

Herders of Chitral The Lost Messengers?

Local Knowledge on Disaster Preparedness
in Chitral District, Pakistan



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Herders of Chitral: The Lost Messengers?

Local Knowledge on Disaster Preparedness in Chitral District, Pakistan

Julie Dekens

International Centre for Integrated Mountain Development (ICIMOD)
Kathmandu, Nepal
April 2007

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Published by

International Centre for Integrated Mountain Development
G.P.O. Box 3226, Kathmandu, Nepal

ISBN 978 92 9115 026 7

Photos

Front cover, page 14: Large boulder deposited during a major flash flood in Reshun Gole, Upper Dhital – *Mats Eriksson*
Page 2: View from Brep showing boulders deposited in a line by a flash floods – *Mats Eriksson*
Page 22: View of the Tirich Mir (7,708m) from Chitral town – *Mats Eriksson*
Page 60: Herders with goats in Upper Chitral – *Mats Eriksson*
Back cover: The old and the new generation, Reshun Gole, Upper Chitral – *Mats Eriksson*

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Printed and bound in Nepal by

Hill Side Press (P) Ltd.
Kathmandu

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Foreword

Inhabitants in the Himalayan region are exposed to many natural hazards. The mountain ranges are young with an unstable geology, steep slopes, and a climate that is difficult to predict. As a result, the region is highly susceptible to natural hazards such as floods and flash floods, landslides, and earthquakes. In populated areas, these can lead to disaster. Vulnerable groups – the poor, women, and children – are often hit hardest.

Since its establishment in 1983, the International Centre for Integrated Mountain Development (ICIMOD) has dedicated much of its work to examining ways to reduce the risk of disasters from natural hazards, thereby working towards the decreased physical vulnerability of the people in the Hindu Kush-Himalayas. This work has encompassed training courses, hazard mapping, landslide mitigation and control, mountain risk engineering, watershed management, vulnerability assessment, and much more. ICIMOD has also fostered regional and transboundary dialogue for improved management of both the resources provided and the risks threatened by the big rivers in the Himalayan region; sharing of hydro-meteorological data and information among the countries in the region is of particular importance for mitigating the risk of riverine and flash floods in the major river basins.

This publication is one of a series produced under the project ‘Living with risk – sharing knowledge on disaster preparedness in the Himalayan region’, implemented by ICIMOD during a 15-month period in 2006 and 2007. The project was funded by the European Commission through their Humanitarian Aid department (DG ECHO) as part of the Disaster Preparedness ECHO programme (DIPECHO) in South Asia, and by ICIMOD. Through this project, ICIMOD has endeavoured to encourage knowledge sharing and to strengthen capacity among key practitioners in the field of disaster preparedness and management. This has been done through training courses, workshops, knowledge compilation and dissemination, and the establishment of a website (www.disasterpreparedness.icimod.org).

The publications resulting from this project include baseline assessments of the disaster preparedness status in the four target countries (Bangladesh, India, Nepal, and Pakistan); case studies and a framework on local knowledge for disaster preparedness; and gender and vulnerability aspects in disaster risk reduction. The publications, training sessions,

and workshops were undertaken in the context of the 'Hyogo Framework for Action 2005-2015' which recommends that regional organisations should promote sharing of information; undertake and publish baseline assessments of disaster risk reduction status; and undertake research, training, education, and capacity building in the field of disaster risk reduction.

The long-term mission to bring the Himalayan region to an acceptable level of disaster risk has only just begun. The

countries in the region are among the most disaster prone in the world in terms of number and severity of disasters, casualties, and impact on national economies. Only by strong commitment, hard work, and joint efforts can this situation be improved. It is ICIMOD's hope that our collective endeavours will help improve disaster risk reduction in the mountain region we are committed to serve.

Dr. Andreas Schild
Director General
ICIMOD

Preface

The cost of disregarding local knowledge

“External agencies, including government officials and technical people, never listen to local advice!”

Workshop participant, Chitral town, October 2006

Flash floods are frequent events in the Chitral District of Pakistan. Most of the time, villagers manage to save their lives. They know how to interpret local environmental signals and where hazardous places are. But on July 14th 2006, a foreign engineer lost his life at a tunnel construction site. That day, an intense rainstorm occurred between 4:00 and 5:30 pm. The extreme rainfall event triggered a flash flood, which rapidly washed away the engineering company’s equipment and residential quarters on the fringe of the river bed. This tragic event, which took the life of one person and damaged a million rupees of equipment, was not a surprise to the locals.

“We told them twice!”, said the leader of a nearby village. “We knew that the retaining walls were too small to channel the water during the rainy season and that they should have been raised.”

The villagers had learned from previous experience: they could remember how two people died in the same place about 40 years ago in a major flash flood. Unfortunately, the engineering company, interested in settling in an easily accessible and cheap area, neglected local advice.

In remote mountainous places like Chitral District, as elsewhere, road construction is associated with development – and short-term employment for the locals. However, it can also be associated with increased vulnerability to natural hazards. In Shainigar, a village in Lower Chitral, greater flood impacts have been experienced since road construction started. The river bed, which used to form a deep channel, has now been filled up to construct a cross-way for a road. The new road has altered the natural channel of the stream and when a flood occurs now,

as was the case on July 30th 2006, the water quickly overflows into the nearby fields. The villagers asked the Government to build a bridge. Unfortunately, their request was ignored. As a result people living next to the river in this village leave their houses when it rains heavily for fear of being washed away. Many stories like these can be found in Chitral District as in other parts of the Himalayan region. They illustrate the fact that local knowledge, in general, and local knowledge on natural hazards, in particular, is normally ignored by external agencies at both national and international levels. Agencies

tend to favour scientific and specialised knowledge; a great deal of which is not in tune with local contexts and realities. Local people are the first to suffer from the direct impacts of disasters, but they are also the first to respond to them. Most of the time, locals are aware of the nature and history of natural hazards in their localities. Ignoring their knowledge may lead to important human and economic costs, especially in the long term. What local people know should be collected, made more visible, and be included in decision-making processes.

Julie Dekens

Acknowledgements

This study is part of a 15-month project (April 2006 – June 2007) entitled, *Living with risk – sharing knowledge on disaster preparedness in the Himalayan region*, supported by the European Commission through its Humanitarian Aid Department (DIPECHO).

I am grateful to all those who guided the project through its various phases: the project manager Mats Eriksson; the network officer Vijay Khadgi; the steering committee members at ICIMOD: Madhav Karki, Jianchu Xu, Michael Kollmair, Zbigniew Mikolajuk and Beatrice Murray; as well as the programme officers at ECHO Indira Kulenovic and Jyoti Sharma in New Delhi, and Béatrice Miège in Brussels.

Rapid Assessment Team: The team members during the field trip included a geographer and geomorphologist/water specialist, Mats Eriksson (ICIMOD); a social scientist/institutional specialist, Julie Dekens (ICIMOD); Ali Sher Khan

(AKRSP Chitral); Dilshad Pari (AKRSP Booni, social organiser/gender); a climate change specialist, Arun B. Shrestha (ICIMOD); and two local translators.

Local Partners: The study was made possible with the help and collaboration of many people among whom were the villagers of Ashret, Baradam, Birir, Brep, Drosh, Gurin, Harchin, Isfangol, Jao Guru, Krakal, Mastuj, and Reshun. Organisations and personnel contributing to this study were the Aga Khan Rural Support Programme (AKRSP) – especially Sardar Ayub (Regional Programme Manager, Chitral), Sherzad Ali Hyder (Manager, Resource Development Section, Chitral), and Qazi Ahmad Saeed (Institutional Development Officer); Focus Humanitarian Assistance, Pakistan – Syed Harir Shah (Programme Manager for community-based disaster risk reduction, Chitral); Government Degree College, Chitral – Inayatullah Faizi; and IUCN-Pakistan, Chitral Unit – Aziz Ali (District Manager).

Reviewers: Thanks for useful comments are due to James Gardner (Professor Emeritus, Natural Resources Institute, University of Manitoba, Canada), Inayatullah Faizi, (Government Degree College, Chitral), Syed Harir Shah (Focus Humanitarian Assistance, Pakistan), Farid Ahmad (ICIMOD), Mats Eriksson (ICIMOD), Muhammad Ismail (ICIMOD), Xu Jianchu (ICIMOD), and Arun B. Shrestha (ICIMOD).

Editors and Production Team: I am grateful to the editors and layout persons for their dedicated work to get this publication finalised, Greta Rana, Beatrice Murray, Dharma Ratna Maharjan and Asha Kaji Thaku.

Some Key Terms

Capacity – A combination of all the strengths and resources available within a community, society, or organisation that can reduce the level of risk, or the effects of a disaster.

Disaster – A serious disruption of the functioning of a community or a society causing widespread human, material, economic, or environmental losses which exceed the ability of the affected community or society to cope using its own resources.

Disaster risk reduction (disaster reduction) – The conceptual framework of elements considered with the possibilities to minimise vulnerabilities and disaster risks throughout a society, to avoid (prevention) or to limit (mitigation and preparedness) the adverse impacts of hazards, within the broad context of sustainable development.

Hazard – A potentially damaging physical event, phenomenon or human activity that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation.

Mitigation – Structural and non-structural measures undertaken to limit the adverse impact of natural hazards, environmental degradation and technological hazards.

Preparedness – Activities and measures taken in advance to ensure effective response to the impact of hazards, including the issuance of timely and effective early warnings and the temporary evacuation of people and property from threatened locations.

Resilience/resilient – The capacity of a system, community or society potentially exposed to hazards to adapt, by resisting or changing in order to reach and maintain an acceptable level of functioning and structure. It is determined by the degree to which the social system is capable of organising itself to increase its capacity for learning from past disasters for better future protection and to improve risk reduction measures.

Risk – The probability of harmful consequences, or expected losses (deaths, injuries, property, livelihoods, economic activity disrupted or environmental damaged) resulting from interactions between natural or human-induced hazards and vulnerable conditions. Conventionally risk is expressed by the notation $\text{Risk} = \text{Hazards} \times \text{Vulnerability}$. Some disciplines also include the concept of exposure to refer particularly to the physical aspects of vulnerability. A disaster is a function of the risk process. It results from the combination of hazards, conditions of vulnerability and insufficient capacity or measures to reduce the potential negative consequences of risk.

Risk assessment or analysis – A methodology to determine the nature and extent of risk by analysing potential hazards and evaluating existing conditions of vulnerability that could pose a potential threat or harm to people, property, livelihoods and the environment on which they depend.

Vulnerability – The conditions determined by physical, social, economic, and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards.

Adapted from UN/ISDR (2004)

Part 1
Introduction



Did You Know?

Chitral, the north-westernmost area of Pakistan, is a region of glaciated mountain ranges and deep, narrow valleys. Flash floods occur regularly from June to August. Property, agricultural land, and irrigation channels are damaged because the arid, vertical landscape often limits settlement and cultivation to active alluvial fans. However, few people die from flash floods because they have learned from experience to identify and interpret environmental signs and signals associated with them: changes in cloud colour, water flow, intensity and frequency of rainfall, and unusual sounds and unusual presence and movements of wildlife. Local stories tell about people forgetting prior experiences with flash floods. Major destructive flash floods may not take place often enough – once or twice per generation – for villagers to remember them and to influence their decisions about where to settle.

Households adopt a few, simple short-term strategies such as storing food, saving administrative papers and other important belongings with relatives or neighbours, moving to safer places especially at night, and running to higher ground. Communities and households also adopt long-term adjustment strategies.

Part I – Introduction

For instance, building houses in safe areas, having dispersed landholdings, and different sources of income to spread the impact of flash floods among their physical and economic assets. This gives people some flexibility and helps them bounce back from natural hazard events more quickly than they would without any coping mechanisms. Many strategies are not designed for natural hazards preparedness, but contribute to it indirectly. Examples of long-term strategies also include adjustments in natural resource management. In Chitral, some communities regulate grazing and deforestation through customary rules. Many people believe flash floods are caused by environmental degradation, especially deforestation and overgrazing by goats. Long-term strategies also include technical and structural aspects like building grain stores, terraces to prevent damage to houses by rockfalls, and traditional retaining walls using local materials to protect settlements and fields from water.

Chitral District is also prone to earthquakes. Locally, traditional houses made of a sophisticated combination of wood, stones, and clay are believed to be earthquake resistant. However, houses built in this way are disappearing because there is

not enough wood and new trends favour separate rooms and larger windows.

Folklore, songs, proverbs, and traditional ceremonies are repositories of collective and family memories of past events. Again, they may not be entirely about hazard preparedness but may incorporate elements of it. Local religious and other key leaders, elders (both men and women), and other social actors are often the key knowledge-carriers about past hazards and the ones who make sense of imminent hazards. Traditional early warning systems for flash floods include a diversity of decentralised strategies used on an ad hoc basis. However, the district is now in a period of transition between traditional early

warning systems and new ones, leaving most communities in an institutional vacuum. The early warning system as of 2006 mainly relied on new, centralised technologies, and these do not reach many isolated communities. Overall, many changes are occurring in the district: a combination of factors (historical, environmental, socioeconomic, demographic, institutional, and political) influences community knowledge and practice of natural hazard preparedness in a complex way. Some factors have helped to reduce people's vulnerability to natural hazards (e.g., better access to water by developing irrigation channels with the help of non-government organisations); others have increased their vulnerability (e.g., population growth forcing people to settle in more vulnerable areas).

Chapter 1

Background

The general purpose of this report is to secure the interest of implementing organisations (governments, and non-government organisations) in, and improve their understanding of, local knowledge, practices, and contexts identified in relation to disaster preparedness so that they can be used in disaster management activities. The case study described here was carried out with the aim of identifying and documenting local knowledge and practices related to disaster preparedness in various villages prone to natural hazards, and developing and testing an analytical framework on local knowledge about disaster preparedness (Figure 1). The goal of the analytical framework is to lay out the key themes and show how the themes are related to, and influence, each other.

Who should read this report?

