground and the social and gender dimensions of vulnerability. By contrast, the analysis of the recent MLP approach developed by the local government showed a willingness to follow a community-based approach towards development planning that values the participation of local communities and recognises their capacities. This thesis argues that interventions should remain centred on development projects because they appear more relevant to the local context, they address better the views of local communities as well as their vulnerabilities and capacities, they concur with priorities highlighted by NGO practitioners and they overall contribute to address the wider structures that create risks and environmental challenges in the first place.

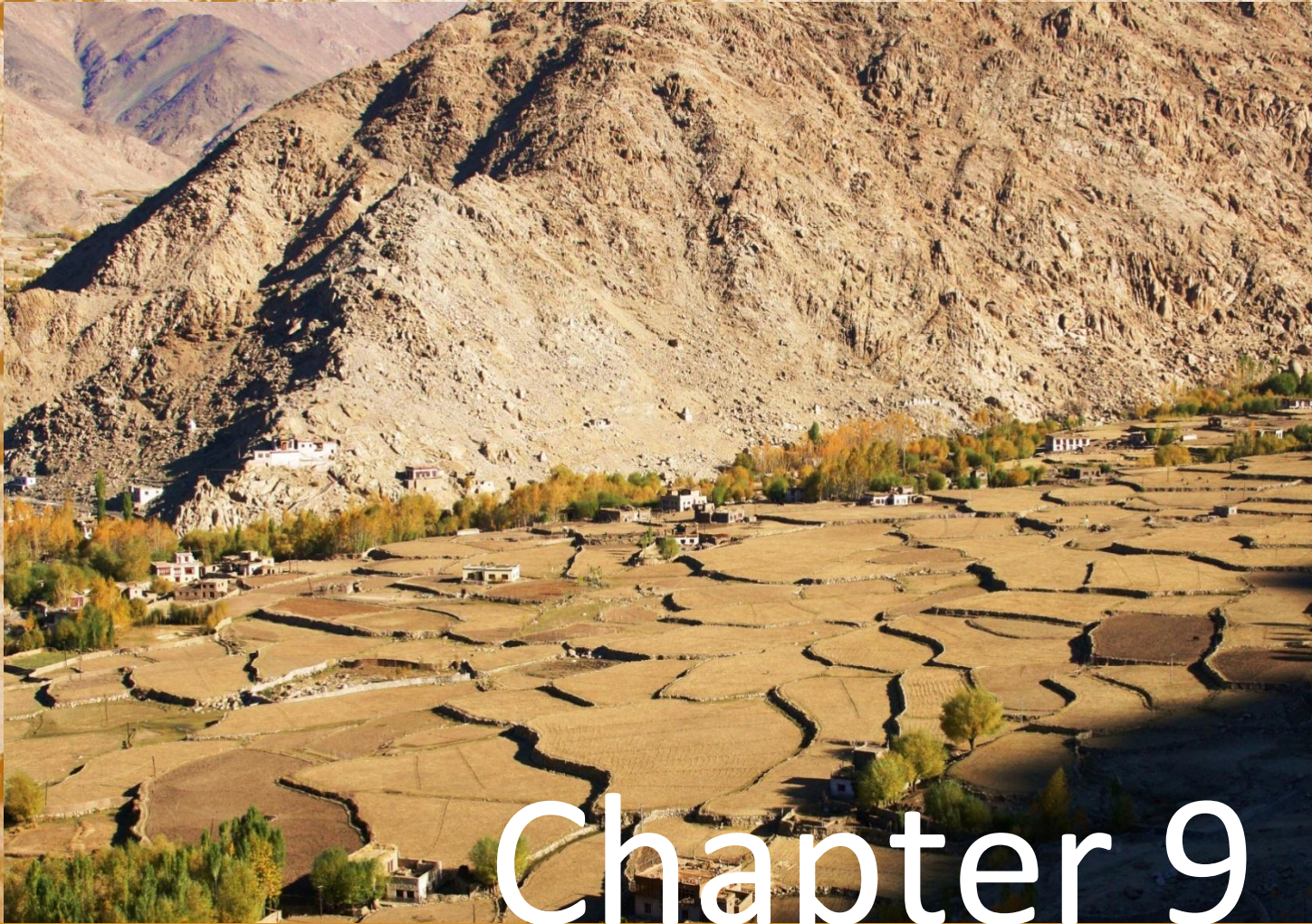
The discussion then explored the limits that could potentially constrain an integrated and holistic approach towards achieving sustainable development when addressing global environmental shocks and trends at the ground level. From these limits, several recommendations were advanced:

1. Findings highlighted a lack of cooperation between the NGO sector and local authorities in Ladakh, with the risk of NGOs supplanting the work and the responsibility of local authorities, thereby undermining local governance. Yet there is a real opportunity to integrate the knowledge and experience of NGOs for implementing innovative ideas into the work of authorities who have begun to rely on community-based approaches. In doing so, approaches would combine both scientific expertise and local knowledge in an effort to foster the capacity building of the local government, the primary institution to represent the interests of the population. This echoes what is being already advocated in the disaster literature (e.g. Gaillard and Mercer, 2011; Wisner et al, 2012).
2. The analysis has underlined the tendency of NGOs' interventions to remain top-down, particularly projects that aim to specifically tackle disaster risk or climate change. Yet, if communities have not participated in the design of projects in the first place or if strategies do not address people's priorities and everyday constraints, innovative ideas and NGOs' efforts will remain meaningless and/or short-term solutions. The recommendation here, i.e. to foster approaches integrating a bottom-up dimension and relying on local needs, vulnerability and

capacity assessments, only repeats what has been already long stressed before in the development and DRR sectors (e.g. Wisner et al., 1991; Chambers, 1995).

