What Influences Local Knowledge?

Many external and internal barriers exist that have prevented local knowledge and practices from being exercised in mainstream institutions working on disaster management. We already mentioned in the background to this paper how the low prestige value given to local knowledge compared to conventional (or scientific) knowledge is rooted in colonialism. Mainstream institutions forgot to reflect upon and question their own myths, including the belief that technical and command-and-control solutions will solve all problems. Until today, natural hazards and disasters are mainly conceived as an issue for national defence and security, contributing to a failure to decentralise power in this sector. Another barrier to the use of local knowledge in disaster management, described in the previous section, is based on the nature of local knowledge itself (dynamic, invisible, complex, diverse, and context-specific in both time and space), which makes it a challenge to identify, understand, and use it. This section investigates factors that contribute to the marginalisation of local knowledge and practices in disaster management and in the process reveals the transformation factors that influence local knowledge. In some cases, it is also seen that the same factors can become new windows of opportunity for empowering communities. These factors include power relations both within a community and between the community and outside organisations, scale issues, and the impact of multiple stresses in a context of rapid change which renders some local knowledge and practices inappropriate or inaccessible.

Power relations

Power relations partly explain why local knowledge has been ignored by the mainstream literature on disasters and institutions charged with disaster management and especially disaster preparedness. Power relations refer to the exercise of control over resources, decision-making processes, knowledge creation, transmission, interpretation, and validation. The nature of control depends upon divers factors (e.g., sociocultural, economic, political, and ecological), takes various forms (e.g., direct and indirect, formal and informal, discursive and non discursive, and symbolic), and has various degrees of influence throughout time and space (e.g., local and extra-local power relationships). The following passage investigates how the use of knowledge is political and reflects conflicts of interest among various stakeholders and, by providing examples in the context of disaster management, how local knowledge reflects local power.

The use of local knowledge is political

The use of local knowledge is political because it threatens to change power relations between different groups, ideologies, cultures, and so on (Berkes 1999). Conflict of interests can reflect divisions between natural sciences and social sciences; science and politics; the official and the non-official (or international, national, and local interests); north and south; highland and lowland; centre and periphery; and short- and long-term interests, as well as among social groups within a community. White et al. (2001) report from a review of the natural hazard and disaster literature:

"Conflicting interests and lack of political will to resolve them seems to be at the base of many failures to apply knowledge effectively."

Conflicts of interest may be increasing, especially in mountain communities that face the influence of a range of different actors and interests (state agencies, industry, development and research organisations, and tourists). Each actor tends to impose its own agenda and define local knowledge differently according to its own culture, experience, and agenda (Berkes 1999, p 165). For example, the focus on environmental and technical aspects of natural hazards is often used in the political arena as a Trojan horse to mask the real issues (i.e., environmental, geophysical, and meteorological issues as a downstream manifestation of political-economic issues). People may also use local knowledge in discourse because it is now becoming politically correct – however it may not reflect their real agenda and practices. Suparamanian and Dekker (2003, p 313) analysed issues of coordination experienced by relief workers in the field and inside mother organisations and revealed how disaster relief work is about control of finances, being political, getting a reputation, or furthering aims not specifically related to the issue at hand. This means that conflicts of interest take place not only between different actors but also within organisations. Ultimately, incorporating local knowledge into a policy framework requires institutional changes and this is hampered by hierarchical structures, institutional inertia, and path dependency.[6]

Knowledge is power: power produces knowledge

We are not equal regarding access to, and benefits from, knowledge and information.

"How knowledge is generated, organized, stored, disseminated presupposes certain relationships of power and control." (Agrawal 1995, p 431)

Who has the knowledge has the power; that is the ability to control resources and discourse over resources (Raffestin 1980). One key instrument of power and knowledge is language. Hewitt (personal communication) refers to the fact that choice of words and how they happen to be translated influences how they are understood. Outsiders do not speak local languages and this often means that local people's interests are not represented because of the language barrier.