In theory, since the 1980s, implementing organisations have begun to acknowledge the existence of local knowledge and practices related to disaster preparedness. However, in practice, many implementing organisations (1) do not have a primary understanding of the value of local knowledge for the success

and sustainability of their projects; and (2) do not have a clear idea of what local knowledge related to disaster preparedness really means and/or how to identify and collect information related to it. This discrepancy between theory and practice is based on biases and constraints existing at all levels (donor, project/organisational, community, household) that result in local knowledge and practices being overlooked. It is beyond the scope of this publication to describe them all in detail. Suffice it to say here, for example, that too often a teaching bias prevails even within community-based organisations whereby communication is restricted to a one-way process (i.e., an external organisation is teaching ‘a community’) instead of a two-way process. One of the reasons for this ‘teaching bias’ is the confusion between education and knowledge: illiteracy does not imply lack of knowledge. Communities can learn from outsiders, but simultaneously, outsiders can also learn from local people. Another reason for the teaching bias is that local knowledge still lacks legitimacy as far as outsiders are concerned, mainly because of their own lack of knowledge, mistaken assumptions, and power relations (knowledge is power!). More importantly, the lack of legitimacy attributed to

Local knowledge on disaster preparedness is based on the following

(1) Observe



People's experience of the local surroundings

History of natural hazards

Examples: knowledge on the location, time, duration, frequency, intensity, predictability of previous hazards

Nature of natural hazards

Examples: knowledge on the onset, origin, and velocity of water flow; knowledge of different types of rain

Evolution of social and physical vulnerabilities to natural hazards

Example: life stories explaining the impoverishment processes of households following recurrent natural hazards and other stresses

(2) Anticipate



People's identification and monitoring of environmental indicators

Early warning signals

Examples: interpretational knowledge of changes in animal behaviour, vegetation patterns; knowledge of local weather forecasts

Time thresholds

Examples: knowledge of when it is time to buy and store food in advance, leave the house, move the cattle, and remove important belongings

Escape routes and safe places for humans and cattle

Examples: knowledge of the safest and fastest routes

Key actors and skills

Examples: knowledge of who knows what, who does what and when, who stays behind, who goes first

(3) Adjust



People's access to assets

Human assets

Examples: specific skills such as traditional carpenters and masons

Sociocultural assets

Examples: knowledge of different social groups depending on occupational, physical ability, ethnicity, gender, caste, class, and age characteristics

Institutional assets

Examples: knowledge generated by local institutions and cross-scale linkages

Financial assets

Examples: micro-finance arrangements such as credits and savings

Natural assets

Examples: natural resource management strategies such as intercropping and agroforestry that conserve biodiversity and protect soil erosion and can contribute to reducing the impacts of natural hazards

Physical assets

Examples: infrastructural safety arrangements such as boats, housing, embankments

(4) Communicate



People's ability to transfer knowledge among themselves and between generations

Oral & written communication

Examples: local songs, poems, proverbs which help the younger generation and outsiders to learn about previous hazards; stories of previous hazards encoded in the names of specific places

Early warning systems

Examples: use of visual signals such as mirrors, fire or audio signals like drums; having dreams of natural hazards in advance

Other practices

Examples: taboos which prevent people from going to certain hazard-prone areas; ceremonies, local art which helps the community to understand and remember past natural hazards, and relieve the anxiety related to the threat of future hazards

Figure 1: The four pillars of local knowledge on disaster preparedness

local and indigenous knowledge is as much a problem from within as it is from without: communities themselves need to be convinced (maybe by governments and non-government organisations) that they have knowledge and that some of it can be useful.

Why you should read this report

This case study can help practitioners to build confidence by providing methodological guidance on how to integrate local knowledge into disaster preparedness activities. The underlying assumption behind this case study is that improving understanding of local communities will help both national and international organisations empower the communities served and hence improve their disaster preparedness. Taking local knowledge into consideration in terms of practices and contexts can help implementing organisations improve their planning for and implementation of disaster preparedness activities. It can help to improve project performance in general; that is, project acceptance, ownership, and sustainability. Understanding, accounting for, and respecting local knowledge can contribute to cost-effectiveness in the long-term, from both a financial and a social point of view. Firstly, economies of scale are based on the assumption that people do different things better on different scales. Understanding local knowledge and practices can facilitate identification of what can be promoted at local level. Building upon local knowledge and practices, when it

is relevant to do so, can decrease dependency on external aid. Secondly, and from a social point of view, taking local knowledge and practices into account can help promote mutual trust, acceptability, common understanding, and the community's sense of ownership and self-confidence. Specifically, understanding local knowledge, practices, and contexts can help development and research organisations to tailor their project activities and communication strategies to needs of local partners (or 'beneficiaries' as they are often termed). It also enables development and research organisations to act as intermediary organisations that are able to translate messages from government level to communities in a way that is understandable and credible. For instance, a meteorological agency might release the following message to communities: "the river is going to rise by one to two metres in the next 24 hours". But is it enough? What does it mean to the locals? (Other key questions are: do the locals trust this source of information? are the locals even able to receive the information? do all segments of society – women, poor, and marginalised groups – receive the information?). Government agencies often release information that is not understood at local level. Disaster preparedness communication tools, such as official warning messages or hazard maps, need to incorporate local references. How can you do so unless you understand and you have identified local knowledge, practices, and contexts; unless you are accounting for them in your project activities; and unless you respect this knowledge?

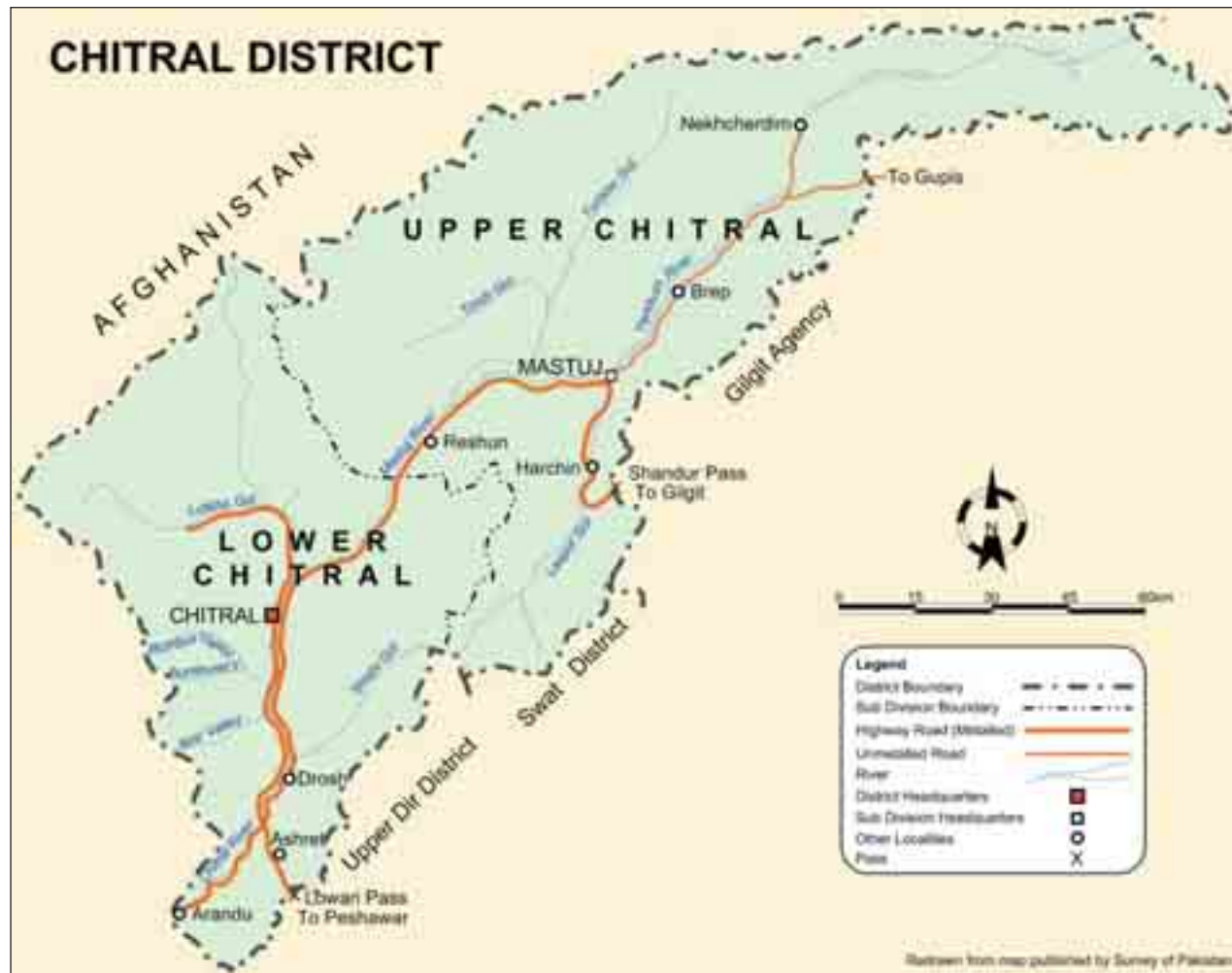


Figure 2: Major roads and place names in Chitral District, Pakistan

Herders of Chitral: The Lost Messengers?

How this report was compiled

The information in this report is based to a great extent on primary data collected during a ten-day field survey in the Chitral District of Pakistan in October and November 2006 (Figure 2). The report is supplemented by secondary data collected in the field. The District of Chitral was selected as a case study area for a combination of reasons. Flash floods are a relatively unknown phenomenon among the general public and government officials. The local government of Chitral is currently formulating a disaster preparedness plan/strategy, and so far only one non-government organisation has been focusing on disaster preparedness since 1999. Local knowledge related to disaster preparedness has been poorly documented in this



Julie Dekens

Figure 3: Women's group discussion, Chenar village, Upper Chitral

region for a combination of reasons; viz., the physical isolation of the place and other political and sociocultural barriers. Further, due to its extreme physical environment, the Chitral District provides a unique laboratory for the study of natural hazards, especially flash floods, and the interaction between hazards and communities.

Semi-structured interviews and group discussions, especially with elders, were carried out in 11 villages located from the southernmost up to the northernmost parts of the district. Interviews focused on both community and household preparedness strategies during the rainy season, in general, and during the flood season in particular. Qualitative data were collected through one on one semi-structured interviews and group discussions with villagers; direct observation; transect walks in and around the villages; and visual documentation (pictures and video). The information was verified and complemented by interviews with key informants in academic, government, and non-government institutions (Aga Khan Rural Support Programme [AKRSP], the World Conservation Union [IUCN-Pakistan], and Focus Humanitarian Assistance-Pakistan) in the town of Chitral.

The villages were selected following a one-day workshop organised in collaboration with the Aga Khan Rural Support Programme and following discussions with key informants in the field. The workshop was attended by 38 participants from local government organisations, non-government organisations,

and community members. The objectives of the workshop were (1) to present the goal and context of the field work, (2) to improve understanding of local contexts, especially in relation to natural hazards, and (3) to identify key informants, study sites for, and stories on local knowledge related to disaster preparedness. During the workshop, four group discussions took place with participants from different sectors. Each group was asked to relate stories about local knowledge on disaster preparedness and to give presentations. These presentations and a brainstorming discussion enabled us to identify study sites and collect some stories. Generally, it also established a common understanding and raised awareness about local knowledge related to disaster preparedness.

How to use this report

The report is in four parts: this introduction followed by the methods, the findings of the case study and a conclusion. The methods section explains the four major steps one has to follow in order to collect and analyse data on **local knowledge related to disaster preparedness**. These four steps can be used as a checklist by implementing organisations.

The third part of the report, the case study itself, provides implementing organisations with a concrete example of what local knowledge on disaster preparedness is and how it can be documented. The case study is based on people's anecdotes and stories. The report uses citations to give local people a

voice. Additional comments are given to put people's voices into context and to reflect their contradictions, repetitions, and complexity. Examples of key questions that implementing organisations should use to improve their understanding and to integrate local knowledge into their disaster preparedness projects are also provided (Box – 'Did you ask?').

The lessons learned from the study are discussed in the concluding section, which also provides a summary of the key findings in tabular form and a bibliography.

The case study itself by definition is not and cannot be complete (i.e., integrating all aspects of local knowledge related to disaster preparedness). The topic is complex and each case is context specific. However, as mentioned already, the case study is organised around an analytical framework that can be used anywhere (Figure 1: the four pillars of local knowledge on disaster preparedness). Most importantly, this case study can help implementing organisations to use and develop the analytical framework to their own requirements. Understanding the process of data collection and the type of information collected in this report is even more important than the outcomes per se, as it helps similar exercises documenting local knowledge to be carried out in other contexts. As such, the intention is that this should be a **learning** case study: it is designed to raise questions and stimulate practitioners to find their own answers (Hussain-Kaliq 2004). The report can be most useful in the project development and implementation stages,

especially during analysis of local contexts (e.g., socioeconomic surveys), and during the design of project activities.

What is **not** covered in this report? This report does not cover how to use the information collected – that is how to use local knowledge related to disaster preparedness and how to integrate it into your own activities (e.g., street drama, school curriculum). The present case study aims only to facilitate understanding about local knowledge on disaster preparedness. **The assumption here is that local knowledge and practices, whether they are relevant or not in a specific context for a specific project, cannot and should not be ignored. Local**

knowledge and practices always need to be taken into account. However, and importantly, it does not mean that all local knowledge and practices are appropriate or sustainable. Therefore, the next important step – which is not part of this case study – includes: assessing which local knowledge and practices you can support within your timeframe; for whom and for which objectives; how to integrate it into your activities; how it can be combined with other knowledge on disaster preparedness; and within which context local knowledge and practices can help to improve your disaster preparedness activities (i.e., contextualising local practices and disasters and providing policy recommendations).

Part 2

Key Steps in Data Collection and Analysis



Chapter 2

Collecting Data

Collecting information on local knowledge related to disaster preparedness involves four major steps: (1) understanding the nature of local knowledge; (2) understanding how local knowledge is being (or not being) produced, used, transmitted, and adapted; (3) understanding the four pillars of local knowledge on disaster preparedness; and (4) understanding the wider context, that is the linkages between local knowledge, disaster management, sustainable livelihoods, and poverty reduction.

Step 1: Understanding the nature of local knowledge

“Local knowledge refers here to knowledge generated through observation and experience of the local environment by a specific group of people.” (Berkes 1999)

What people know is influenced by, and influences, what people do and do not do, and what people believe in. To understand local knowledge one has to understand and account for people’s

various ways of knowing as much as people’s practices and beliefs. In this report, we use the term ‘local knowledge’ in the broadest sense to include each dimension: knowledge types, practices, and beliefs (Berkes 1999) because these dimensions are closely interrelated. As such, the nature of local knowledge tends to be more holistic than other forms of knowledge in the sense that it is highly embedded in people’s livelihoods. ‘Indigenous knowledge’ is part of ‘local knowledge’: it refers to, *“local knowledge held by indigenous people, or local knowledge unique to a given culture or society”* (Berkes 1999).

Firstly, with respect to knowledge types – Local knowledge is often associated with local technical knowledge probably because it is the most visible/concrete aspect of local knowledge. Technical local knowledge includes, for instance, local methods of construction, use and combination of specific local materials for houses, retaining walls, terraces, and so on. Additionally, many other types of local knowledge exist (e.g., ecological, social, and historical knowledge). For instance, local ecological knowledge provides local methods such as agroforestry and polyculture which can contribute

to conservation of ecological diversity. Local non-technical knowledge is often not easily identifiable by outsiders because it is closely embedded in people's livelihoods and worldviews. Local knowledge is scattered and institutionally dispersed: it is located at the individual/household level as well as collectively through community stewards and other key social actors (e.g., shamans, elders). One can also make a distinction between everyday knowledge about the environment and specialist knowledge retained by a few individuals or local experts. Local knowledge also tends to derive more from memory, intuition, and the senses than from the intellect. Finally, another distinction can be made between experiential knowledge (i.e., knowledge gained through experience) and transmitted knowledge (i.e., knowledge gained through transmission from stories, poems, songs, and religious practices, for example). Obviously local knowledge is always a mixture of the two. However, transmitted knowledge does not meet with the same problems of legitimacy in the community as experiential knowledge (personal communication, Dr. James Gardner).