3. Findings concurred with previous studies on the necessity to integrate strategies within existing development efforts in order to ensure the relevance and effectiveness of projects to local needs and to reduce vulnerability to risk. However, development efforts are not the panacea if they do not integrate 'sustainability' as a prerequisite. Shortcomings highlighted in the discussion emphasise the importance of adopting a holistic approach in order to tackle efficiently environmental shocks and trends.

4. The gender perspective adopted throughout this research has further stressed the necessity to ensure sustainability and also highlighted the disjuncture between the recognition of gender in theory and what is being done in practice. The discussion has, for instance, argued that development interventions, such as the creation of SHG, do improve women's economic resources and might participate towards their emancipation, but they also subject women to be valued for the money they are making rather than for their everyday workload and responsibilities. The methodology used for this research finally suggests that while the process of separating men and women enables needs and vulnerability/capacity assessments to highlight gender differences, these might not be recognised and acted upon. However, creating a space where both women and men are confronted with these differences and points of convergence to reach consensual decisions might be the first step to foster the recognition among both dominant and dominated groups that gender does matter and to challenge structures of domination mainly exerted by men.



Chapter 9

9

CONCLUSION

This thesis sought to assess the relevance of disaster and climate-related interventions in relation to local communities' contexts, priorities and needs through using a gender perspective. It has presented empirical evidence from Ladakh that the causes leading to the vulnerability of local communities to natural hazards remain the same in the context of climate change and are inherently linked to unsustainable development. Drawing on the integration of approaches to tackle risk highlighted in the literature review, this thesis argues that emphasis should be placed on development practices that improve people's access to livelihoods, with a perspective of sustainability, in order to better address disaster risk, climate change as well as everyday risks faced by local communities. The gender sensitive methodology and perspective used throughout the research highlights the importance of social determinants of vulnerability and focuses attention away from the hazard. Attention to gender and vulnerability also emphasise the necessity for practices to focus on the root causes of unsustainable development and to challenge the status quo, rather than mainstreaming DRR and CCA into development models that are male-dominated and which promote people's (and disproportionately women's) vulnerability. In this concluding chapter, I first summarise the main research findings and recommendations to inform DRR and CCA interventions. I then reflect on the research process and the implications for further research.

9.1 Findings and contributions to knowledge

Chapters 4, 5 and 6 combine to draw a holistic analysis of the way Ladakhi communities experience and perceive climate change and natural hazards in relation to their everyday risks (Objective I). To do so, I relied on DRR frameworks and used a gender perspective in order to conduct a vulnerability and capacity assessment of local communities in the context of environmental shocks and trends. This addresses recommendations from development, DRR and CCA studies that have repeatedly stressed the necessity to analyse the societal dimension producing risk in the context of both natural hazard-related disasters and climate change. This also served as a basis to compare current policies and practices in regard to DRR and CCA in Ladakh (Objective II) and evaluate the relevance of development, climate-related and DRR interventions to local communities' realities (Objective III).

9.1.1 Empirical findings: climate change as just one challenge among others faced by mountainous communities in the South

The empirical evidence from Ladakh highlights that root causes leading natural hazards and the impacts of climate change to become disasters are intrinsically linked with the unsustainable development of societies. Through the gender-focussed review of Ladakhi people's geographical, economic, social and political marginalisation, the analysis pointed out how certain groups' access to or lack of resources influences their vulnerabilities and capacities in times of both crisis and incremental changes. Among factors contributing to people's disproportionate marginalisation, the assessment showed that gender and geographical location play significant roles in shaping greater vulnerability for women and people living in remote areas, because they have lesser means to diversify sufficient and secure incomes. The general discourse of both male and female interviewees highlighted differences in gender roles but considered there to be an equality of status between both sexes. Yet findings from the field suggest that women faced a heavier workloads, had a lower literacy rate, had fewer opportunities to access formal employment and earn secure income and were not involved in decision-making processes at the community level to the same extent as men. Finally, there were no female political representatives within the local government, or at the state level. These, combined with women's specific roles and status, contribute to exacerbate their vulnerability faced with difficult situations. Whether they have to cope with alcoholism of one of their family members, the occurrence of flash-floods or the scarcity of water resulting from over consumption or from climate change, Ladakhi women face overall a greater marginalisation than men, shaped by the same wider structures. The absence of women as local elected political representatives also means that half of the population might not have their needs and opinions acknowledged, heard or taken into consideration when designing policies and projects regarding DRR and CCA.