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[6] Ostrom (1992, p 61) defines 'path dependency' as follows: "Over time, experience with successful rules enables individuals to learn how to use these rules even more effectively. Any effort to use alternative rules may then be doomed to rejection. Even if those alternative rules could help increase the performance of the system (once individuals gained experience with them), initial efforts to experiment with them are not likely to lead to their adoption."

The support of local knowledge and participatory approaches can be seen as a threat to national interests and political structures, especially in authoritarian regimes (Thrupp 1989). We have mentioned already how natural hazard and disaster risk management have often been associated with issues of national defence, and the army often plays a key role in responding to natural disasters. This might cause an institutional barrier to integrating local knowledge and practices into what is often considered as an issue of national security. Interestingly, Agrawal (1995) denunciates the limits of the current method of archiving local knowledge outside of its context as a means of replicating power asymmetries instead of enabling the poor to exercise control over their knowledge. Indeed, those who document indigenous knowledge are often western educated or are outsiders. Agrawal (1995) argues in favour of going beyond the rhetoric that knowledge is power to understand how power produces knowledge.

Local knowledge reflects local power

Power relations related to the creation, interpretation, or validation of local knowledge can be found not only between community and external organisations but also within communities – or rather within what is often (mis) conceived as being a homogenous community. According to Thrupp (1989, p 16) certain members of a community control more information than others and that gives them power and privilege. Local power dynamics and hierarchies influence relationships between local knowledge and external agencies. Mosse (2000) argues that local knowledge is often 'planning knowledge' meaning that it is shaped by dominant groups in the community and development project interests. Khan (1991) provides a detailed case study in Northern Bangladesh of how the local elite influenced NGOs' decisions to locate flood shelters and control access to the shelters. As a result the shelters were not placed in the best locations either for vulnerable people or in terms of hazard risk (Twigg 2001).

Elsewhere, Howell (2003) in a case study in the 'char' lands[7] of Bangladesh reports how attitudes to preparedness are often influenced by religious leaders, some of whom advocate prayer as the only appropriate and necessary measure. She states that prayers are used as a power tool by religious leaders and other elite groups to discourage cooperative preparedness measures amongst the poor and therefore to preserve the status quo. Another example of the role of political and religious factors in influencing people's vulnerability to natural hazards comes from a case study on local knowledge related to flood preparedness in the Chitral District of Pakistan (Dekens 2007b). The case study shows how local political and religious powers can influence local practices in flood preparedness by inhibiting community initiatives and institutional cross-scale linkages. Political and religious powers are divided between the Ismaili Muslims in Lower Chitral and the Sunni Muslims in Upper Chitral. The Ismaili Muslims follow the Aga Khan, the founder of the regional NGO called the Aga Khan Rural Support Programme (AKRSP), as their spiritual leader. Therefore, some religious and political Sunni Muslim leaders refuse to accept any intervention from the AKRSP as a way of opposing the Ismaili Muslims. In another case study on local early warning about drought in Kenya, Pratt (2002, pp 63-4) mentions how religious fundamentalism

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[7] 'Char' lands refer to new islands of land in Bangladesh: the islands are formed from depositions caused by erosion processes associated with constant changes in river path and size.

in the past decade contributed to the declining practice of traditional knowledge and drought indicators because this was perceived to interfere with the prerogatives of religious leaders in the community.

"People are no longer consulted or prefer not to share their knowledge, because this practice is misconstrued in some communities as 'predicting the future', an act prohibited by the Koran."

External organisations can play a key role in mediating local power relations and improving internal community communications. For example, Cronin et al. (2004) report how a participatory hazard mapping exercise in Ambae Island, Vanuatu, uncovered the influence of a traditional social organisation in disaster preparedness. In the local hierarchical structure, women and youths are the lowest ranking community members. Male chiefs dominate all decision-making, on disaster preparedness as well, and women are poorly represented in the process, inhibiting their ability to make timely decisions. These examples illustrate how local power groups become involved in and capture projects to further their own interests and maintain their authority (Mosse 2000, p 4).