Secondly, with respect to local practices, institutions, and skills – In the literature, local practices are also referred to as 'risk-spreading strategies', 'preventive measures', 'adaptation strategies', 'coping strategies', 'adjustment strategies', 'safety nets', and so on. Local practices are mediated by local institutions and associated power relations. Local institutions constitute a set of formal and informal rules, norms, values, organisations, and patterns of behaviour that define who is allowed to use what

kind of assets (i.e., natural, sociocultural, economic, political) at what time and under what circumstances. At the local level, various types of institutions exist. For instance, institutions can be classified in terms of social, religious, political, judicial, and economic institutions (Appiah-Opoku and Hyma 1999) or in terms of familial, communal, social, and collective institutions (Bingen 2001). Examples of local institutions are: the family, the household, marriage, the caste system, kinship exchange networks, traditional rural reciprocity networks, schools, and so on. Institutions shape every aspect of a livelihood system¹ from the type and amount of assets individuals, households, and organisations can build upon, together with the creation, transformation of, access to, returns from, and accumulation or reduction of assets (Bingen 2001), to their livelihood strategies (e.g., whether people manage to diversify, innovate, intensify), their livelihood outcomes (e.g., whether people manage to increase social services or promote a certain type of rights), and the 'vulnerability context' (e.g., crisis, shocks, trends) that people face. Ostrom (1992) identifies several reasons why institutions matter. First, "institutions shape the patterns of human interactions and the results that individuals achieve" through monitoring, sanctioning, and conflict resolution mechanisms for instance (Ostrom 1992). Second, institutions can increase and/or decrease the benefits from a fixed set of inputs. Third, "institutions shape human behaviour through their impact on incentives" (Ostrom 1992). Incentives are rules,

¹ A livelihood system refers to a combination of modes of livelihood at one time - e.g., farming, migrant labour, and informal activities (Murray 2001).

norms, values that control material, energy, and information flows, and therefore livelihood decisions and strategies.

Local practices and institutions encompass various dimensions. Practices may be different from one level to another. For instance, some local disaster preparedness practices may only be found at the household level while others may only be found at the community/village level. Further, practices may be different from one social group to another. For instance, Sinclair and Ham (2000) documented adaptive strategies related to household livelihoods in the Western Himalayas and concluded that, “not all strategies are viable for each group within the village. Some strategies may be village-wide, while others are specific to socioeconomic status, age, or caste, or any mixture of variables. [...] This picture of complexity is deepened when it is recognised that some strategies are only viable when others are in place.”

Some practices may be directly designed for disaster preparedness; others may be designed for other purposes (e.g., making a living) but may contribute indirectly towards disaster preparedness. Finally, some practices may help people to deal with natural hazards in the short term; while others may help them to be prepared and to adapt in the long term.

Thirdly, with respect to local belief systems – Local belief systems are understood here as the combination of people’s

beliefs (e.g., sociocultural, religious belief systems), worldviews (i.e., ways of perceiving the world), values/moral principles (e.g., respect, reciprocity, sharing, humility), and ethics. Belief systems shape people’s understanding, perceptions, and response to natural hazards. Understanding local beliefs, perceptions, and values is crucial therefore because it gives one insight into why people do things the way they do. In that sense, “with some groups, how people say things [and in which context they say things – author] may be more important than what they say” (Berkes 1999) because the outcome can be interpreted in many ways unless you understand the context. In other words, understanding the process is more important than understanding the outcome per se. For instance, the perceived fatalism of the rural poor in the Himalayas in accepting natural hazards as the ‘will of God’ cannot be understood simply as equivalent to the western connotation of fatalism, which is associated with passivity and apathy. As Hutton and Haque (2003) put it, “the perceived powerlessness among the poor reflects not resignation and passivity but a realistic perception of their position vis-à-vis dominant resource relationships”.

As such what is perceived as fatalism is part of a sociocultural and psychological coping response for people who lack individual choice and power. At the same time not all beliefs are sustainable or relevant. Some values have led to massive environmental degradation and the collapse of entire societies (Diamond 2005).

Step 2: Understanding the processes surrounding local knowledge

All three dimensions of local knowledge (knowledge types, practices, and beliefs) are interrelated and influence one another constantly. Local knowledge and knowledge in general emerges from a dynamic process of knowledge creation, use, management, and transmission. In fact, local knowledge is disappearing and being created all the time (Berkes 1999). Before trying to build upon local knowledge and practices, one needs to understand the processes involved. How is local knowledge disappearing and being created? How is local knowledge used in a specific context and by whom? How is local knowledge being transmitted within the community and between generations and who is transmitting it? How is local knowledge managed at the household and community levels? What are the key local institutions that influence knowledge management? Who has access to local knowledge, how, and under which conditions?

The process of knowledge creation itself is complex and includes aspects of internalisation, socialisation, and externalisation of knowledge, as well as the combination of one type of

knowledge with other types (Nonaka 1991). For the purpose of this report, two important points need to be highlighted. First, the internalisation of practices means that, “local people often have difficulties identifying specific practices or institutions as specifically oriented toward coping with hazards, even though those same practices do play a role in reducing risk. This makes sense given that most of these practices have been developed over centuries of trial and error. Also, some of the very practices that do reduce risk can be remarkably oppressive in other ways. In some cases [...], for example, the need to create social obligations outside of the community (that can protect households in the event of disaster) leave little options for women when it comes to choosing a marriage partner. They have virtually no voice in the matter, but their enforced silence helps to ensure the security of their natal household (and the household they are married into)” (personal communication, Dr. Ken MacDonald).

Sometimes, prior experience of a natural hazard is forgotten because the event does not happen frequently enough for people to remember and internalise it. The combination of local knowledge with external knowledge is not new. Communities totally isolated from outside influence are rare. Local knowledge is not isolated: it has always been connected to other places and other types of knowledge.

Step 3: Understanding the four pillars of local knowledge on disaster preparedness

The framework in Figure 1 can be employed to identify the four pillars of local knowledge on disaster preparedness. It can be used as a checklist of the key characteristics to identify and take into consideration during project planning and implementation. Local knowledge on disaster preparedness relates to four major dimensions of knowledge: observation, anticipation, adjustment, and communication.

Firstly, with respect to observation – Local knowledge on disaster preparedness relates to people’s observations of natural hazards through their daily experiences of their local surroundings. For instance, in the Chitral District, careful observation of the movement of the sun and the stars serves as a decision-making tool for farming activities (Akbat Khan Rahmat 1996).

Secondly, with respect to anticipation – Local knowledge on disaster preparedness also relates to people’s anticipation of natural hazards through identifying and monitoring local indicators such as early warning and environmental signs of imminent hazards as well as time thresholds, escape routes

and safe places for humans and cattle, and key skills, actors, and the roles they play within the community.

Thirdly, with respect to adjustments – Local knowledge on disaster preparedness also relates to people’s adjustment strategies through trial and error. It includes aspects of how people cope, adapt, experiment, and innovate in the face of natural hazards and how they learn from previous hazards they have faced. Their capacity to adjust is based on their access to assets (or people’s strengths, or capital endowments including human, sociocultural, institutional, financial, economic, political, physical, and natural aspects) which – as mentioned previously – is mediated by local institutions and influenced by external institutions and global factors and trends. Importantly, not all adjustment strategies are sustainable in the long term.

Fourthly, with respect to communication – Local knowledge on disaster preparedness also relates to the communication strategies about natural hazards among community members and between generations. Here communication refers to the sharing of information related to past and imminent natural hazards. In traditional rural communities, knowledge is usually transferred orally, but not exclusively so. Understanding local knowledge on disaster preparedness therefore requires us to pay attention to informal education and internal learning processes.

Step 4: Understanding the wider context: the relationship of local knowledge, disaster preparedness, and livelihoods to poverty reduction

Local knowledge is influenced by the type, frequency, and intensity of past and present natural hazards, as well as by other shocks and global trends and factors – for instance, the impacts of climate change, globalisation, road construction, and national policies on natural resources. Indeed, in many cases, natural hazards, although constituting an important stress, are not the major stressor faced by communities. From a local knowledge perspective, as suggested by Battista and Baas (2004), it is more interesting to, *“look at shocks that are recurrent and chronic and that contribute to gradually increasing the vulnerability of the community instead of exceptional natural events which require emergency operations from outside”*.

The lack of an explicit connection between local knowledge and disaster management in the literature reflects the lack of linkages between poverty reduction and disaster management,

and, more generally, the dominance of a sectoral approach to disaster management. Did we forget that **disaster risk reduction is also poverty reduction**? The issue of local knowledge on disaster preparedness needs to be understood and integrated into the wider issues of sustainable livelihoods and poverty reduction. Ultimately, improving implementing agencies’ understanding of the linkages between local knowledge and disaster preparedness can help implementing organisations to promote livelihood security and build resilient communities. Local knowledge can be used as a key entry point for this.

The four steps outlined above can be used as a checklist to verify that you have incorporated the key aspects of local knowledge on disaster preparedness into your project. The next part of the report presents the information collected in the Chitral District on local knowledge related to flash floods and earthquake preparedness. The case study is organised according to the framework in Figure 1. Chapter 1 focuses on local knowledge related to the observation and experience of flash floods. Chapter 2 focuses on local knowledge related to the anticipation of flash floods. Chapter 3 focuses on adjusting strategies. Finally, Chapter 4 focuses on how local people communicate and share information about past and imminent hazards.

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Chapter 3

Observing and Experiencing Flash Floods

Local knowledge on disaster preparedness in the Chitral District of Pakistan includes aspects related to people's observation and experience of flash floods, anticipation of floods, adjustment strategies, and communication strategies.

The people of Chitral have knowledge about the history and nature of flash floods in their own locality based on daily observation of their local surroundings, close ties to their environment for survival, and an accumulated understanding of their environment through generations. They have learned to interpret their landscape and the physical indicators of past flash floods. They can also describe and explain how their own vulnerability to floods has changed over time.

Nature and history of flash floods in Chitral

Cloud and glacier outbursts

"It was 4 pm on July 14th 2006 when the flood started. It was not raining here in the village. It was only raining higher up in

the mountains. [...] The flood blocked the river for 10 minutes and it became a big lake and destroyed a water mill. The flood continued until 9 pm. Some big stones are still stuck inside the valley." (Narrated by Islamuddin, Aziz Urahman, Gul Muhammad Jan, Rashidullah, Khan Zarin and Ghulam Jafar, Gurin village, Gurin Gole, Shishi Koh valley, Lower Chitral)

"We were ready to take our goats up to the higher pastures when eight days of discontinuous heavy rain fell from June 30th till July 9th 1978. We shifted our animals and family members during that period to a nearby village. On July 7th, the river started to build up in the main course and to spill over. Some houses were destroyed. On July 9th even more houses were destroyed. The main flow came during the night of July 9th". (Chenar village, North of Mastuj, Upper Chitral)

"The water slowly started to flow continuously over the stream channel on June 14th 2005. [...] On July 9th at 9 pm the water started to cover the land and people had to run away from their houses. In the village, people wondered how it had happened because it was not raining before the flood. But people in

the high pasture had seen a huge hole/cave formed in the soil beneath the glacier from which the water came." (Group discussion, Resettlement area close to Brep, Upper Chitral)

Spring snow melt

"It was a very nice and sunny day around June/July in the high mountain. I was herding some goats. The weather was very hot. I was staying close to a stream and I started to see the flow growing more and more. No glacier or lake is up there. I was too high to give any signal that a flood was coming." (Narrated by Zerbali Khan, an old herder, Harchin, Upper Chitral)

The deep narrow valleys and glaciated mountain ranges of Chitral District were surely the most efficient ramparts against invaders. But today the associated dynamic geomorphological and climatic processes are probably the major enemies for the growing population. Shrubs mostly with very few trees grow in this arid and steep landscape. Barely 3.5% of the Chitral area is suitable for farming (Khattak 1999). Cultivation is almost entirely limited to active alluvial fans which are transformed into oases when people construct irrigation channels. These rainfed, irrigated lands are very fertile because of the constant deposition of eroded sediment. Farmers grow cereals, fruit trees, and some vegetables mainly for subsistence purposes, using buffaloes to plough the land. However, the oases are often temporary. Any intense and prolonged rainfall, especially during the months from June to August, induces debris flow

and flash floods, and these often destroy the little agricultural land there is.

Local communities have a lot of experience of where floods occur and which areas are flood prone (experiential knowledge). Local stories highlight the different types of flash floods in the region. Some flash floods are triggered by cloud outbursts; others by glacial outburst or the snow melting in spring. Flash floods in Chitral have become part of people's lives: *"When the rainy season comes, people are mentally prepared."* (Workshop participant, Chitral Town, October 2006); *"it's a continuous process"* (Qazi Said Ahmad, Ashret village), and



Mats Eriksson

Figure 4: Irrigated land (left) with clear demarcation of the vegetation due to the irrigation channels (centre left), and non-irrigated land (right) in Morilasht region, Upper Chitral.



Arun B. Shrestha

Figure 5: A glacially derived debris flow destroyed 106 houses and large areas of agricultural land in July 2006 in Brep, Upper Chitral.

whatever happens “life goes on” (Munawar Khan, Baradam village). Informants have very good memories of the events they have witnessed. Often, they can recall spontaneously the precise date and time when a flood occurred. Stories show that there are important differences in the time taken for a flood to accumulate; varying from a few days to a few hours. In Brep, for instance, a very dry area located in the northern part of the district, the story of the last flood indicates how a slow glacial lake outburst release took about three weeks. Local stories show how local knowledge provides insight into previous water levels, change in water levels, types of flash flood and triggering factors in the locality, location of previous floods, and impacts of previous floods on livelihoods and property.

Part 3 – The Case Study



Julie Dekens

Figure 6: Destruction of cultivable land by a flash flood in Gurin village, Shishi Koh Valley, Lower Chitral, in July 2006.

Interpreting the landscape

“In 1961, my father decided to build a house in the village. One of the village elders came to him and suggested to him not to build a house on that particular site. The suggestion was based on the argument that the site had lots of river bed rocks (‘shotar bokhtu’) because the Begusht River used to flow there back in 1905. The old saying is that: ‘water never forgets its path’ (ogh than zhagho no rakhchur). But my father did not pay attention to the elder’s suggestion. He built a house and so did many other people. In July 1978, the stream flooded and took away all the houses with it.” (Amir Hazar, Izh village, Lotkoh Valley, Garachashma, Chitral District)

“The ruler took our land in Buni [local town, Upper Chitral] and gave us this land. When we moved here, the villagers of Chenar told my husband about the flood that had occurred in the village 100 years ago. Big rocks were deposited. In 1978, the stream took a new path. The whole village was destroyed but nobody died.” (Chenar Village, Mastuj, Upper Chitral)

Not only do past hazards leave psychological traces in people’s memories, often also they leave traces on the physical landscape. As such, the landscape becomes a precious source of information of what happened in the past; a physical repository of past events. Some people understand environmental signs



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Figure 7: Man sitting on rocks deposited by a flash flood on the road from Chitral towards the Lawari Pass, Lower Chitral. Notice the wooden log also deposited by the flood (centre).

of past flash floods in the landscape and can interpret these signs from their knowledge and previous experience of flash floods. Large rocks are a major indicator of past flash floods. Some people can recognise the location of past water stream/floods by interpreting the shape, location, and nature of slopes, rocks, geology, and morphology.