The strong social capacities characterising local communities, however, through extended social networks of relatives, groups of neighbours and traditional agrarian activities that rely on solidarity between villagers, all contribute to reinforce the resources of the majority of Ladakhis and counterbalance their geographical, economic and social marginalisation. This contributes to enhance their capacities in times of crises as illustrated by the preponderant role of local communities in the aftermath of the 2010 flood, who rescued affected families and helped them recover. Faith also plays an influential role in strengthening the capacities of individuals, because it helps them cope better with difficulties. Faith also shapes the way Ladakhi people perceived their environment and the causes leading to natural hazards and climate change. The latter was not spontaneously raised by interviewees as a major problem. In fact, approximately a third of them, mostly women, did not

know or understand what the concept meant or had only vaguely heard about it. A minority of respondents, again mostly women, actually perceived the global warming of temperatures as a positive phenomenon that would help them receive more melt water and earlier in the year, which would make their daily activities easier. In contrast, a third of respondents, mostly young to middle-aged and formally educated men understood the concept of climate change and what the impacts could mean for their daily lives. This analysis has thus shown how the combination of social factors, including gender, education and geographical location, creates differences between and within mountain communities and influences people's experience of climate change whereby women seemed less aware and less informed about the concept, but more concerned about potential consequences in terms of access to natural resources.

Despite these differences, the majority of people indicated that they had observed environmental changes that worried them but they pointed out other drivers such as pollution and increasing pressures on natural resources rather than just climate change. They also emphasised how they consider climate change and the occurrence of the floods in 2010 as interconnected. To explain the causes of climate related-changes and hazards, a third of respondents believed that these are divine punishments resulting from humans' bad actions and that relying on their faith and religion to guide their action is the only way to prevent these from happening. In contrast, another third of interviewees, mostly men, advanced solutions linked with the general scientific discourse surrounding climate change, pointing out the necessity to reduce CO₂ emissions and raise awareness among people. However, the final third of interviewees, in addition to most FGD participants, viewed climate change as one problem interconnected with many others. Increasing competition between people along with the loosening of spirituality and solidarity within society is thought to generate a lack of care for the environment which eventually results in the occurrence of natural hazards and climate change. Based on this view, people advanced solutions both on spiritual and scientific grounds. While they considered that industrialised regions elsewhere in India and in the world should be the ones reducing their CO₂ emissions, they also stressed the necessity for societies worldwide to realise the harmful impacts that human activities, selfish behaviours and non-spiritual ways of living have on the environment.

9.1.2 The relevance of using DRR frameworks and a gender perspective in the context of climate change

This assessment has been conducted with a holistic approach that acknowledges the role of gender along with wider structures which shape the development of societies, and the uncertainties of

climate change. Linkages between both DRR and CCA sectors were thus created at the onset of this research by using an angle of approach that builds on the concepts of vulnerability and capacities (used in both sectors) rather than approaching the topic from a hazard angle. In other words, the analysis of people's vulnerability and capacities in the face of natural hazards is also relevant in the context of climate change because focusing on the nature of the threat will not explain why certain groups are more likely to suffer from current or future shortages of water, floods and other natural hazards. What the analysis has shown is that structures shaping the ability or inability of people to protect themselves from, face and/or recover quickly from current or expected impacts of natural hazards and long-term environmental changes, highlight the same root causes shaping the marginalisation of local communities regardless of the hazard. Those who do not have the means to access and secure sufficient resources and those who suffer from social discrimination are the most vulnerable to the occurrence of decennial floods or recurrent and/or predicted water shortages. Likewise, the strong solidarity between and within Ladakhi communities enables people to better cope in times of shocks, whether they face challenges linked to alcoholism or the 2010 floods. In short, focusing on a vulnerability approach and relying on DRR frameworks developed since the 1990s, is relevant for any type of hazards including climate change, even though studies have pointed out that differences related to the nature of the threat could prevent the integration of DRR and CCA sectors.

Overall, this research has relied on data drawn from discussions with local people as part of an approach that values local knowledge and perspectives. By exploring and integrating the views of local communities in the assessment of their everyday risks, this research has pointed out that climate change or natural hazards were considered more as indicators of deeper and more concerning challenges for the development and the improvement of people's well-being. The case of Ladakh brings empirical evidence that climate change will only exacerbate existing problems linked to unsustainable development that impact the most marginalised and vulnerable populations the hardest, including women. The gender perspective used in this thesis contributes to emphasise the fact that regardless of the threat, the root causes remain similar and should be the focus of attention of governments and organisations. In other words, looking at gender enables us to go beyond the lack of integration of both DRR and CCA in practice to emphasise that development challenges, such as gender inequalities, remain problematic regardless of the occurrence of natural hazards or the warming of the climate. To recognise the importance of gender is part of the process of reducing the vulnerability of the most marginalised groups and therefore achieving sustainable development.