Mosse (2000) demonstrates how access to all local perspectives is problematic and challenging and how participatory approaches often serve to represent external interests as local needs, dominant interests as community concerns, and so forth. Ironically:

 "rather than project plans being shaped by indigenous knowledge, it is farmers who acquire and learn to manipulate new forms of planning knowledge. In this way, local knowledge becomes compatible with bureaucratic planning." (Mosse 2000, p 12)

Scale issues

How do temporal, spatial, and functional scales of an institution influence the use of local knowledge in natural hazard management? The scale of observation and management of natural hazard risks determine the representation of (and therefore the response to) changes induced by (or influenced by) natural hazards. What may appear to be a negative change on one temporal scale may be part of a positive cycle when viewed from a higher-order temporal scale. One such example is the processes leading natural hazard risks to decrease or increase ecological diversity, depending on the spatial and temporal scales of observation and/or the scale of occurrence of hazard events. Agricultural fields destroyed by a flood can become very fertile after a few years, for example, because of the capacity floods have to:

"irrigate and fertilize fields, flush out salts and toxins from soils and watercourses, and recharge reservoirs. In many regions, annual flooding sustains current levels of agriculture." (Few 2003, p 45)

Issues related to scale dynamics, scale mismatches, and scale myopia influence how and why local knowledge on disaster preparedness is (mis)used (or not).

Scale dynamics

Some scale dynamics influencing local knowledge and practices from being exercised include cross-scale linkages, cascading effects, and scaling up and down processes. Firstly, we mentioned in the background to this report that most natural hazard risks are multi-scale and that they should be managed on different scales simultaneously instead of in isolation from one another. This means investigating cross-scale linkages, in other words:

"linking institutions both horizontally (across scale) and vertically (across levels of organisation)." (Berkes 2002, p 293)

Cross-scale analysis is important because:

"events or phenomena at one scale influence phenomena at other scales" (Cash and Moser 2000) in complex ways and with positive and/or negative effects on the different scales (Young 2000, p 4). Indeed, processes are interrelated. According to Wisner and Luce (1993, p 129) local problems may have their origins in another part of the world. Cross-scale analysis is challenging since:

"data requirements are huge and applicable theories at each level may be quite different." (Berkes et al. 2000, p 13)

Secondly, and consequently, scale dynamics refer to the way natural hazards cascade down (in combination with other exogenous and endogenous perturbations and responses) across different scales, and through various filters that can simultaneously, or not, amplify or attenuate the impacts of hazards (Kasperson and Kasperson 2001, p 5). D'Souza (1984) mentions:

"how the labour market for skilled craftsmen in the oil fields of the Middle East may draw away artisans from the mountains of Pakistan, reducing the ability of local people to build houses reinforced against the impact of earthquakes." (Wisner and Luce 1993, p 129)

Thirdly, scale dynamics can also refer to ways of upscaling and/or downscaling 'good practices'. Many local practices related to disaster preparedness are localised and context and time specific. Wisner and Luce (1995) have reported how in the urban context:

"in general the community is active on its own behalf, but efforts are fragmented and not often recognised and supported by official agencies."

The recognition that local best practices in disaster risk reduction that capitalise upon local strengths need to be upscaled is growing. Berkes (1999) argues in the context of natural resource management that a potential exists to generate universal management principals from locally-developed practices. Further, if the scaling up of local practices remains challenging; the scaling down is often bound to fail:

"reducing vulnerability at, say, the national level [does not] automatically reduce vulnerability among social groups, households and individuals in that nation." (Wisner and Luce 1993, p 128)

As Sen (1981) demonstrated in the case of food security, the issue is not one of availability of resources per se but rather one of entitlements such as access, control, and management of assets.