Life histories

Forgotten experiences

“We didn’t know the flood was coming because it was our first experience!” But one man remembers: *“Such a flood happened during our grandparents’ time but we never expected such an event.”* (Group discussion, Brep, Upper Chitral)

“After that major flood in 1978 we began to run out of our houses as soon as it was raining but now we have stopped doing that.” (Chenar village, Upper Chitral)

Most people have scant knowledge of floods they learn about second hand, especially if they happened before they were born, if oral tradition is weak, and if knowledge is not transmitted frequently enough. Stories demonstrate how, in some cases, prior flash floods have been forgotten because flash floods of great magnitude do not occur frequently enough in one place (i.e., more than once in a generation) for villagers to remember them (from one generation to another) and for

this to influence their decision-making regarding settlement. This shows how frequency of flash floods influences people's capacity to remember hazards and how transmitted knowledge is probably more 'porous' than experiential knowledge.

Evolution of vulnerabilities to flash floods

"Initially our village was located below the glacier because people had access to drinking water there. Then the British built water channels on the other side of the river and people started to occupy this area as well. Since then, most people have built houses on both sides of the river; and this is a great advantage because in winter people living close to the glacier who suffer from water shortages are able to shift temporarily to the other side. However, a few families only have land on one side of the river, the most vulnerable to landslides and flash floods, because the former local ruler of Chitral took some of their land. So today those people are more vulnerable." (Dost Mohammed and Sardar Azam, village between Mastuj and Buni)

"Some people here have land on both sides of the river! Our great-grandfathers dug irrigation channels in what is called today 'Oshul Deh' and divided the land among them. It used to be an advantage because in case a flash flood happened we could easily seek refuge on the other side of the river.

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Mats Eriksson

Figure 8: Woman living in a resettlement area after the flash flood which destroyed 106 houses in the original village in Brep in July 2006

Nowadays, the land is being more and more divided among our relatives. We can still fall back on our relatives but it is not our own house anymore." (Panan Deh and Osheel Deh, Reshun, Upper Chitral)

A combination of external factors (acting simultaneously, or not, and influencing and re-enforcing each other) often influences people's vulnerability to flash floods. For instance, some stories illustrate how environmental, demographic, and historical/political factors have played a major role in changing people's vulnerability to flash floods. Land scarcity and water access

often compel people to stay close to the streams and glaciers (environmental factors). With the growing population, land fragmentation reduces people's options and their flexibility to choose safe locations and to resettle during the rainy season (demographic factors). In some cases, people used to live in safe places but the local rulers confiscated their land.² They were resettled in a vulnerable place and/or they simply lost part of the land upon which they used to fall back during the rainy season (historical and political factors). Stories about land

resettlement during the times of former local rulers, or currently following construction of infrastructure (e.g., hydropower stations), are common in the region. Life stories can provide useful information about local perceptions about floods and changes in people's physical and social vulnerability to floods. This information can help to identify vulnerable groups and individuals that might otherwise be 'invisible'.

² Land confiscation happened for various reasons (inefficiency of services at the household level, intrigues with the neighbours, politics, intrigues with the court, religious factors)
– Prof. Faizi, Chitral College

Box 1: Did you ask? Observation and experience of flash floods

History of floods – What do people know about the history of floods in their locality – e.g., when and where did the last flood occur? What was the water level of the last flood? How many people died? What damage was caused by the flood? How do people understand and interpret the situation or the landscape using their knowledge and/or previous experience of floods?

Nature of floods – What do people know about the nature of floods in their locality – e.g., onset, origin, velocity, types of rain, etc?

Interpreting the landscape – How do people understand and interpret the situation and the landscape from their knowledge and/or previous experience of flash floods?

Evolution of physical and social vulnerabilities – What is people's understanding of their own vulnerability (e.g., in pre-disaster situations) and of the factors that influence it? Are they living in a more vulnerable house now than before? Why? What happened? Do people have different priorities than they had before and how does this influence their vulnerability to natural hazards? To what extent are people able to identify the problems and to what extent are they able to solve them on their own initiative? How does disaster change, increase, and/or create new vulnerable groups (i.e., emerging vulnerability or vulnerable groups)? What other natural hazards and stresses do the community face and how does this influence local knowledge on disaster preparedness?

Chapter 4

Anticipating Flash Floods

People manage to anticipate flash floods by observing and interpreting warning signals in the local environment. They also manage to make basic emergency plans and to identify time thresholds for saving key belongings and for moving out and higher up, for instance. People also have knowledge of safe settlement areas and from whom to seek advice and support within the community.

Forecast and early warning signals for flash floods

“The people of Chitral have a smattering of knowledge about the movements of astronomical bodies like the sun, the moon, and the stars. The pace of the movements of these bodies, after long observation, provided visual guidance to them in their daily lives. [...] The sun’s journey [...] has also been marked in connection with the cultivation of different crops and other work. Experience enabled people to receive guidance even in the rainy season. In a mountainous country, the sun rises over the hills and the rays of the sun coming out earlier through notches in the cliffs have been closely observed and marks

made to record the advance of a season. [...] The scheduling of farm work according to these calculations is called ‘dehqan hisab’, ‘the peasants’ account. From these movements of astronomical bodies, predictions about whether the coming seasons will be dry or wet are also made.” (Akbar Khan Rahmat 1996, Rahmat is an eminent local poet)

“We saw black clouds, lightning, and huge thunderstorms above us in the mountains. Some dust was also starting to rise and we heard the noise of boulders falling and rolling down. [...] We understood that a big flood was coming and we ran away to safety.” (Islamuddin, Aziz Urahman, Gul Muhammad Jan, Rashidullah, Khan Zarin and Ghulam Jafar, Gurin village, Gurin Gole, Shishi koh valley, Lower Chitral)

“Forty years ago, a snow avalanche affected our village. Before the avalanche, a mountain goat went down to the village. This unusual apparition of wildlife gave us a signal that something was going to happen because mountain goats normally don’t come down to the villages.” (Islamuddin, Aziz Urahman, Gul Muhammad Jan, Rashidullah, Khan Zarin and Ghulam Jafar, Gurin village, Gurin Gole, Shishi koh valley, Lower Chitral)

“The whole valley started shaking like it does during an earthquake before the flood came.” (Islamuddin, Aziz Urahman, Gul Muhammad Jan, Rashidullah, Khan Zarin and Ghulam Jafar, Gurin village, Gurin Gole, Shishi koh valley, Lower Chitral)

“People know when it will rain. They look at the direction of the wind.” (Qazi Said Ahmad, Ashret village, Lower Chitral)

“We also knew that the flood was coming because of the typical smell.” (Old lady, Chenar village, Mastuj, Upper Chitral)

People can identify and monitor natural phenomena related to flash floods such as the colour of the clouds, intensity of rainfall, unusual sounds, and changes in water flow. As such, they have some level of hydrological and meteorological knowledge. Some people are able to identify the unusual movements and appearance of wildlife (ants, birds, rats and mice). Long observation of the sun, the moon, and the stars used to help people make decisions about farming activities (Rahmat 1996). Overall, few people die in flash floods because they have learned from experience to identify and interpret environmental warning signs and signals of flash floods. However property, agricultural fields and irrigation channels, are damaged often. (*“The danger from flash floods is not so much to life as it is to livelihoods”*; *“Protecting the land, more than life itself, is the big issue.”* Workshop participants, Chitral Town, November 2006) Today, this ability to observe and monitor environmental signals is weakening partly because the

number of men working outside the village is increasing (see Chapter 6, section on local early warning systems in 2006).

Time thresholds and emergency measures

“Since this event, when it rains heavily we know we have to get ready to run away with our luggage. Most of us have a bag prepared with clothes and shoes. We have already shifted all our important documents to safer places” (i.e., relatives’ places). (Abdullah Khan Shakir, Shainigar village, Drosh)

“Now every time it rains we move out of our houses!” (Imam of the village, Isfangol village, Upper Chitral)

“When it rains heavily we climb higher up because we know that a flood will occur.” (Elder, Panan Deh, Reshun Gole, Upper Chitral)

“If it is raining heavily at night we stay awake.” (Shapir Khan and Muhammad Yousaf, Panan Deh, Reshun, Upper Chitral)

“After that event, we began to sleep with our shoes on during the rainy season.” (Old lady, Chenar village, Mastuj, Upper Chitral)

Flash floods are very challenging because they occur, by definition, very rapidly and do not leave much time for

Herders of Chitral: The Lost Messengers?

preparedness. Use of the time between the observation of key environmental signals and the occurrence of floods is therefore crucial. Households adopt a few simple short-term strategies before the rainy season starts or during heavy rainfall such as saving administrative papers and other belongings with their relatives or with neighbours, moving physically to safer places especially at night, running higher up and staying awake or sleeping with shoes on, and having a 'go-bag' ready. **Although most of these simple strategies might seem like 'common sense' or 'universal knowledge', it is important to recognise that people have bounded rationality; that is, people's rationality is limited to their own information and beliefs.** For instance, a man interviewed described how his wife ran away from the house as a flash flood was coming but then, seeing many people on the street, decided to go back to get her veil. She was then trapped in the house, but did not die. Her husband likes to believe that the veil saved his wife from the flood; seeing her return to get it as a protection factor rather than a risk. This story illustrates the point that 'running away' when the water starts rising might not always be accepted as common sense depending on religious and cultural beliefs and practices for instance.

Safe places for building houses

"We take two things into account when we build our houses. We don't build houses in the way of floods and in places where stones may fall down." (Elder, Krakal village, Kalash Valley, Chitral)

Part 3 – The Case Study

"In the Parsan Valley, people used to have strict rules to prevent the location of settlements in hazardous places. They were not allowed to build settlements close to the river. But now, with the increase in population, people are living closer to the river bed due to lack of land." (Syed Harir Shah, Programme Manager in Community-based Disaster Risk Reduction, Focus Humanitarian Assistance, Chitral)

"Twenty years ago a major flood washed away all the houses in the village. At that time, our houses were located in a vulnerable place because no water was available higher up. After that major flood, access to water improved and we rebuilt our houses higher up on the mountain slope in safer places. This year the flood did not destroy any houses." (Islamuddin, Aziz Urahman, Gul Muhammad Jan, Rashidullah, Khan Zarin and Ghulam Jafar, Gurin village, Shishi koh Valley, Lower Chitral)

"The whole area is flood prone, but it is very costly to buy land somewhere else." (Shainigar village, Drosh, Lower Chitral)

"I don't feel safe here. A flood event might happen again but what can we do? We don't have another place to live." (Lady, Chenar village, Chitral)

"Our homes never get washed away!" (Qazi Said Ahmad, Ashret village, Lower Chitral)

"Houses are built in the wrong places!" (Workshop participant)



Figure 9: The physical geography of Chitral District does not, in general, provide many safe places to live. The mountain slopes often consist of steep, barren land unsuitable for settlement. The river plains are exposed to recurrent floods making them equally unsuitable for settlement. The only land left is on the numerous alluvial fans occurring at the mouths of stream gorges, or valleys, descending from the high mountains. Often, living on these alluvial fans is connected with a high level of risk, since they are exposed to recurrent flash floods and debris flows. In fact, alluvial fans are formed from such events. Hence, people are often in a situation in which they have to find the least vulnerable spot within the alluvial fans. In general, such places are at the sides or at the very edges of the fan.

The first step towards disaster preparedness in mountain regions is for people to locate their houses in safe places, away from debris flows, flash floods, and snow avalanches. Settlement options safe from floods are few. In many places, the river channel takes up the whole valley. Most of the time, irrigation channels have to be built to make the land suitable for settlement, and this involves additional costs that have to be borne by the locals. In most cases, people can only try to minimise risks by choosing the less hazardous places whenever possible. Some houses are built on relatively ancient alluvial fans that have been progressively cut off by a major stream coming from the mountains. In such cases, settlements may be safer than on more recent alluvial fans because a deep channel is formed by progressive stream erosion. Other settlements are built in clusters and slightly high up on excavated mountain slopes (but still relatively close to the river beds for water access) not only to be safe from floods but also to save the suitable land for agriculture. However, many new, dispersed settlements are also located on active (and therefore very risky) alluvial fans due to lack of available land and population pressure. Houses located at the bottom and on the sides of alluvial fans are safer than those located on the top and in the centre as the chance of floods and the velocity of water/debris flows are reduced.

Generally, the location of houses depends on a combination of factors: including environmental (avoiding areas prone to



Figure 10: Buildings located on top of an alluvial fan, Upper Chitral

flash floods and choosing areas with access to drinking and irrigation water; equally, lack of water often forces people to build their houses close to the river bed), socioeconomic (e.g., land fragmentation because of division among the sons, getting land from relatives, willingness to live close to relatives and on one's father's land), demographic (e.g., increase of population), institutional (e.g., customary rules, no memory of previous floods), political (e.g., land regulation and building codes – or lack of!), and historical (e.g., land requisition). Interviews reveal, for instance, that in certain places the location of houses has improved over time because water has

been made available in safer areas and people have learned from previous experience of a flood (e.g., Gurin village, Shishi koh Valley). Elsewhere households newly affected by floods and with prior experience of them are rebuilding their houses in the same area or very close to the damaged area because of lack of assets/options and because of people's desire to remain close to their relatives – and this trend is common in the region (e.g., Chenar village, Mastuj area).

An apparent contradiction transpires from the last two quotations in terms of whether or not houses are built in safe places. This apparent contradiction reflects the current changes that are happening in the district. *“We have lost the local knowledge. Houses are now being built in vulnerable places”*, comments Professor Faizi of Chitral College. Some settlements, including newly-constructed public schools, are even located at the hydrographic apex of active alluvial fans, the most vulnerable area. The district currently lacks statistical data and analysis to validate field observations and community perceptions on this topic properly. Different forces are also interacting at the same time, and this makes the situation quite complex. On the one hand, the increasing population means that access to safe places is decreasing. On the other, access to drinking and irrigation water has also probably increased, especially following interventions by non-government organisations in the 80s. New land has been cleared for new houses and people have been able to settle down in new places (maybe safer than

previously?)³. Schools are built by the government but the land is generally donated by the local communities so the worst land is often provided because of the pressure on land and lack of suitable areas for cultivation and settlement. Members of local on-government organisations are convinced that *“communities need to be made aware of natural hazards again”*.