In parallel, using the vulnerability approach to disaster and relying on DRR frameworks enabled the holistic dimension emphasised in the analysis whereby climate change has been addressed as just one driver of change among others. Local respondents underscored that the root cause of their primary challenges are linked to the loosening of spiritual values, the decreasing solidarity between community members, and a current development path that does not respect the environment and the interconnection between all living beings. In light of a political ecology perspective, the analysis pointed out that root causes of development problems appear similar to those that reinforce the vulnerability of certain groups to disasters or to the harmful effects of climate change. It thus provided an alternative way of framing the global issue of climate change or disasters based on ethical and spiritual perceptions rather than on the dominant technical and scientific understanding and predictions of environmental impacts (Blaikie, 1995).

9.1.3 Disasters, adverse impacts of climate change and unsustainable development: similar drivers but non-integrated responses

Policy makers and NGO practitioners at the international level have recently recognised linkages between DRR and CCA and called for interventions to address adaptation and vulnerability reduction simultaneously. In India, the national policy to address climate change aims to integrate climate-related efforts with long-term development, while DRR policies have shifted in theory from a relief-centred approach to a more pro-active, holistic strategy to mainstream DRR within development planning. Yet, evidence from Ladakh suggests that there is no effective synergy between climate-related or DRR efforts to reduce vulnerability, neither in the formulation of integrated policies nor in the implementation of projects to effectively address environmental risks and changes. The analysis in Chapter 7 showed that policies remain dominated by a top-down and technocratic approach to tackle risks with little scope for inputs from the community level to challenge the dominant economic system which contributes to producing their vulnerability. Governmental interventions aim at dealing with hazards, the vulnerability of infrastructures or the lack of awareness of exposed populations and thus overlook differences between and within communities, including gender aspects that build the social dimension of disasters and climate change.

This has to be counterbalanced with the work of the NGO sector and local authorities in Ladakh who tend to draw more on local coping mechanisms as highlighted by relief activities after the floods in 2010. A few rehabilitation projects have also been implemented with attention to DRR. However, while most NGO representatives were aware of and highlighted societal processes that shape local communities' vulnerability to hazards, the majority of them still identified disaster risk preparedness

strategies that do not build upon the root causes of the damages and considered that DRR measures should focus on people's lack of awareness. In parallel, climate-related projects could be questioned for the relevance of (i) developing mitigation efforts at a small scale while multinational companies continue to make profit from the carbon market that supports these projects and continue to emit CO₂, (ii) making people aware of environmental shifts that they have contributed little to and (iii) encouraging communities to adapt to a changing society based on terms that most are not happy with.

However, the discussion has shown that the main outcomes of climate-related projects such as the building of PSH and artificial glaciers were less the attenuation of CO₂ emissions or the adaptation to climate change and more the enhancement of beneficiaries' livelihoods. These, along with other current development projects, implemented by the local government and NGOs, contribute to enhance people's access to resources and therefore reduce their vulnerability to hazards, environmental change and everyday challenges. Such projects could thus be valued as DRR or CCA strategies because they address causes of marginalisation and vulnerability that are inherently linked with development issues and remain the same in the context of both climate change and disaster risk. In contrast, to build recommendations advocating a better integration between DRR and CCA is meaningless if both sectors remain hazards-centered in practice and ignore the root causes of unsustainable development. Empirical findings from Ladakh thus challenge the theoretical argument of authors such as Kelman and Gaillard (2008; 2010) who advocate CCA to draw from DRR in order to better reduce vulnerability. This research has demonstrated that to rely on DRR frameworks is relevant to highlight factors creating risks and areas to focus on in order to tackle people's vulnerability and enhance their capacities. However, empirical findings from Ladakh have also shown that in practice, authorities and NGOs have not yet followed the theoretical shift from the dominant and hazard-centered approach to the vulnerability paradigm of disasters. This contributes to preventing interventions from tackling effectively the social construction of disasters and adverse impacts of climate change. This thesis thus nuances studies that advocate the systematic use of CBDRR to better foster sustainable development practice and/or CCA (e.g. Delica-Willison and Gaillard, 2012). Far from suggesting that CBDRR is not useful and relevant to fostering innovative ways of addressing people's vulnerabilities and integrating gender issues, this thesis emphasises the gap between theories and practices and warns against the trend to generalise from what works in particular contexts, assuming this could work elsewhere. Numerous examples from South Asia and India do illustrate the relevance and success of CBDRR to deal with hazards (e.g. Mehta, 2009; Gol-UNDP, 2009). The case of Ladakh however, shows that it is actually the community-based approach to development that local authorities currently follow that might encourage them to draw on best

development practices in order to better address DRR and mainstream CCA. The recent MLP approach developed by the local government showed their willingness to follow a community-based approach towards development planning that focuses on improving people's livelihoods, values the participation of local communities and recognises their capacities. Therefore, interventions to tackle risk would more usefully draw from development practices because they appear more relevant to the local context; they address better the views of local communities as well as their vulnerabilities and capacities; they concur with priorities highlighted by NGO practitioners and they overall contribute to addressing societal factors that create risks and environmental challenges. However, development approaches must also take into account sustainability.