Scale mismatches

Scale mismatches preventing the use of local knowledge and practices are administrative, organisational, and sociocultural. Firstly, mismatches on the administrative and organisational scales relate to the disconnection between people-at-risk, their own national government, and international agencies; and this is mainly due to distance management (i.e., centralisation of decision-making at national level). Mismatches exist especially between the location of disasters and knowledge related to it and the location of authority and capacity to do something about it. For example, local knowledge was often vested in the older generation of informal leaders who may not hold official positions anymore (UNEP 2004). The weakening of local governance illustrates a mismatch between the traditional and administrative authorities in the context of democratisation, which can have a negative effect on institutional coordination in disaster management (Battista and Baas 2004, p 25). Suparamanian and Dekker (2003) argue that, in the context of relief aid, local knowledge about what to do (because they are there locally, in the field) and authority to implement things are rarely located in the same sector. Knowing what to do is a necessary but not sufficient factor to be able to carry out actions (this is valid for exceptional and/or extreme disasters but not necessarily recurrent ones): Suparamanian and Dekker (2003) state that this mismatch creates a paradox of power and often requires a 'renegotiation of authority'.

Secondly, sociocultural scale mismatches refer to cultural incompatibilities between the local level and external organisations. For example, Materer et al. (2001, p 10) describe how people approach and classify rainfall in a different way from conventional science:

"Actual rainfall data did not correspond to how the villagers remembered the production year. In statistically high rainfall years locals defined drought by rainfall variability, locality and timing and not as the amount of rainfall received in a year."

However and, at the same time, scale mismatches can be interpreted as an opportunity to build upon different strengths on different levels. Often local warning systems tend to replace the official warning system when the latter breaks down (Schware 1982, p 212). As Battista and Baas (2004, p 13) point out, more than one approach is needed; whereas exceptional disasters are beyond local capacities and call for widescale, external intervention, recurrent natural disasters can be managed best by local means. The necessity to combine 'top down' and 'bottom up' approaches in disaster

management, depending on the scale and frequency of natural hazards, has been raised elsewhere (Brouwer and Nhassengo 2006).

Scale myopia

Scale myopia (or 'amnesia' in the sense of 'forget to consider or take into account') refers to the incapacity of central authorities to see far away, in both time and space, what is outside the national canvas. Often policy-makers have the big picture but lack understanding of what really happens and the impacts of the implementation (or non implementation) of their policies locally. This is ironic as:

"their decisions are often most strongly felt at the very local, individual level." (Hall and Davis 1999, p 1)

Often national disasters hide small, local ones which occur more frequently (e.g., landslides) and do not matter on the local scale (Van Aalst and Burton 2002, p 21). For instance, landslides are a major hazard in the Darjeeling district of West Bengal in India; however, this is disregarded by policy-makers sitting in Kolkata who mainly focus on floods, which are perceived to be the major problem (Personal communication, Mr. Roshan Rai).

Another aspect of scale myopia relates to time preference. Ideally, immediate measures and long-term measures need to be combined. The International Labour Organisation (ILO 2002, p xiv) mentions that, however important short-term preparedness and relief measures might be, long-term measures focusing on self-reliance are essential for ensuring livelihoods and capacities. It argues for state-people partnerships.

The following section on transformation processes illustrates the role of multiple stresses, global factors, and trends in influencing local knowledge on disaster preparedness.

Natural hazard risks, global factors, and trends

In many cases, natural hazards, although they can represent an important stress, are not the major stress faced by communities. Aside from natural hazard risks, community ability to anticipate and respond to disaster is influenced by other stresses (e.g., poverty, state policies, and legislation) and global factors and trends (e.g., climate change, globalisation, and privatisation). Studies focusing on multiple stresses and how they interact with one another to give a specific type of response (or no response) are still few in the field of natural hazard and disaster research. For the purpose of this report, we will focus on three major factors of change influencing people's coping strategies to natural hazard risks: the impact of state legislation; policies, especially those promoted through 'conservation' and 'development' projects; and economic and cultural globalisation processes.