Critical actors and skills

Religious leaders and elders

“Local religious leaders and other pious people used to predict disasters and in many places it was true.” (Group discussion, workshop on local knowledge, Chitral Town, October 2006)

“In ancient times, we used to get advice on where to build new houses from two or three elders in the village, but now we make decisions at the household level.” (Elder, Panan Deh, Reshun Gole, Upper Chitral)

“In the past the ladies were the custodians of local knowledge. The women used to memorise all the traditional things because they were stuck at home and because they were also the direct target of natural hazards. They had to be at the forefront of natural hazards because they were sometimes on

³ According to Prof. Faizi, Chitral College, the Methar system (the last ruling dynasty of Chitral as an independent state until 1892, Ali and Khawaja 2004) was more efficient than the current one, for example it had a better way of constructing water channels.

their own and they had to find ways to cope with the hazards. Aged women are key informants for local knowledge related to natural disasters. In the case of weather forecasts old men are more knowledgeable than the women because they are the ones responsible for crop management and harvests.” (Professor Faizi, Chitral College)

“My grandpapa was well aware about the harvesting season, crop protection, water management, the forthcoming season’s severity, philosophy of working together, risk reduction in day-to-day affairs, importance of reforestation, and use of watershed etc. He knew how to make meteorological and hydrological forecasts, for instance, regarding pests. Solar observation, astrological beliefs, and observations of previous seasons and the application of traditional wisdom were among the traditional knowledge he used to inform the family and the villagers how to plan their next year’s harvest.” (Syed Harir Shah, Programme Manager for Community-based Disaster Risk Reduction, Focus Humanitarian Assistance, Chitral)

Key leaders, artisans, other social actors and skills

“The ladies were not ready to leave their houses but the head of the village at the time – a forester, whose grandfather had witnessed the previous flood – convinced us to leave.” (Women’s group discussion, Chenar village, Mastuj, Upper Chitral)

“Not everybody can make and use a ‘booq’.⁴ You need the right size and shape of horns and you need to know how to whistle.” (Durdana Khan, an old retired herder, Harchin village)

“Nobody in the village, knows how to build a traditional house like this one, but there are one or two local carpenters from Reshun who know.” (Elder, Panan Deh, Reshun Gole, Upper Chitral)

“Men know stories of floods that happened in nearby villages because they travel more than women. But women travel now a little bit more than before.” (Women’s group discussion, Chenar village, Mastuj, Upper Chitral)

“In the traditional society of Chitral, youngsters were given training in different skills. Chitrali handicrafts of wool, clay, iron, wood, and skin were the main source of subsistence. The education policy that replaced the old system has no direction. It produces people with certificates and degrees that serve no purpose. The result is that our society has produced unemployed youth instead of skilled people. New generations in the families of traditional craftsmen/women are giving up their ancestral professions without being able to adopt better ones.” (NWFP and IUCN-Pakistan 1999)

⁴ A horn made out of a yak or local goat horns used by herders as a communication tool and sometimes to give signals about imminent danger.

Different people in the same community have different types of knowledge. People's status within the community also gives their knowledge different values and meaning. Some people are more knowledgeable about natural hazards than others because of their profession, their age, their status, their family history, their skills, and/or specific gifts etc. Some people, because of their specific skills and ability to 'read' the landscape, the sky, and other elements of the environment

are trusted by the community and their advice is followed. This means that people manage to anticipate floods because of their trust in local advice and predictions (e.g., elders, local religious leaders, and other pious people). However, changes in the education system and the fact that the decision-making process is now based mostly at the individual and household levels result in the weakening of traditional knowledge and skills.

Box 2: Did you ask? Anticipating flash floods

Early warning signals – How can local people manage to anticipate and identify environmental warning signals of flash floods? What do people observe, hear, and sense before a flash flood happens? Do people have traditional/ local weather forecast systems? How do people know that it is time to leave their house?

Time thresholds and emergency measures – When do people know that it is time to leave their houses and move on to higher ground? What should they take with them?

Escape routes and safe house locations – How are communities and households preparing for a flood that is

about to happen? Where will people go? Why are people building houses in vulnerable places? Is it because of a lack of knowledge and/or a lack of options? What main obstacles are people facing in trying to build their houses in safe places?

Critical actors and skills – Who is doing what within the community? Who holds or owns the relevant knowledge about floods? Who has specific skills that can directly or indirectly contribute to improved disaster preparedness? How can these skills be nurtured?

Chapter 5

Adapting to Flash Floods and Other Hazards

Strategies for adapting to flash floods in Chitral include various technical and non-structural measures. Technical strategies include the construction of food stores, terraces to reduce damage to houses from falling rocks,



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Figure 11: Wooden food store in the Kalash village of Jao Guru, Birir Valley, Lower Chitral

retaining walls for flood protection, and traditional earthquake-resistant structures. Non-structural strategies especially rely on strong family and social networks, the ability to spread the risk of natural hazards among different assets through spatial and economic diversification mechanisms, traditional natural resource management regulations, and the ability to learn from previous mistakes and community initiatives. When people are asked directly what they are doing to improve their preparedness against natural hazards, not many elements come to mind. Indeed, over time people tend to internalise their practices; and they become part of people's culture and day-to-day life. This is especially true for long-term adjustments. In fact most of the non-structural strategies have been established for people to cope with many kinds of stress and not only flood preparedness per se. Nevertheless, all adjustment mechanisms add to social and economic resilience.

Technical and structural strategies

Food stores, terraces, and retaining walls

"The flood took place on July 14th 2006 from 4 pm to 9 pm. [...] It destroyed all our fields but our houses were safe and so were our grain stores kept inside the houses. We can store up to two to three months of grain but the quantity depends on how much land each person has and on the time of the year. We also have houses in the pastures with food stores (butter especially) but the flood washed away three of those. It had



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Figure 12: Retaining walls along a stream in Birir village (Kalash) financed by an external organisation using local materials. Traditional flood-protection walls are made out of stone and wood. But nowadays, in many places, wood is becoming very expensive, or is even unavailable because of excessive deforestation.

never happened before!" (Narrated by Aziz Urahman, Gurin village, Gurin Gole, Shishi Koh valley, Lower Chitral)

"Through our work with communities here in Chitral we have seen cases in which people built terraces at the back of their housing plots to reduce damage from rock fall on their houses." (Syed Harir Shah, Programme Manager for Community-based Disaster Risk Reduction, Focus Humanitarian Assistance, Chitral)

"Before, the community used to construct protection walls but now it is too costly so we rely on the government." (Abdullah Khan Shakir, Drosh, Lower Chitral)

"In the old days there was no system of preparedness in place to ensure food supplies for the inhabitants during the 6-month winter period. The people themselves ensured they had enough essential commodities for the block period. Even today, local people, the business community, and the local government arrange essential commodities and wheat for six months in summer in preparation for winter, and the business community as well as the households stock their daily needs for a four to five month period to overcome the season's harshness. People still use indigenous wisdom to harvest seasonal crops according to the changing climatic situation, and they know how to protect their crops, plants, and livestock from the harsh weather conditions. A very famous saying is: "if you are not caring for yourself, who will care for you" (Thansoro key khiyal

Herders of Chitral: The Lost Messengers?

no arrow, ka ta khiyal koy).” (Syed Harir Shah, Programme Manager for Community-based Disaster Risk Reduction, Focus Humanitarian Assistance, Chitral)

Traditional earthquake-resistant houses

“If an earthquake starts, we always run into our houses!” (Kalash elder, Krakal village, Bumburet Valley, Lower Chitral – Kalash are an ethnic minority in Lower Chitral)

“There are many rich people here but they don’t build traditional houses.” (Reshun, Upper Chitral)



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Figure 13: Traditional Kalash houses, Krakal village, Bumburet Valley, Lower Chitral. The flat roof also serves as an outdoor living space.

Most Kalash elders have witnessed at least one or two major earthquakes and many small ones, but they are not too worried about them. Traditional houses in the Kalash valleys, and in Chitral and the North West Frontier Province (NWFP) in general, are earthquake resistant due to a sophisticated combination of wood, stones, and clay. A traditional house consists of a single room without windows (*baipash*) and a veranda. Five wooden pillars⁵ support a flat roof made of stone and mud layers. Due to the cold climate, a hole in the roof to let the smoke out of the central fireplace is the only opening bringing in light and air apart from the entrance. The walls are made of stone, mud, and clay with thick wooden logs (25 inches). The Kalash elder reports that only the cattle sheds and the walls along the roadside are damaged by big earthquakes because these structures do not have any wood. But nowadays, access to wood is becoming more and more difficult due to deforestation. A traditional house might require about 10 to 20 big trees. The poorest households cannot afford wood anymore and instead have to use more stones and clay. Most of the other houses are made of mud brick, because wood is expensive. Rich households do not always follow the traditional trends anymore either – for reasons other than financial ones, including the social status attached to modern buildings. The modern trends favour houses with separate rooms, larger openings/windows, and corrugated roofs. Certainly the new

⁵ The five wooden pillars are found in most traditional Chitrali houses and have a special meaning in the Ismaili religion. Each pillar symbolises a prophet: Mohammed, Ali, Fatima, Asan, and Hussain. (Group discussion, Brep resettlement area, Upper Chitral)

style provides a healthier environment because it has better ventilation than the traditional style and the materials used are less prone to fire, but the structure is not as energy efficient and earthquake resistant as the traditional structure. The decreasing use of traditional houses is also related to the lack of labour due to the increasing number of men seeking jobs outside their villages. Building traditional houses is extremely labour intensive and requires specific skills. Overall the changes in house construction raise an interesting point



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Figure 14: Kalash girl in front of a traditional Kalash house, Bumburet Valley, Lower Chitral. Traditional houses are stronger because they are made out of a sophisticated combination of wood, stones, and clay. But nowadays, access to wood is becoming more and more difficult due to deforestation – especially for the poorest households who cannot afford to buy it.

of controversy regarding the roots of the problem and how to tackle it. Some people perceive traditional (wooden) houses as not being ‘environmentally friendly’ because they take a lot of wood to construct. Others perceive that the forest policy is not adequate and does not allow people to manage the forests in a sustainable manner – this is discussed below in the section on ‘natural resource management’.

Non-structural strategies

Social capital

“We help each other. We are people descended from one ancestor here. We are one people. It’s natural to help each other.” (Qazi Said Ahmad, village leader, Ashret village, Chitral)

“The villagers from higher up used to warn us and we used to spend nights outside in this other village. The people of this village used to help us to save our belongings. They help us a lot!” (Aged woman, Chenar village, Mastuj, Upper Chitral)

“Now we are building a new house here [on the fringe of the last debris flow]. We don’t have any other options. We are not going to the resettlement area because our relatives live here and we still have a small plot of land. Whether or not the resettlement area is safer from floods, our relatives are here so it is more convenient for us to live close to them. We can’t leave this place because it is our family land. No one can leave their ancestral land!” (Woman, Brep, Upper Chitral)

Herders of Chitral: The Lost Messengers?

“We lost seven fields in the last major flood in 1978. Even if I could I would not leave this place because I am attached to this land and I am comfortable in my own area. It is more important to live with my relatives than to live in a safer place.” (Women, Chenar village, Mastuj, Upper Chitral)

Relatives and neighbours provide social and psychological insurance before, during, and after floods. Some women also go back to their parents’ homes during the flood season. Households have strong family/lineage/clan ties and social support networks or systems which help reduce their sense of helplessness. However, this sense of solidarity in the face of threat may weaken as men are starting to work outside the villages to earn cash, therefore increasing individualism. Moreover, a strong sense of place and family ties sometimes contributes to underestimation or disregard of the possibility of future hazards. Despite knowing about the danger, some people affected by floods still prefer to resettle in the same vulnerable area to maintain, and still benefit from, family support.

Diversification strategies

“Everybody in the village has land in the pastures and some household members (both men and women) go there for two to three months during the summer.” (Elder, Panan Deh, Reshun Gole, Upper Chitral)

“It is safer to keep the livestock up in the pastures during the rainy season.” (Women’s group discussion, Chenar village, Upper Chitral)

“All our livestock (goats, sheep, and cows) are taken up to the pastures, but there are also risks higher up.” (Elder, Panan Deh, Reshun Gole, Upper Chitral)

“People now have grain from the warehouses and go to work in the cities. They also cut trees in the mountains and sell wood to the market for 100 Pakistani rupees per kilogramme. It is difficult because we have less and less wood available and work is not easy to get outside. So we are still very dependent on our agricultural land. We will start to cultivate this land [that had just been damaged by the flood] again as soon as possible.” (Islamuddin, Aziz Urahman, Gul Muhammad Jan, Rashidullah, Kahn Zarin, Ghulam Jafar, Gurin village, Shishi Koh Valley, Lower Chitral)

“No one leaves the village permanently. It is only seasonal migration.” (Qazi Said Ahmad, village leader, Ashret village, Chitral)

“Due to lack of management, the cultivated area in Chitral could not be increased in either quantity or quality. For example, the rotation of crops was abandoned and the one-crop system was forced upon the farmers and thus the traditional cultivation

system of growing maize, barley, millet, and pulses was abandoned. As a result an amount of 60 million is annually spent on food subsidies for the district from the national exchequer". (NWFP and IUCN-Pakistan 1999)

Pastures, agricultural land, and houses – three (gendered) habited worlds wherein herders/nomads, men, and women are at the heart of a complex agropastoral system, a combination of irrigated cultivation and animal husbandry. Livelihood diversification has been a key coping mechanism for facing the harsh environmental conditions (including physical isolation and natural hazards) and economic hardship. Chitral remains closed to the rest of Pakistan for about six months of the year during the winter because of snow, which can be several metres' deep (and temperatures can reach minus 15 degrees Celsius). Certain strategies spread the risks of flash floods among people's physical and economic assets, allowing the system to maintain a level of flexibility and to bounce back in the face of change in general (and natural hazards in particular). Long-term strategies include vertical transhumance and economic diversification, but also the separation of houses from animal sheds, and landholdings dispersed over a wide area. All four aspects may contribute towards disaster preparedness in certain contexts and indirectly only: apart from transhumance, they are not common practices in the region.

Transhumance can be described as a resource optimisation strategy between the lowland and the pastures (vertical spatial

diversification) allowing people to take advantage of the ecological niches, depending on seasonal climatic changes by moving livestock between different grazing lands (using the fast-growing and nutritious higher altitude plants, while the sites at lower elevation rest or are used for cropping and vice versa). However, generally, this resource optimisation strategy also increases some risks. In the transfer of livestock, the herds and flocks and herders are at risk from avalanches, storms, blizzards, landslides, and so on – more so than they would have been had they stayed put. In fact, blizzards in late spring and early fall have probably caused more deaths and damage to transhumance flocks and livestock than any other natural hazard (Personal conversation, Dr. James Gardner). This means that transhumance might be a useful strategy for spreading the risk of possible death of livestock in flash floods but on an ad hoc basis only.