Finally, although international institutions have recognised the importance of mainstreaming gender within development, DRR and climate change efforts, the empirical evidence from Ladakh has emphasised the gap between policies and actual practices. Whereas DRR and climate-related interventions in Ladakh did not address gender, as they remained hazard-centred, development projects were giving greater attention to disparities between men's and women's access to resources. This supports the call to strengthen the current development sector in Ladakh that contributes, for instance, to reducing women's economic marginalisation, rather than advocating the implementation of new DRR and CCA sectors that might still ignore the vulnerability dimension of disasters and climate change. However, the gender perspective adopted throughout this research has further stressed the necessity to ensure sustainability and to challenge domination processes. To encourage and give women the opportunity to generate income might foster their emancipation but it reproduces a mindset already criticised, by more than three decades of literature on gender and development, for valuing individuals through their productive efforts rather than for their everyday workload and responsibilities (e.g. Harcourt, 1994).

9.1.4 Limits and recommendations to better address DRR and CCA with attention to gender

Four potential limits though could or actually do constrain an integrated and holistic approach towards achieving sustainable development when addressing global environmental shocks and trends at the ground level. Firstly, the lack of cooperation between the NGO sector and local authorities might lead NGOs to supplant the work and the responsibility of local authorities and therefore undermine development efforts. Secondly, the tendency of several NGO interventions to remain top-down, particularly projects that aim specifically to tackle disaster risk or climate change, might render projects incommensurate with local communities' views and priorities. Thirdly, to

conduct and promote development without 'sustainability' might replicate an approach that remains disconnected from societal structures that created vulnerability in the first place. Finally, the disjuncture between the recognition of gender in theory and what is being done in practice in the fields of development, climate change and DRR emphasises the fact that efforts should focus on 'development' but not that which creates or tolerates inequalities and therefore perpetuates the marginalisation and vulnerability of those discriminated against.

The resulting recommendations to inform the development sector in Ladakh advocate:

- The combination of both NGOs' expertise and local knowledge in an effort to foster innovative ideas appropriate to the context, and the capacity building of the local government, the primary institution to represent the interest of the population. This approach is already followed by TISS-Institute of Social Sciences in Ladakh along with other local NGO practitioners but the analysis has shown a lack of systematic collaboration between NGOs and authorities.
- To foster approaches integrating a bottom-up dimension and drawing on local needs, vulnerability and capacity assessments. If communities have not participated in the design of projects in the first place or if strategies do not address people's priorities and everyday constraints, innovative ideas and NGO efforts will remain meaningless and/or short-term solutions.
- To adopt a holistic and sustainable approach in order to ensure the relevance and effectiveness of projects to reduce people's vulnerability to risk, to address gender differences and therefore to tackle efficiently environmental shocks and trends.
- To foster the recognition among both dominant and dominated groups that gender matters in development, DRR and CCA and to challenge structures of domination mainly exerted by men.

Most of these recommendations can be found in previous studies in the field of development or DRR where researchers and NGO practitioners have long and repeatedly advocated the focus on the social construction of disasters (e.g. Copans, 1975; O'Keefe et al., 1976; Hewitt, 1983; Blaikie, 1985; Blaikie et al., 1994); the integration of bottom-up approaches and the involvement of local communities (e.g. Wisner et al., 1991; Chambers, 1995; 2007); closer collaborations between the NGO sector and authorities (e.g. Christoplos et al., 2001); the need to ensure sustainability for vulnerability reduction (e.g. Anderson and Woodrow, 1998; Lewis, 1999) and the necessity to address gender issues (e.g. Harcourt, 1994; Fordham, 1998). The empirical evidence from Ladakh thus emphasises that lessons from the fields of DRR and development have not been learned, not only in the more recent climate change sector but also by policy-makers and NGO practitioners

involved in DRR. This thesis thus nuances the romanticised idea that DRR is the panacea for sustainably reducing vulnerability as advocated by Kelman and Gaillard (2008) for instance. Despite existing evidence which already stresses what should be done to tackle efficiently the root causes of disasters and long-term environmental challenges as reviewed in Chapter 2, the majority of DRR practices in Ladakh remain disconnected from local realities. What more could be researched and written to initiate the theoretical shift from the dominant approach to disasters to the emphasis on vulnerability? Perhaps, one implication for further research is to investigate the way we could effectively challenge the status quo and draw from what we already know.

Similarly, recommendations that consist in calling for better recognition of women's needs, disproportionate vulnerabilities and voices have already been formulated both by academics and policy makers. One might argue that we need more research to understand why, despite the evidence, there still is a systematic lack of attention to gender issues in DRR or climate-related efforts. However, as Buckingham (2010: 502) stresses: '[...] *there is enough evidence now to justify increasing women's involvement in decision making on climate change*'. One could go further and ask why we need to justify the fact that women should have a say in decisions that impact their lives. As Wangyur, a 74 year old respondent from Saboo said: "*Men and women must be treated equally you know, you can't clap with one hand, you need two hands to produce a sound*". The conclusion, here, stresses, again, the fact that knowledge and evidence exist but development interventions have yet to act upon them to address risk. Drawing from the methodology I relied on for conducting this research and in light of the views of those I have been researching with, I argue that to recognise, value and act upon the voices of women, and other marginalised groups, will help challenge the status quo, the same one that leads many societies on a current unsustainable development path.