The impacts of nation-state interventions

Many communities are at risk from natural hazards due to lack of development, but in this section we will investigate the other side of the coin: that is, how development processes can increase the risks from natural hazards in some communities. Contemporary states, through legislation, policies, and development projects at national level, and even outside their boundaries through development aid, have transformed traditional agrarian societies in the Himalayas and elsewhere. The nation state has taken control of community resources, thereby changing (and often restricting) community access to, and benefit from, resources and often undermining their traditional management strategies and local institutions (Linkenbach-Fuchs 2002, p 11). The alienation of communities from their environment as a result of state intervention has been documented most in the context of natural resource management and change in community access to natural resources (e.g., forest and non-forest products, land, water, and stones). These changes have led to increasing dependency on external aid and market forces, as well as increasing vulnerability of the community to perturbations such as natural hazards (Farooquee 2004).

The nature of development projects in the Himalayas is based mainly on resource-extraction (e.g., hydropower projects) and centred on service activities (e.g., tourism). It has contributed to an increase in accessibility because of the establishment of infrastructure, intensification of resource use, monetisation of the economy, and commercialisation of resources; and it has created new (natural hazard) risks for local communities and led to the loss of material and land resources for many (Linkenbach-Fuchs 2002). Government development projects, such as dams for electricity generation and irrigation, mining operations, plantations, and recreation areas that convert agricultural land to industrial and commercial uses are undermining people's capacities to cope with natural hazards by restricting their access to land and other resources they used to fall back on before, during, and after disasters. Ironically, some of these development projects are perceived to be more disastrous than natural hazards from a community perspective (Heijmans 2001). Das (1998), in a case study in Dibrugarh town in Assam, India, relates how the construction of a dam following a major earthquake led to gradual changes in the river ecology in and around the town. The control measures disrupted the traditional, local flood management system. Before, recurring floods were responsible for fertilising the soil, cleaning the stagnant water from the town, and providing a source of protein because of the large quantity of fish caught – but this system has disappeared now. Local environmental warning signals for natural hazards that people used to rely on have become obsolete due to rapid change in climatic conditions combined with excessive human intervention (Rural Volunteers Centre no date, p 9 – Dhemaji district, Assam, India).

Elsewhere the impacts of development projects are influencing animal migration patterns, which used to provide local warning signals of hazards (Jaarsma et al. 2001 in a case study on flood early warning in Mozambique). Engineering programmes administered by government agencies upstream can render the traditional flood responses of villagers located downstream obsolete – especially if the transformation of the ecosystem caused by government projects upstream is not communicated

to villagers downstream, as mentioned by Schware (1984) in a case study on local knowledge about flood hazards in West Bengal, India. Development processes therefore can induce major ecological changes, often leading to the decline of the natural resource base. Many people are losing their access to natural resources and this increases their vulnerability to natural hazard risks.

Ironically, natural hazards themselves can also lead to growing state control over community resources with the motive of resource conservation. In some cases, natural hazards are associated with degradation of natural resources, leading to top-down conservation projects (Mc Sweeny 2005). McSweeny (2005, p 1458) describes how changes in forest policy undermined the capacity of some communities in Honduras to adapt, following Hurricane Mitch, because of change in access to forest resources and the ability to extend agricultural lands into primary forests; a measure essential to their ability to reconstruct their homes and re-establish the agricultural base. This case study shows that conservation policies might actually create perverse incentives in the long-term for community-based conservation. McSweeny (2005, p 1467) concludes that forest conservation policies often discourage local people from protecting forests as they are forced into wage labour. She suggests that incentives in terms of forest resources would prevent labour migration and encourage local monitoring of forests.

Finally, major natural disasters can also create a culture of dependency on government intervention (UNEP 2004). The influx of external help can become a disincentive for both local governments' support for local coping strategies and for the communities themselves, as mentioned already in the background section of this report. One example comes from the impact of relief aid following recurrent hurricanes in Vanuatu. External food aid acted as a disincentive to cultivation of emergency food supplies, upon which they used to rely, thereby creating new dependencies and undermining people's self-reliance and self-organisation (Mercer no date, p 5; UNEP 2004). External help can create a 'financial mask' that can prevent people from learning from and adapting to natural hazard risks in the long term.