In some areas, the animal sheds are located away from the houses (horizontal spatial diversification). Indirectly this can contribute to spreading the risk of physical damage from flash floods over a geographical area. However, the practice is very context-specific and varies from place to place depending, for instance, on political/religious, economic (labour efficiency), institutional (access to user rights), and climatic factors and illustrating the complexity of the system. For instance, in some places, it is a new trend influenced by religious, political factors. The religious leader of the Ismaili Muslims recommended to its followers, mainly located in Upper Chitral, that they separate



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Figure 15: Young herder bringing a flock of goats to the pastures, Chitral District

their sheds from their houses for hygienic purposes. In Lower Chitral, separating sheds from houses is not new, but reasons for doing so vary. In some cases, houses are built on slopes, whereas sheds are built close to the fields so that manure from the sheds can easily be transported to them. In the case of congested villages, specific routes are assigned to each villager for his cattle. A villager with no user rights is compelled to build his shed outside of the village. Finally, due to the harsh climatic conditions during winter, some people may want to build their sheds close to their houses to be able to watch their calves, especially at night. (Personal communication, Farid Ahmad)

A third strategy for spreading risks is to rely on dispersed landholdings. If a flood damages one field, the landowner can still fall back on other fields located somewhere else. However, many people do not have dispersed landholdings. In most cases, only the richest people have dispersed landholdings. In other cases, dispersed landholdings may also depend on people's/family's past relationships with the former rulers. Again, the ability to rely on dispersed landholdings as a risk-spreading strategy against natural hazards is quite context-specific.

People rely on different sources of income (economic diversification). Most rely on subsistence agriculture, livestock, selling wood and getting jobs outside the village. Today, although more people than before are diversifying their livelihoods through remittances, the agropastoral system is still central to people's livelihoods because of the lack of job opportunities outside (one reason why people do not leave their villages permanently). In that sense, spatial and economic diversification mechanisms are often intertwined. Obviously not all diversification strategies are appropriate or sustainable. In Chitral, as in many other places in the Himalayas, the livelihood diversification process includes the sale of wood. This is because of the lack of jobs and leads to increased deforestation.

Natural resource management

Access to landownership

“We are not homeless. Everybody has a piece of land. We inherited our land from our ancestors.” (Qazi Said Ahmad, village leader, Ashret village, Lower Chitral)

“One hundred and three households lost some land and 57 households lost everything due to the flood. Eighteen families are now living in the resettlement area [land provided by the government]. The others are living on their relatives’ land. Now we don’t want anything from the government. We only want the land that is around our houses and drinking water.” (The land around the resettlement area is owned by the Government.) (Group discussion, Brep, Upper Chitral)

“Our land is more fertile now! Most of the damaged fields from the last 1978 flood are now cultivable and very fertile.” (Aged women, Chenar village, Mastuj, Upper Chitral)

Community regulations on grazing and deforestation

“People here have too many goats! To stop the floods people need to stop the goats from grazing and to start forest regeneration. I have witnessed lots of changes in the forest cover over time and many timber mafias are working here. Rich people hire contractors to cut down trees for sale in Chitral. People are overgrazing their herds and cutting down trees because they do not have other means of livelihood. Unemployment and

lack of education are big problems.” (Qazi Said Ahmad, village leader, Ashret village, Lower Chitral)

“The government destroyed the forest higher up and to hide the degradation they set the forest on fire. This is why we had this big flood recently.” (Villagers, Lower Chitral)

“The community ban cutting down trees and pulling shrubs to reduce the floods. If we do cut trees and pull out shrubs we are fined. I know many people who have been fined. People report whenever they see somebody cutting down trees. Now we have to buy firewood from lower down in Chitral.” (Dost Mohammed and Sardar Azam, village between Mastuj and Buni, Upper Chitral)

“In Garumsheshma [local place] the community imposed a ban on cutting down trees at a specific time of the year.” (Syed Harir Shah, Programme Manager in Community-based Disaster Risk Reduction, Focus Humanitarian Assistance, Chitral)

“In order to prevent furrows (small gullies) being formed, communities used to ban the practice of dragging wood down the slopes. Gullies may aggravate flash floods in case of extreme rainfall events. This type of ban reduced the impact of floods but had a big impact on people’s livelihoods because they were left with no alternatives. Now this practice is being revived in some places due to deforestation problems.” (Aziz Ali, District Manager, IUCN-Pakistan Chitral Unit)



Arun B. Shrestha

Figure 16: Tracks caused by dragging wood on denuded hills around Chitral town. Traditional forest resource management included a verbal code of conduct ('dastoor') laying down various principles such as bans on cutting wood in a certain locality or bans on a number of undesirable activities on a particular rangeland for a particular period. One such activity is the practice of dragging logs down the hillsides after they have been cut in high altitude forests. This practice has been banned in order to reduce soil erosion as a result of gullying along the tracks formed by the dragged logs. (NWFP and IUCN-Pakistan 1999)

Most people in Chitral District own land. This is very important as agriculture is still their most important means of subsistence, as very few jobs are to be found outside. Communities used to have strong rules to secure the sustainable use of pastures and forests. Nowadays, these informal community rules allowing for

the sustainable use of the forests have eroded because of the nationalisation of forest resources in 1975, but some of them are also now being revived in certain areas. (NWFP and IUCN-Pakistan 1999)

Other attitudes towards flash floods

Learning from previous mistakes

"We have learned now that we should build our houses on slopes. Our houses should have fewer rooms. Our valuables should be stored in safe places. Our money should be in government banks. Now we are thinking of building a common store for grain, and animal sheds in safer places." (Group discussion, resettlement area, Brep, Upper Chitral)

"Some villagers are now completely indebted. This man for instance bought a house on loan, did all the repairs, and had just rented it out for a few days when the flood came and washed it away. The people who have not had anything damaged by the flood don't come together. Now we are thinking of a village or social organisation to which everybody could contribute in case of a crisis (saving money)." (Shainigar village, Drosh, Lower Chitral)

Community initiatives and attitudes towards external help

"Now we are also writing letters to the government requesting it to build embankments. Writing these letters is what we are

doing to prepare ourselves because we are expecting floods every year.” (Abdullah Khan Shakir, Shainigar village, Drosh)
“Before, people were solely dependent on their own resources. But now their mindset is different. People are becoming dependent on the government.” (Prof. Faizi, Chitral College)

“We managed to arrange four million Pakistani rupees from the Aga Khan Rural Support Programme to construct retention walls against recurrent floods, but the local mullahs (religious and political leaders) prevented us from having any kind of arrangement with Aga Khan Rrural Support Programme. We received threats that we were engaging in anti-Pakistani actions and we fear that whenever we make a request for action we may be arrested.” (Villagers group discussion, Lower Chitral)

Other general attitudes towards flash floods reveal that some people manage to learn from previous mistakes and have

started to organise themselves at the community level; for instance, to request external help from the government and non-government organisations. Some attitudes seem to indicate an increasing dependence on external help. The last quote illustrates how political and religious factors can come into play in influencing people’s vulnerability to floods. The villagers’ complaint reveals that local political and religious powers can inhibit community initiatives and institutional cross-scale linkages. This example also reveals how religious beliefs, and in this case the division between the Ismaili Muslims in Lower Chitral and the Sunni Muslims in Upper Chitral, can influence local practices in disaster preparedness. The Ismaili Muslims believe that the Aga Khan, the founder of the Aga Khan Foundation, is their religious leader. Therefore, some religious/political Sunni Muslim leaders refuse any intervention from the Aga Khan Rural Support Programme, which is linked to the Aga Khan Foundation as a way of denying or opposing the Ismaili Muslims.

Box 3: Did you ask? Strategies of adaptation to natural hazards

Technical and structural strategies – Food storage: how are communities and households preparing for the rainy season? Do they have specific food storage techniques? When do they start storing food? Where? What kind of food? For how many days or months can they rely on the food store? **Terraces and retaining walls:** what are people doing at the community level to control the stream? **Traditional earthquake-resistant houses:** what can be learned from traditional housing structures? What are the elements that make traditional buildings more earthquake resistant than new ones? What are the elements that reduce the sustainability of such buildings (e.g., very labour intensive)? How can traditional structures be made more sustainable? Which households are building traditional houses and which ones are not? Why are those households not building traditional houses anymore? How do external forces, including natural resource policies, have an impact on local knowledge and practices? How are current (forest and land) policies influencing local practices? How can changes in the policies support or prevent people from adopting earthquake-safe practices?

Social capital – What are people's relationships with their relatives and their neighbours like? What does a households' social network look like? Where are their relatives located? What networks are people embedded in (e.g., family, social, professional, political) and how can the villagers best use them for disaster preparedness?

Diversification strategies and natural resources management – How do communities and households try to spread the impacts of flash floods among their resources (physical, economic, social)? Do they have landholdings in different locations? Do they have different livelihood activities? Do they also rely on cash-income activities? What background and mindset do people have regarding business? Do they have micro-finance arrangements and entrepreneurial attitudes or backgrounds? Do land ownership disputes arise from loss of land due to flash floods? What are the local adjustment strategies? Are they equitable?

Other attitudes towards flash floods – What are people's attitudes towards flash floods? What are the indicators that people have learned from previous flood events? How does the context (e.g., historical, sociocultural [age, gender, class, caste, physical ability, and ethnicity] and religious background influence local knowledge about and practices in disaster preparedness? For example, in this case study, do Sunni Muslims have different knowledge about and practices in disaster preparedness than Ismaili Muslims? Do people who have been settled for a very long period of time (e.g., the Kalash) have different knowledge about and practices in disaster preparedness than people who have not been living in the region for so long? How does the Islamic belief system influence, promote, and/or hinder local knowledge and practices on disaster preparedness?

Chapter 6

Communicating About Natural Hazards

“Knowledge generation in itself will not be sufficient for building adaptive capacity in social-ecological systems.”

(Folke et al. 2002)

Generating knowledge does not mean that knowledge is understood, memorised, and used. In other words, knowledge generation is different from knowledge assimilation. In many societies with oral traditions, past events, including flood events, are embedded in individual and collective memory through storytelling, songs, poems, proverbs, worshipping activities, ceremonies, and rituals. These activities serve as a way of communicating in time (between different generations) and in space (from place to place). Various studies in anthropology and human ecology (e.g., Folke et al. 2002; Berkes 1999) have shown how rituals and taboo are the transformation of social memory into practical resource and ecosystem management. Worshipping ceremonies, storytelling, songs, and proverbs not only help people to remember past events but also help them to convey messages in an attractive and convincing manner. Local songs and proverbs also help to turn abstract events into something more vivid and concrete. The younger generation may not have faced a major flood, and therefore it is difficult for them to fully understand what it means and to consider it possible in the future.

Part 3 – The Case Study

Stories from local religious leaders, elders, and families

“An old story says that a religious leader called Metar Qalandar used to live in Brep village in Upper Chitral. The holy man predicted that three parts of the village which were under three streams would be washed away by floods in turn and from time to time. In 2005, a flood washed away 103 houses. People say that the night before the flood, they heard a mysterious noise and knew that something was going to happen.” (Narrated by Muhammad Siyar Khan, Brep village, Upper Chitral)

“Every year whenever a small flood occurs, elders in the village keep repeating stories related to the bigger floods that have happened in the past. The elders say that the past 2006 flood was higher than the previous ones.” (Islamuddin, Aziz Urahman, Gul Muhammad Jan, Rashidullah, Kahn Zarin, Ghulam Jafar, Gurin village, Shishi Koh Valley, Lower Chitral)

“One hundred years ago a similar flood event to the one in 1978 took place. Our grandparents used to tell us about it! Everybody knows about it in the village. After what happened in 1978, we have told our kids that whenever there is heavy rain they have to escape.” (Woman, Chenar village, Mastuj, Upper Chitral – the 1978 flood is very much alive in every day discussions.



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Figure 17: Elder wearing traditional Chitrali cap, Reshun village, Upper Chitral. Asking people, and especially elders, to tell stories about what happened during major natural hazards they experienced or that they heard of from other people who witnessed hazards is an efficient way of collecting information related to local knowledge on disaster preparedness – especially in cross-cultural contexts. In many cases, it takes time for people to tell stories. It is therefore more efficient to visit people more than once to gain their confidence and revive their memories.

Proverbs, songs, and traditions

“The flood comes the way it has come in the past.” (Local proverb narrated by Dr. Inyatullah Faizi, Chitral College)

“A river always remembers its way.” (Local proverb narrated by Dr. Inyatullah Faizi, Chitral College)

“We used to have a song related to the flood that took place 100 years ago. It described how the flood destroyed the beautiful land of the village. Nobody remembers it now.” (Elder, Panan Deh, Reshun gole, Upper Chitral)

“Folk songs and stories are less documented here than in the rest of Pakistan because of the lack of political backing and the diversity of local languages.” (Prof. Faizi, Chitral College)

“‘Lavak natek’ is part of an important Kalash festival held in December called ‘chitermas’. Men and boys go down the mountains shouting and making a noise. If they see a fox, it is a sign of a good year. During that time, women watch the scene from the village.” (Kalash elder, Birir village, Birir Valley, Lower Chitral)

“When it rains a lot or when it does not rain at all, Kalash men, including young boys, go up to the mountain to sacrifice a goat.” (Kalash elder, Birir village, Birir Valley, Lower Chitral)



Mats Eriksson

Figure 18: Kalash elder and child, Bumburet Valley, Lower Chitral. Local knowledge is always a mixture between experiential knowledge (knowledge gained through one's experience) and transmitted knowledge (knowledge gained through transmission in such things as stories, poems, songs, and religious practices). Transmitted knowledge allows for the transfer of knowledge between different generations, including the youngest generation who may not have witnessed flood hazards. Transmitted knowledge does not suffer the same problems of legitimacy in a community as experiential knowledge, because it has often been deeply internalised into people's daily practices and beliefs over generations.

At village and household levels, people learn about flash floods and share information about them, mainly orally. Elders and other key knowledge carriers (e.g., local religious leaders) in the community transmit their experience of past natural hazard events through local and family stories, proverbs, and songs. The role of the elders is crucial as some have learned from previous experience how to read environmental signals; they know the history of previous disasters, when and where they occurred, what was the level of the water during the last flood, and so on. Folk stories, songs, proverbs, and ceremonies may not be entirely dedicated to hazards but may incorporate elements about them (e.g., references to hazards or hazard warning signs through symbols). Human memory is short: folk and family stories, songs, proverbs, and ceremonies contribute to remembering past events in the community as well as what to do or not to do (rules) and they help to pass on the information to other generations (transmitted knowledge). They act as real repositories of collective community and family memories. However, social memory of prior flood disasters is fading over time, especially if something happened a long time ago, as illustrated by the loss of the song in Reshun Gole. Further, with the increasing rate of change, what is communicated by the older generation might not feel relevant to the younger generation.

Collective ceremonies may simulate elements of natural disasters through symbolic actions (e.g., running down from the hills and shouting) and act as cathartic events for the whole community.