9.2 Reflection on the research process and limits

My research questions evolved substantially during the course of the PhD. My initial intention was to study the way local communities adapt to climate change, with a strong emphasis on gender differences. This was influenced by a literature review which suggested that communities already adapt to climate change but that their gender-based capacities and strategies were under-researched. The literature pointed out that climate-related interventions needed to draw more on local knowledge and be more gender-sensitive in order to address people's needs. This focus changed, however, after the pilot field visit.

Ladakh was chosen as a case study partly because the available documentation stressed that the region already faced the impacts of climate change. This was a prerequisite to explore communities' strategies of adaptation. This would also enable me to compare local strategies with current climate-related interventions being undertaken by NGOs in Ladakh. The initial visit and encounters with local communities, however, highlighted a gap between the way people comprehended climate change and what climate-related NGO projects and studies documenting Ladakh suggest. Above all, discussions among communities suggested conflicting views regarding climate change, sometimes considered as an unknown phenomenon or, on the contrary, feared by certain people who had either noticed environmental change or heard the popular discourse predicting climate-related disasters. People were also focussing on changes that have occurred in their environment and culture due to new economic activities, greater interactions with outsiders and drivers other than just the climate. Many of these changes were perceived negatively and people generally highlighted problems and sources of worry linked to a variety of societal processes. Therefore, it appeared difficult to stick to research questions that focussed on people's response to climate change when it seemed a little disconnected from their realities and the broader context of change. This prompted me to explore more the apparent disjuncture between what constitute people's main priorities and the current focus of NGOs on climate-related interventions. The research questions thus evolved towards this perspective with a strong emphasis on DRR and gender.

Inspired by my academic background in disaster management, interviews with villagers and NGO practitioners regarding climate change increasingly suggested that interventions tended to reproduce the dominant approach to disasters. Respondents, both villagers and organisation representatives emphasised the necessity to tackle the floods and other impacts perceived to be linked to climate change, rather than looking at the reasons that can lead environmental phenomena to cause damage. This echoed previous studies that have warned of the duplication of hazard-centred DRR approaches by climate-related efforts, where the literature has shown their limits (Kelman and Gaillard, 2008, 2010; Mercer, 2010). I therefore hypothesised that a Ladakhi case study might show that the relatively recent CCA did not draw from examples and lessons learned in the more experienced DRR. Given their overlapping objectives and strategies, I wondered whether and why climate-related efforts (would) reproduced approaches that have already proved of little benefit to reduce disaster risk. It was only at the stage of analysing the data that I had collected however, that I began to question the lack of integration between CCA and DRR responses and their continued reproduction of a hazard-centred approach. While the data clearly demonstrates these features, I was not able to explore the reasons for them through the fieldwork. This constitutes one of the limits of this research and a potential field of investigation for further studies.

My academic background also influenced the reliance on DRR frameworks which proved useful and relevant in regards to the theoretical underpinning and for addressing the objectives of this research. One could question however, why I created a new 'framework' or diagram instead of simply following the PAR model, for instance, or one of the three other models presented in Chapter 2. When reflecting on the analysis process, I realise that it is the complementarity of the four frameworks that helped me interpret the construction of communities' marginalisation, vulnerability and capacity. None of the diagrams taken individually helped me visualise and describe, for instance, how some resources producing vulnerability in certain groups can be counterbalanced with the access to other resources enhancing people's capacity. I needed a framework that shows 'in one go' how different structures influence the access to or lack of resources that in turn simultaneously shape the vulnerability and capacity of individuals, households or communities. This does not undermine the usefulness of these individual frameworks to help me analyse the empirical data in a holistic manner, but it echoes findings of Laubin et al. (2011) when they researched practices from the NGO sector in France in the field of CCA. They found that NGO practitioners admitted to having limited understanding of existing methodologies to conduct vulnerability and capacity assessments. Instead, the majority of organisations tended to recreate their own frameworks as means to better capture the topic based on their collective understanding of the process (Ibid). Since my own research process concurs with this statement, I wonder whether it is the complexity of the analysis in itself (rather than the process of collecting the data) that constrains NGO practitioners to conduct vulnerability and capacity assessments as a prerequisite of their projects and therefore make them focus instead on the hazard.

