Summary of the Key Findings

OBSERVATION			
	Knowledge, practices, beliefs	**Local functions**	**Strengths, opportunities advantages**
History and nature of floods	• 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	• 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	• 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	–	• 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	• Prior experience forgotten due to resettlement or frequency of natural hazards	• 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	• Complexity: various factors at play and/or acting simultaneously or not	• 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	

Herders of Chitral: The Lost Messengers?

ANTICIPATION			
	Knowledge, practices, beliefs	**Local functions**	**Strengths, opportunities advantages**
Early warning signals of flash floods	• 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	• Rapid assessment • Trust • Cost effective • Ability to save life
Time thresholds and emergency measures	• 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	• Knowledge of where to run (or stay), where are the safest and fastest escape routes, and where to build houses	Instrumental	• Few people die from floods. Floods mainly affect people's property
Critical actors and skills	• Ability to trust local guides' advice and predictions (e.g., elders, local religious and other pious leaders)	Instrumental Psychological	• Trust, respect
Weaknesses, obstacles, constraints		**Potential applications**	
Early warning signals of flash floods	• Less local monitoring as more men are working outside the village	• To combine with other 'modern' techniques and information	
Time thresholds and emergency measures	• 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.	• 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	• Decreasing options for safe location of houses due to changing factors/increasing pressures (e.g., demographic pressure)	• Reviving the place of traditional knowledge and skills in school curriculum	
Critical actors and skills	• Loss of traditional knowledge and decreasing trust on the part of younger generations due to change in education system		

Part 4 – Conclusion

LOCAL KNOWLEDGE PAKISTAN

ADAPTATION			
	Knowledge, practices, beliefs	**Local functions**	**Strengths, opportunities advantages**
Technical and structural adaptations	• Traditional earthquake resistant structures • Food storage • Terraces to reduce rock fall damage to houses • Retaining walls for flood protection	Instrumental	• Earthquake resistant houses based on experience • Use of local material (stones and wood) and local skills • Food security
Social capital	• Ability to find psychological, financial and technical support from relatives and neighbours • Sense of place and family ties	Instrumental Psychological Sociological	• Sense of shared community, cooperation, strong social support networks/system • Reduce sense of people's helplessness • Social and psychological assurance
Diversification strategies	• Transhumance • Separated house and animal shed locations • Dispersed landholdings • Economic diversification	Instrumental	• 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	• Access to land ownership • Community regulations on grazing and deforestation	Instrumental	• 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	• Learning from previous mistakes • Community initiatives and attitudes towards external help	Psychological	• 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	• 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?	• Policy implication/access to forest resources • Awareness raising among local people about the weaknesses/limitations of modern houses
Social capital	• 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	• Reinforcement of people's self confidence
Diversification strategies	• 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	• 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	• 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?	

Part 4 – Conclusion

COMMUNICATION			
	Knowledge, practices, beliefs	**Local functions**	**Strengths, opportunities advantages**
Communicating about past hazards	• Stories from local religious leaders, elders and family • Proverbs, songs and traditions	• Instrumental • Psychological	• 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	• Mirror and traditional fire systems • Call for prayer system • Shepherd system • Shouting, whistling, and running downstream	• Instrumental	• 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	• 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.	• 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	• 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	• 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)	