Ceremonies, such as the ‘lavak natek’ in the Kalash community, are a symbolic means of dealing with anxiety. This festival can be interpreted as a collective forecasting ceremony; a way of helping the community overcome the anxieties associated with future uncertainties (including uncertainties about the weather and natural hazards). The ceremony helps to reduce stress and the psychological distress associated with living with risks and uncertainties. It is a means of incorporating these times of great stress and loss into a community’s collective memory in such a way that they are rendered more manageable on an individual human scale. Such ceremonies permit the incorporation of hazards into daily life within the structure of people’s everyday cultural construction of reality, and they can contribute to the normalisation of natural hazards (Bankoff 2004). At the same time, some beliefs and related practices can also act in a negative or dysfunctional way. For instance, the ritual of slaughtering goats to prevent floods in the Kalash communities may prevent the community from carrying out some essential tasks for flood preparedness. This ritual also confers on goats a cultural and symbolic value and function, but might place limitations on having sufficient food and a means of securing finances during and following hazard events. According to a local saying, “the death of a Kalash is the Kalash destruction”; which refers to the tradition of slaughtering the entire flock for ceremonial purposes when a Kalash person dies. Basically in the Kalash culture, goats are kept for ceremonial purposes and are never sold (no economic value is attached to goats) (Personal communication, Mr. Aziz Ali).

This example demonstrates how local beliefs and practices can have both positive and negative effects in terms of disaster preparedness.

Traditional early warning systems

Mirror and traditional fire systems (phumbarash)

“The mirror system was a visual signal system used before the British period. Local people used the reflection of the sun on a mirror to convey warnings (including warnings of floods) to other people and villages.” (Workshop participant, Chitral town, October 2006)

“A local system of signalling by beacons is organised by the local inhabitants from the Baroghil Pass to Mastuj and from the Dorah Pass to Chitral. They are prepared on war becoming imminent or if a serious flood is expected. The village nearest to the beacon’s site is responsible for its preparation and lighting.” (British Military Report and Gazetteer on Chitral 1928)

“This system was used before the British period. Until the thirteenth century, the fire system was efficient and quick. The system worked well in case of floods due to the breaking of lakes formed by the glacier tongue blocking the river (‘chatiboi’) but the system was not quick enough for flash floods triggered by heavy rainfall. After the thirteenth century (when Islam

came to the region), this visual signalling system became a parallel system and was slowly replaced by other means of defence (including warning signals): the call for prayer system [see below] and later on the wireless warning system (i.e., code system) introduced in 1895 by the British.” (Personal communication, Prof. Faizi, Chitral Town, November 2006)

Call for prayer system (azan)

“Most villages have a mosque. Any call for prayers outside of the regular daily prayer times is used as a warning system (including flood warning). This system is still in use today.” (Personal communication, Prof. Faizi, Chitral Town, November 2006)

Herder system (pazhal)

“Each clan within the Chitral District used to have a herder in charge of taking the livestock to the pastures during the rainy months from June-August. It was a collective system based on reciprocity. The herder used to be a person from the village itself and had strong socioeconomic ties with the community. Sometimes the herders happened to be at the right place at the right moment to communicate the imminent danger of flash floods to communities lower down. They would shout the message to another herder in a lower pasture or to the nearest village if possible. Different herders would choose different places in order to spread the flocks evenly on the available grazing land. This way, they could also warn each other. A

few of them also knew how to blow the ‘booq’, a trumpet-like instrument made from the horn of a yak or a wild goat. Rhythms and tunes would vary from valley to valley, village-to-village, and herder-to-herder conveying different meanings. For instance, a certain tune could indicate that the herder was ready to take the livestock up to the pastures and that villagers should release their animals; another tune would indicate the return of the flock to the village. In some cases, specific tunes would also warn of the danger of predators and of the danger of floods and avalanches.” (Personal conversation, Prof. Faizi, November 2006)

Shouting, whistling, and running downstream

“People from villages higher up warned us by whistling and shouting that the flood was coming.” (Group discussion, Shainigar village, Drosh, Lower Chitral)

“In the village of Uchusht a flood occurred in 1993. The flood first came with moderate intensity. Then the flood stopped. As people started collecting fuelwood a high intensity flood came and washed away four people. The person warning the others became a victim of the flood.” (Group discussion, Workshop on local knowledge, Chitral, October 2006)

These traditional warning systems of imminent hazards have something in common: they are all set up on an ad hoc basis

(not systematically) and they are all used **indirectly** as flood warning systems. For instance, the mirror and fire systems were first and foremost traditional ways of defence and the call for prayers is first and foremost related to religious activities. Thus, the traditional warning system was based on a diversity of strategies related to military, religious, and pastoral or herding activities. This combination of systems was probably a weakness as well as a strength of the system. One advantage is that the diversity of strategies using both visual (mirror and fire systems) and audio (mosque and herders) means of communication allows the system to be kept flexible enough to adapt to a diversity of contexts.

Different warning systems are required for different types of flash floods and for different types of environments. In some places and contexts, one warning signal will work better than another according to the nature of the hazard, the distances between the lower and high pastures and between villages, the shape of the valley, the density of the vegetation, the relationship, location, or distribution of other villages, day time or night time, and so on. For example, many stories report how the herders were too far away from the villages to give the warning and/or the event happened too quickly. The traditional warning systems were also very well adapted to and in tune with the local sociocultural context ensuring some level of acceptability and trust and cost effectiveness (e.g., use of the mosque).

Local early warning systems in 2006

“The old system is gone and the new system is not working!”
(Workshop participant, Chitral Town, November 2006)

“The Reshun River in Reshun village is prone to recurrent floods every year. On one sunny day, the stream started to flood high up on to the pasture. No one in the village lower down had any idea that a flood was coming except one of the villagers who had taken the goats for grazing on the high pastures. He warned the villagers lower down with his cordless phone. People were able to move to safe areas. Nobody died but the flood washed away people’s crops and property.” (Narrated by Sher Murad, Reshun village, Upper Chitral)

“Technology has taken over but not in Chitral!” (Workshop participant, Chitral Town, November 2006)

“There are still a few herders on the pastures but they are vanishing. People lower down are not listening to them anymore. Youths go to school and men work at the market.”
(Mr. Aziz Ali, District Manager, IUCN-Pakistan Chitral Unit IUCN Chitral)

“The traditional early warning system was perfectly fine. The herders used to pass on the message to the communities. They used to shout and it was very efficient.” (Workshop participant, Chitral Town, November 2006)

The first quote nicely sums up the present dilemma in Chitral. The district is now in a transition period, leaving many villages in an institutional vacuum. Most of the traditional early warning systems have disappeared due to a combination of socioeconomic, geo-political, technological, land-use, and perception factors and changes. The progressive disappearance of the herder system from the 70s onwards, for example, illustrates how each of these factors come into play and is shaping the current changes in a complex manner. Since the 70s, new opportunities have been opening up with the spread of education, increased access to markets, and introduction of cash money. With the increase in income diversification (especially through government jobs) men have less incentive to work in the pastures (personal communication, Aziz Ali, IUCN-Chitral). Further, following the Afghan War in 1982-83, Afghan refugees provided cheap labour for this type of job. *“The Afghan system was itself a hazard. It contributed to the degradation of the pastures. Compared to the traditional system, it was more individualistic and based on loose ties with the communities”* (personal communication, Prof. Faizi, Chitral Town). Progressively, a rotational grazing system (‘sotseri’) on a household basis replaced the herder system. The situation now varies from village to village and valley to valley. For example, in some villages, the people themselves accompany the livestock to the pastures for two to three months. In other places, people hire a herder for the whole village. Many people assume that the herders contribute to the degradation of the pastures due to overgrazing by goats. Goats are often

associated with deforestation and increased flash floods and in many places there is a ban on goats. Another strong (and common) perception or belief is the faith in technology to resolve all issues. Ultimately, this belief may influence people’s willingness to take risks: they may take more risks because they rely upon external technology and help.

The new early warning systems rely upon scouts’ sirens, telephones, and information delivered by the central government through the Flood Forecasting Division of the Meteorological Office in Lahore based on data from radars and satellites. However, new technologies have limitations. Firstly, although they provide relatively rapid means of communication, not everybody can benefit from them. The early warning systems might even contribute to increasing socioeconomic disparity among households and villages because not every village and household can have access to, or more importantly benefit from, the new technologies and information delivered by them. Shouting and whistling is still the most common form of communication used today. Secondly, the scouts’ sirens are only posted in the Chitral and Mastuj areas. They do not reach all the villages. Due to the rapidity of flash floods, the Chitral scouts are mainly able to release post-hazard warning signals. Thirdly, the diversity of communication strategies and options has been replaced by technological solutions that are centralised. People are now more dependent on external technologies and external experts, which may be contributing to a reduction in their flexibility, adaptability, and creativity and



Arun B. Shrestha

Figure 19: Abandoned scout watching post (centre) above the village of Drosh, Lower Chitral. The scouts in Pakistan are a different institution from the scouts in western countries. In Pakistan, they are a paramilitary force. Since 2004/5, all scouts' watching posts have been closed down due to improvements in security in the district. Today, the scouts are only based in Chitral and Mastuj (Upper Chitral). This centralisation of the scouts in the district also means that they contribute more to relief aid and less to disaster preparedness.

to the development of dependency. People are becoming more dependent on the government; they do not fall back on the traditional systems anymore.

With the end of the traditional herder system, vertical communication (and also monitoring) between the high and low pastures and between the pastures and the villages has probably diminished as less information flows between them than heretofore. Further, livelihood diversification through seeking employment outside the villages may also influence horizontal communication (e.g., possible changes in roles and/or relationships between and within villages, between and within households, between men and women). On the one hand, men and women may be travelling more and may therefore be more exposed to other (flood) stories from which they can learn. On the other hand, men are away and less present to observe and monitor their local surroundings (while women are still mostly working inside the house). Overall, this subject, and especially the importance of the fire system and of the herder system, is very controversial and no consensus exists among local people about the relevance of the traditional warning systems. The various hypotheses raised here on the impacts of change show the complexity and the diversity of the situation. More research is required to test these hypotheses.

Box 4: Did you ask? Communicating about natural hazards

What are the local stories about previous flood experiences? Who knows about these stories in the community? Do people know about local songs, proverbs, and poems related to past natural hazards in the village? How is knowledge on natural hazards transmitted among community members (between different social groups – men versus women; leaders versus followers) and between generations (i.e., between elders and youngsters)? What are the strategies that help people to reduce the stress related to future natural hazards? To what extent do local ceremonies and beliefs help people to reduce their anxiety and/or increase their anxiety about future hazards?

Part 4
Conclusion



Chapter 7

Discussion

The general purpose of this report is to provide inspiration and ideas to implementing organisations to help them understand and identify local knowledge, practices, and contexts in relation to disaster preparedness. For this purpose a case study was undertaken in the Chitral District of Pakistan to document local knowledge on disaster preparedness in 11 villages.

Lessons learned

The people of Chitral have been able to reduce human losses from flash floods as well as the economic, environmental, social, and psychological impacts of flash floods, based on daily observation of their local surroundings, experience of past and recurrent flash floods, and the internalisation of some practices over generations. Local knowledge and practices on flood preparedness that are particularly vivid in Chitral include the following:

1. Interpretation of their landscape and the indicators of past flash floods such as the past location of streams or

floods by looking at the shape and nature of the slopes and the location of rocks

- 2. Identification and monitoring of early warning signals of flash floods based on environmental indicators, weather predictions and interpretations, specific smells and sounds, location and types of rain, and the unusual appearance and movement of wildlife**
- 3. Evaluation of time thresholds concerning when to run out (or stay) and move key belongings or take emergency measures during the rainy season such as staying awake, sleeping with shoes on, or having a ‘go-bag’ ready**
- 4. Development of technical, structural, and non-structural strategies to accommodate their lives in the longer term (Such strategies range from traditional techniques of house construction to developing strong social support systems, informal rules for the sustainable use of forests, and various livelihood diversification strategies – most of which are not directly targeted at disaster preparedness but can contribute to it.)**

The potential applications of local knowledge for improved disaster preparedness in Chitral could capitalise particularly on these four key elements. For example, this knowledge could help implementing organisations to improve their understanding of local and regional variability and specificities associated with natural hazards, and local perceptions of natural hazards, and therefore people's response to hazards. It could also help implementing organisations to tailor their project activities, communication strategies, and policies to local cultural perceptions, values and traditions, and strategies. Further, local people can help external organisations to verify and improve their own information for hazard mapping and for the identification of safe locations for construction of buildings, roads, tunnels, and so on. This kind of knowledge is often bought expensively by trained scientists and engineers from outside. But, as highlighted at the beginning of this report, disregarding local knowledge and advice may lead to important human and physical costs for external agencies.

Why the herder symbol?

There are many challenges to the application of local knowledge to disaster preparedness. One such challenge is the rapid change occurring at the regional, national, and international levels and influencing the relevance and sustainability of local knowledge and practices. In this context, some traditional and local practices are becoming obsolete and irrelevant. For instance, and coming back to the original question

raised by the title of this report, if the herders of Chitral are the lost messengers of traditional and local knowledge, the herder system of Chitral could well symbolise a lost linkage between the traditional and the new knowledge systems. The vanishing herder system is a symbol of the current changes and challenges facing communities in the District of Chitral – as in many other places in the Himalayas. In Chitral, people's priorities, which used to revolve mainly around water harvesting, hunting, grazing land, and fodder, are changing. The herders used to provide early warnings of flash floods. It was one ad hoc, traditional early warning system among others. Nowadays, the district is in a transition period: traditional strategies are disappearing while new strategies are not yet in place or functional. A combination of factors (historical, environmental, socioeconomic, demographic, institutional, technological, and political) influences communities' knowledge and practices in relation to natural hazard preparedness in a complex way. Some factors have contributed to a decrease in people's vulnerability to natural hazards; others have contributed to an increase in their vulnerability. The vanishing herder system symbolises the weakening of local/traditional knowledge and institutions due to changes happening in the region at large and their impacts on local knowledge. The vanishing herders, in particular, mean that changes are occurring in the linkages between the highlands and lowlands, between pastures and villages, between old and new generations, and between traditional and new early warning systems for natural hazards. Can or should the herders try to continue to maintain those linkages?

Probably not because it might not be relevant anymore in the changing context; and yet, what can we learn from the herder system that can be used in today's context? The Chitral case study illustrates the need to understand how changes in the regional context (e.g., role of forest policy, laws, implementation, conflicts between different laws, and so on) influence local knowledge on disaster preparedness. Documenting local knowledge, therefore, means paying attention to the contexts (i.e., understanding the contexts and how processes on different scales influence communities and vice versa), including how external forces weaken and/or strengthen local knowledge and practices. How can local knowledge be strengthened in the face of the current changes?