Finally, the place of gender within the research also progressively evolved. At first, and informed by the literature, I designed research questions focussing on gender as a key parameter in the analysis of communities' adaptation strategies. However, the initial field visit in Ladakh suggested that looking at gender differences was meaningless. Informants were repeatedly pointing out that no gender inequalities existed in Ladakh and that men and women enjoyed equal status and rights. It was also common to hear that there is greater gender equality in Ladakh compared to the rest of India. I thus assumed that the choice of Ladakh as a case study did not allow me to explore gendered responses to climate change. Nevertheless, it became apparent during pilot interviews, in the first phase of the fieldwork, that male and female interviewees had different opinions when talking about their daily activities, resources, everyday risks, environmental changes and views about the work of NGO and local authorities. In particular, women seemed less aware of climate change as a concept. They also raised different concerns from men, shaped by their daily activities which determined

diverse vulnerabilities and capacities despite the alleged equality between Ladakhi men and women. My research questions thus evolved to explore in a more nuanced way the role of gender in shaping people's vulnerabilities and capacities, as well as their perceptions of climate change and natural hazards. In parallel, I wanted to examine whether policy makers and NGO practitioners acknowledged potential gender differences in practice especially since the academic literature and international policies underline the necessity to incorporate gender in development and humanitarian projects. Therefore, I retained the idea of using a gender sensitive methodology to conduct interviews and focus group discussions through relying on a gender-balanced team (see Le Masson, 2013 for a discussion). This raised numerous points that accentuated the fact that gender matters when researching CCA or DRR. This research process shows how, despite being aware of the gender literature, I have been easily distracted and underestimated the role of gender because of the assumption that equality of rights meant equality of perceptions and representation. This highlights the need to read beneath the words that informants use and to explore people's understanding of gender. By spending time in the field and collecting the views of those experiencing environmental changes, the gender sensitive research process and the combination of methods enabled me to uncover differences between people that I might have missed had I only relied, for instance, on semi-structured interviews with household representatives who are typically men. This approach contributes to challenging traditional masculinised views on environmental and development issues and confronting both those researched and researchers with different perspectives to address climate change.

Overall and among the diversity and multitude of cross-cutting themes between the climate change and DRR fields, the emphasis placed on gender and DRR in relation to CCA in this research proved useful in the methodological and analytical processes. It addressed the lack of empirical studies integrating DRR and CCA with a focus on vulnerability and capacity and gender whereas the latter is still marginalised in climate change studies. It highlighted the gap between theories, policies and practices in the case of Ladakh and contributed to show the dichotomy between the (in)effectiveness of interventions targeting climate change and disasters, and the experience of local communities in the face of a multitude of everyday risks other than climate change or natural hazards. It finally underscored the need to recognise and assess the interconnection of different structures and their impacts on people's daily lives at the onset of development strategies and to ensure that these are part of a sustainable, holistic and integrated approach to reducing people's vulnerability and enhancing their capacities.

APPENDIX A.

GUIDING QUESTIONS FOR SEMI-STRUCTURED INTERVIEWS WITH VILLAGERS

INFORMATION GIVEN ORALLY TO PARTICIPANTS:

General presentation of the researcher (name, nationality, affiliation and occupation)
The purpose of the study
The reason for choosing them (importance to have local opinions)
Any information will be confidential
The approximate amount of time they will be involved in the research
Their right to withdraw at any time
Encouragement to ask questions
Whether they accept to have their answers translated by an interpreter
Whether they accept to have their answers recorded

BASE QUESTIONS

Age
Marital status
Who is the head of the household / Relationship to head of household
Last completed year of education
Occupation
Income if relevant
Membership to any group(s)

ACTIVITIES

What are your daily activities?
Do you receive any help?
How do they change throughout the year?
Which is your favourite period and why?

What are your (relevant male or female counterpart) daily activities?
How do they change throughout the year?

Do you feel your activities are valued?
Who do you think does more work in the household?

RESOURCES

Which resources do you use and are responsible for and which resources is your (relevant male or female counterpart) responsible for? (Use and Control Tool)

Who usually takes decision?
Regarding money /who uses it, who pays the bill?
About children (if relevant)?
When wanting to go somewhere?
When a work has to be done?

Are you involved in community decisions?
If no, who takes decisions in the community?

Do you feel your voice is heard by the local authorities?

- (For women) Do you feel your voice is as heard/valued as men's? Why

- (For younger men) Do you feel your voice is as heard/valued as elders? Why?

RISKS

What are the main challenges/concerns in your daily life? Please give your three main problems.

(If not raised before) Do you have concerns linked with the environment?

(For elders) How do those concerns compare to main challenges in the past? Are they the same?

Have they changed over time?

What do you predict your fears will be in the future?

(If not raised before) How have you seen your environment changing during your lifetime?

Have the changes been for better, for worse or both? Why?

(If not raised before) What is your opinion about climate change?

Does it constitute a threat/concern?

If any, what impacts of climate change do you perceive (environmental, economic, social, etc)?

VULNERABILITY AND CAPACITY

Have you overcome challenges in the past? If yes, how did you deal with this challenge? What are the factors that helped you?

What are/were your strategies to face identified risks/challenges?

Are there any strategies/solutions/options that you think should be adopted but are unavailable to you? (due to scale of problem, resources, politics, beliefs, etc.)