Local knowledge as a tool for change

The goal of this report was not to provide an exhaustive list of 'local good practices', and the emphasis was not on describing local knowledge and practices per se because these are context based. Rather, understanding local knowledge and practices

should be used as an entry point to understanding processes of knowledge creation, transmission, and how communities manage to adapt, or not, to a combination of changes to maintain sustainable livelihoods. As such, the herder system also symbolises the nature of local knowledge: it is dynamic and complex, always changing and operating between the loss of traditional knowledge and the creation of new local knowledge. Understanding, accounting for, and respecting local knowledge, practices, and contexts can become a tool for change. Firstly, it can help people to adapt external knowledge to local contexts and integrate the 'users and beneficiaries' into projects (Visser 2006). As Hutton and Haque (2003) put it: *"Little effort has been made to achieve an accurate understanding of how people of different cultures perceive, interpret and respond to natural hazards. [...] Western conceptualisations of natural hazards, human vulnerability and poverty cannot be uniformly imposed on divergent cultures and societies."* Secondly, an understanding of local knowledge can help to assess which local knowledge is still relevant and can be disseminated to others (Visser 2006). We hope that this report will contribute to the promotion of change at the level of individual professional practice or organisational or sectoral levels.

Summary of the Key Findings

OBSERVATION			
	Knowledge, practices, beliefs	Local functions	Strengths, opportunities advantages
History and nature of floods	<ul style="list-style-type: none"> • Experiential knowledge on different types of flash flood and triggering factors, location of previous flash floods, previous water levels, change in water levels, impact of previous flash floods on life and property, etc. • Ability to interpret the landscape and indicators of past flash floods such as the location of past streams/floods by looking at the shape, location, and nature of the slopes, rocks, geology, morphology, etc. 	Instrumental	<ul style="list-style-type: none"> • Detailed information related to the nature and history of flash floods in people's localities based on past experience, daily observation, and monitoring of the local surroundings • This kind of knowledge is often bought expensively by trained scientists from outside.
Life histories	<ul style="list-style-type: none"> • Life stories explaining changes in people's vulnerability to flash floods and the perceived factors (e.g., environmental, demographic, historical and political) that have influenced them 	–	<ul style="list-style-type: none"> • Information related to the perceived evolution of people's physical and social vulnerability to floods and the factors related to their vulnerability
	Weaknesses, obstacles, constraints	Potential applications	
History and nature of floods	<ul style="list-style-type: none"> • Prior experience forgotten due to resettlement or frequency of natural hazards 	<ul style="list-style-type: none"> • Better understanding of local variability/specificities and processes (e.g., important time differences regarding the onset of floods from a few days to a few hours) • Understanding of local perceptions of natural hazards • Ability to provide advice to local people and external people (including engineers) regarding safe locations, construction sites (buildings, roads etc.) • Information can be useful for hazard mapping, survey, and other inventories combined with conventional knowledge • Part of the process of data 'triangulation' 	
Life histories	<ul style="list-style-type: none"> • Complexity: various factors at play and/or acting simultaneously or not 	<ul style="list-style-type: none"> • Understanding local perceptions of floods together with other stresses • Understanding how people's vulnerability to flood hazard is changing over time • Identification of vulnerable groups/individuals 	

ANTICIPATION			
	Knowledge, practices, beliefs	Local functions	Strengths, opportunities advantages
Early warning signals of flash floods	<ul style="list-style-type: none"> Ability to identify and interpret early warning signals of flash floods based on environmental indicators, weather interpretations/predictions, smells, sounds, location and types of rain, unusual appearance and movements of wildlife etc. 	Instrumental Psychological	<ul style="list-style-type: none"> Rapid assessment Trust Cost effective Ability to save life
Time thresholds and emergency measures	<ul style="list-style-type: none"> Knowledge of when to run (or stay), when to move key belongings, stay awake, or sleep with shoes on Having a go-bag ready 	Instrumental	
Escape routes and safe places for humans and cattle	<ul style="list-style-type: none"> Knowledge of where to run (or stay), where are the safest and fastest escape routes, and where to build houses 	Instrumental	<ul style="list-style-type: none"> Few people die from floods. Floods mainly affect people's property
Critical actors and skills	<ul style="list-style-type: none"> Ability to trust local guides' advice and predictions (e.g., elders, local religious and other pious leaders) 	Instrumental Psychological	<ul style="list-style-type: none"> Trust, respect
Weaknesses, obstacles, constraints		Potential applications	
Early warning signals of flash floods	<ul style="list-style-type: none"> Less local monitoring as more men are working outside the village 	<ul style="list-style-type: none"> To combine with other 'modern' techniques and information 	
Time thresholds and emergency measures	<ul style="list-style-type: none"> Prior experience forgotten Bounded rationality: people's rationality is limited to their own information and beliefs. For instance, a woman decided to go back to her house to get her veil when the flash flood was coming. She was trapped in her house but did not die. People believe now that the veil saved her. 	<ul style="list-style-type: none"> Recognise the differences between local knowledge and common sense: 'running away' when the water starts rising for instance is not always 'common sense' Understanding and accounting for people's 'bounded rationality' 	
Escape routes and safe places for humans and cattle	<ul style="list-style-type: none"> Decreasing options for safe location of houses due to changing factors/increasing pressures (e.g., demographic pressure) 	<ul style="list-style-type: none"> Reviving the place of traditional knowledge and skills in school curriculum 	
Critical actors and skills	<ul style="list-style-type: none"> Loss of traditional knowledge and decreasing trust on the part of younger generations due to change in education system 		

ADAPTATION			
	Knowledge, practices, beliefs	Local functions	Strengths, opportunities advantages
Technical and structural adaptations	<ul style="list-style-type: none"> • Traditional earthquake resistant structures • Food storage • Terraces to reduce rock fall damage to houses • Retaining walls for flood protection 	Instrumental	<ul style="list-style-type: none"> • Earthquake resistant houses based on experience • Use of local material (stones and wood) and local skills • Food security
Social capital	<ul style="list-style-type: none"> • Ability to find psychological, financial and technical support from relatives and neighbours • Sense of place and family ties 	Instrumental Psychological Sociological	<ul style="list-style-type: none"> • Sense of shared community, cooperation, strong social support networks/system • Reduce sense of people's helplessness • Social and psychological assurance
Diversification strategies	<ul style="list-style-type: none"> • Transhumance • Separated house and animal shed locations • Dispersed landholdings • Economic diversification 	Instrumental	<ul style="list-style-type: none"> • Having assets located at different places (houses, livestock, landholdings) contributes to spreading the risk of losing assets from natural hazards • Transfer of livestock from lower elevations to higher elevations allows people to take advantage of different ecological niches, enables the observation and monitoring of the pastures and sometimes avoids livestock being killed by floods lower down
Natural resources management	<ul style="list-style-type: none"> • Access to land ownership • Community regulations on grazing and deforestation 	Instrumental	<ul style="list-style-type: none"> • Most people in the Chitral district have access to land ownership and agriculture still constitutes most livelihoods due to lack of jobs outside • Community used to have strong rules related to the sustainable use of the pastures and the forest. Some of them are now being revived in some areas.
Attitudes	<ul style="list-style-type: none"> • Learning from previous mistakes • Community initiatives and attitudes towards external help 	Psychological	<ul style="list-style-type: none"> • Reduces sense of people's helplessness • Helps people to give meaning to things that they cannot control and/or understand

Adaptation cont.....		
	Weaknesses, obstacles, constraints	Potential applications
Technical adaptations	<ul style="list-style-type: none"> • Decreasing access to natural (forest) and human resources • Labour intensive techniques • Loss of traditional skills • Lack of labour due to increasing number of men seeking jobs outside • Change in trends of house construction • Dependence on external food subsidies? 	<ul style="list-style-type: none"> • Policy implication/access to forest resources • Awareness raising among local people about the weaknesses/ limitations of modern houses
Social capital	<ul style="list-style-type: none"> • Increase of individualism as men are starting to work outside the village and to earn cash • Re-settling in a vulnerable area despite knowledge of danger because of family ties 	<ul style="list-style-type: none"> • Reinforcement of people's self confidence
Diversification strategies	<ul style="list-style-type: none"> • Diversification strategies might be useful on an ad-hoc basis only • Increased risk of death during transfer of livestock by natural hazards • Separating houses and animal sheds is a very context specific practice • Mainly rich households have dispersed landholdings • Part of the livelihood diversification process includes selling of wood due to lack of jobs which leads to increased deforestation 	
Natural resources management	<ul style="list-style-type: none"> • Informal community rules allowing for the sustainable use of pastures and forests have been eroded due to the nationalisation of forest resources in 1975 	
Attitudes	<ul style="list-style-type: none"> • Religious beliefs can contribute to inhibiting community initiatives and institutional cross-scale linkages. The Ismaili Muslims believe that the Aga Khan, the founder of the Aga Khan Foundation, is their religious leader. Therefore, some religious/ political Sunni Muslim leaders refuse any intervention from the Aga Khan Rural Support Programme, which is linked to the Aga Khan Foundation as a way of denying or opposing the Ismaili Muslims. • Increasing dependence on external help, ability to blame and hold the government responsible for disasters? 	

COMMUNICATION

	Knowledge, practices, beliefs	Local functions	Strengths, opportunities advantages
Communicating about past hazards	<ul style="list-style-type: none"> • Stories from local religious leaders, elders and family • Proverbs, songs and traditions 	<ul style="list-style-type: none"> • Instrumental • Psychological 	<ul style="list-style-type: none"> • Local stories, songs, proverbs enable knowledge transfer among people in the community and between different generations. • Ceremonies such as the lavak natek in the Kalash communities is a symbolic means for dealing with anxiety in the face of natural hazards and uncertainties
Traditional early warning systems	<ul style="list-style-type: none"> • Mirror and traditional fire systems • Call for prayer system • Shepherd system • Shouting, whistling, and running downstream 	<ul style="list-style-type: none"> • Instrumental 	<ul style="list-style-type: none"> • Flexible and decentralised system well adapted to the context through use of a diversity of strategies: different warning systems are required for different types of flash floods and for different types of environments
	Weaknesses, obstacles, constraints	Potential applications	
Communicating about past hazards	<ul style="list-style-type: none"> • Rate of change is increasing so what is communicated by older generations may not be relevant in the new contexts • Beliefs also act in a negative or dysfunctional way. The ritual of slaughtering of goats to prevent floods in the Kalash communities may prevent the community from carrying out some essential tasks for flood preparedness. This ritual also confers to goats a cultural/symbolic values and function. This might have limitations during and following any hazard event to secure food and financial requirements. 	<ul style="list-style-type: none"> • Better tailor government coping mechanisms and communication with local cultural perceptions, values and traditions and therefore increase trust with external organisations • Better understand and respect and account for local practices and believes • Try to capitalise on cultural practices and values where they are strengths and attempt to moderate them where they may be obstacles (Bankoff 2004) 	
Traditional early warning systems	<ul style="list-style-type: none"> • Systems set up on an ad hoc basis only and used indirectly as flood warning systems • Most traditional early warning systems have now vanished mainly due to economic changes • Traditional early warning systems are becoming obsolete now due to the lack of people to carry out the messages because men are working outside the villages 	<ul style="list-style-type: none"> • Evaluate the strengths of the traditional warning systems and try to integrate those strengths with the new early warning system (e.g., flexibility, adapted to diversity of the physical environment, simple and trusted from the community) 	

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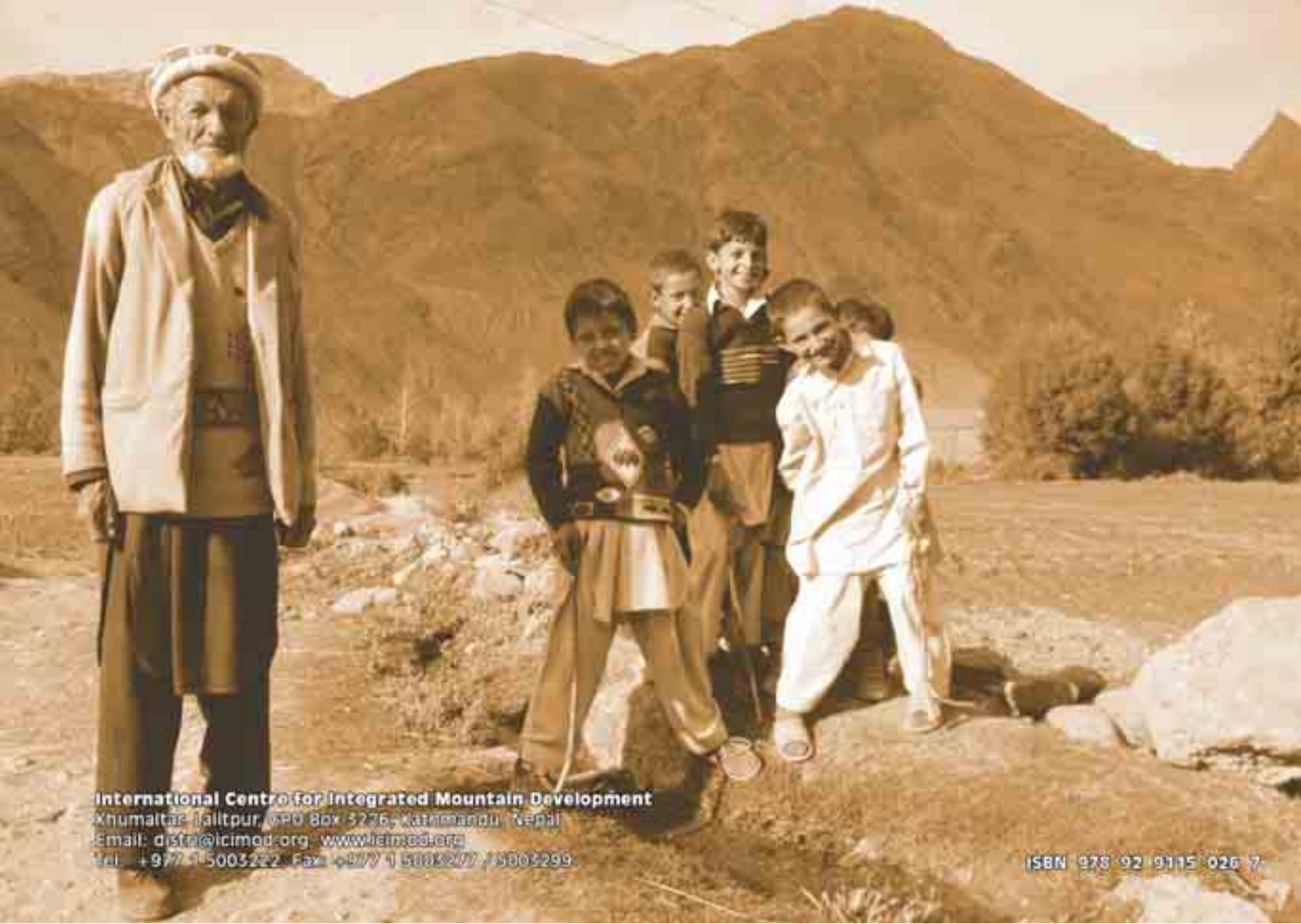
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ISBN 978 92 9115 026 7