What are/were the factors that reduce or strengthen your ability to cope with risks/challenges that you identified?

OPINION ABOUT OUTSIDE PROJECTS (disaggregated by site)

How have you benefitted from NGOs or governmental projects? *(If yes) which ones?*

Are you aware of projects within your community or communities nearby?

(If yes) What do you think about those initiatives/projects?

Do you think they are necessary or useful? Why?

Do you think they take into account or address your main worries? If yes, how? If not, why?

(If relevant) have you built upon outside initiatives/projects to strengthen your capacities?

Do you think initiatives/projects take into account differences between men and women?

Do you think they should? Why?

FUTURE

What are your priorities/aspirations for the future?

For yourself?

For your family?

For the wider community/Ladakh?

APPENDIX B.

GUIDING QUESTIONS FOR SEMI-STRUCTURED INTERVIEWS WITH NGOS

What do you feel are your organisation's core activities?

[If relevant] How do you place climate change within your organisations work? What projects do you run?

Project implementation

How did the project started? What made you focus on this specific topic?

When you go to villages, do you ask villagers about what their needs are?

If yes, what are the most common issues that they raise? What are the most common things they see as problems?

Passive Solar Houses

Are you involved in building passive solar housing?

How do you select the people who benefit from solar houses? Are there specific targeted groups or specific villages? Do you use economic or geographical indicators for example?

Do you provide funding for villagers?

Do you go back to villages to assess or monitor the projects?

Do you ask villagers their opinions about the project?

Artificial Glaciers

How many artificial glaciers have you constructed?

Have they been successful?

Do you go back to villages to assess or monitor the projects?

Do you ask villagers their opinions about the project?

Gender policies and practices

Does your organisation have a specific gender policy or a women's empowerment ideal in their projects?

Are there any projects that you feel benefit women more than they benefit men?

Since there is gender equality [if relevant, according to their opinion] in Ladakh, why do you think some of those projects are specifically with women?

When you go to organise meetings with villages and you explain the projects, do you find there are equally represented men and women. Or is it more men? Or more women? Why?

Women Self Help Groups

How are Self Help Groups created? Is it the women villagers themselves who create the group or is it your organisation?

Why the project is specifically targeting women?

Are they [the women] usually enthusiastic and motivated to be part of the group? Why?

Are their husbands or family relatives happy with them joining the group?

Do they have to pay a membership fee?

What kind of activities do they do?

Who decide on the activities to develop?

What do they use the money that they earn for?

How do you feel the SHG benefit to women? To their families? To their community?

About the floods [Disaster Risk Reduction]

Did your organisation have any response to the recent floods last year?

How did you design the relief strategy?

Did you take the opinions of those who were affected when you conducted relief?

Do you think there is a link between climate change and the floods that happened last year?

Why do you think this disaster happened?

Why do you think there was so much damage?

In light of the floods last year, will you be thinking about Disaster Risk Reduction in future projects at all?

If your organisation was able to, what projects would you like to expand into? What problems do you feel you would like to work on in priority in the context of Ladakh?

APPENDIX C.

INDIA'S NAPCC - EIGHT NATIONAL MISSIONS

(Adapted from Satapathy et al., 2011 : 32)

<p>The National Solar Mission</p>	<ul style="list-style-type: none"> • promotes the development and use of solar energy for power generation and make solar energy competitive with fossil-based energy options.
<p>The National Mission for Enhanced Energy Efficiency</p>	<ul style="list-style-type: none"> • aims at implementing a host of programmes that will improve energy efficiency in the energy-consuming industries and sectors. Incentives are among others: energy-savings certificates, reduced taxes for energy-efficient appliances and public private partnerships.
<p>The National Mission on Sustainable Habitat</p>	<ul style="list-style-type: none"> • promotes energy efficiency as a core component of urban planning. It includes the extension of the existing Energy Conservation Building Code, more efficient waste management and recycling and more environment-friendly transportation.
<p>The National Water Mission</p>	<ul style="list-style-type: none"> • sets the goal of a 20 % improvement in water use efficiency through pricing and other measures.
<p>The National Mission for Sustaining the Himalayan Ecosystem</p>	<ul style="list-style-type: none"> • aims to conserve biodiversity, forest cover and other ecological values in the Himalayan region including the region's glaciers, which are a major source of India's water supply.
<p>The National Mission for a 'Green India'</p>	<ul style="list-style-type: none"> • focuses on the afforestation of 6 million hectares of degraded forest lands and the extension of forest cover from currently 23 % to 33 % of India's territory.
<p>The National Mission for Sustainable Agriculture</p>	<ul style="list-style-type: none"> • supports climate adaptation in agriculture through the development of climate-resilient crops, the expansion of weather insurance mechanisms and innovative agricultural practices.
<p>The National Mission on Strategic Knowledge for Climate Change</p>	<ul style="list-style-type: none"> • seeks to establish a better understanding of climate science, impacts and challenges. This mission envisions a new Climate Science Research Fund, improved climate modelling and increased international collaboration.

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