Economic globalisation

Market-induced demands in combination with the rapid population growth has led to an increased focus on cash cropping (e.g., horticulture, vegetable cropping) pushing staple food crops (and emergency food crops – Author) on to more marginal, fragile slopes (Jodha 2001, p 331). The increasing commercialisation of agriculture and resources associated with economic globalisation has often led to the conversion of resilient, diversified agroecosystems focused on subsistence into monocultural ecosystems focused on (often short-term) cash cropping (Farooquee 2004 [Western Himalayas], Mercer no date [South Pacific, especially Fiji]) – that said, cases illustrating a reverse tendency can also be found. Dekens (2005), for example, describes the emergence of a polycultural system following the closure of tea plantations that had monopolised cultivation in a village of Darjeeling District, West Bengal, India, from the 19th century. This, together with the dominance of a few seed companies, promotes an extremely negative attitude to 'old' crops and open-pollinated varieties (Stiger et al. 2005) and is leading to a reduction of traditional crops that are less marketable but more tolerant to

hazards (Mercer no date [Fiji]; Heijman 2001 [Kalimantan, Indonesia]). Similarly, new materials and building practices used for house construction do not provide the same disaster-proof features as the traditional ones (Dekens 2007b [Chitral]; Rautela 2005 [India]; Mercer no date [Fiji]; Jigyasu 2002 [India and Nepal]). Economic changes are also leading to the loss of craftsmanship.

Cultural globalisation

Cultural globalisation is also influencing how people perceive their own resources and knowledge. Local coping strategies are eroding also because the people themselves, especially the younger generation, tend to disregard their own resources and knowledge because of growing exposure to global and national influences and the pressure of modernisation and cultural homogenisation. They are exposed to different (western) standards, values (e.g., individualism, consumerism), and lifestyles. Linkenbach-Fuchs (2002, p 11) mentions how:

"heteronomy has to a large extent replaced local autonomy. [...] [And how] a culture of indifference (against humans and nature) has started to replace a culture of solidarity." As a result, "traditional communication networks are breaking down, meaning that elders are dying without passing their knowledge on to children." (Langill 1999, p 8)

Also due to formal education, the position of elders within the community is undermined. Changes in information technology influence the geography of personal networks. Parker and Handmer (1998, p 55) argue that personal networks are dispersing because of information technology. Hence local knowledge will be hard to obtain.

In order to understand how to identify and use local knowledge and the process of marginalisation surrounding local knowledge, one has to contextualise local knowledge and practices on disaster preparedness within the wider context – rather than merely describing knowledge per se. Although it might seem obvious, often the content of local knowledge has been recorded leaving out the context in which it had developed (Antweiler 1998, p 35). In fact, understanding the context and processes surrounding local knowledge creation, transmission, and interpretation is more important than understanding the knowledge outcome per se. This is because local knowledge is context-specific in both time and space. Understanding transformation processes in the sociocultural, political, and economic contexts and how they cascade through different scales (international, national, regional, local) can help to identify the changing nature and status of local knowledge and practices and the consequences for changing vulnerability (Jigyasu 2002, p xxv). How to identify local knowledge and practices on disaster preparedness despite its changing nature and status? What can be learned from it? The various dimensions of local knowledge on disaster preparedness are described in the following section.

Did you know? 'The earth is faster now'

The loss of traditional knowledge and coping strategies is being reported widely throughout the world. The erosion of local knowledge and coping strategies due to a combination of rapid changes has contributed a great deal to the controversy surrounding the current use of local knowledge and practices. To quote the title of a book on community observations of climate change in the Arctic, 'The earth is faster now' (Krupnik and Jolly 2002), what is new is the rate of change: change is happening faster – supposedly than people's capacity to adapt (?). The 'transition hypothesis' raised in hazard research (White et al. 2001) has been that "in periods of rapid social and economic change marking development, societies may become peculiarly vulnerable to hazard as older forms of adjustment may deteriorate before new forms become available." The factors responsible for the erosion of local, coping strategies are many and include a combination of demographic, sociocultural, political, economic, environmental, and other financial and technological factors.

Did you know? Transition time in Chitral District, Pakistan

In the Chitral District of Pakistan, communities used to rely on a diversity of early warning systems (i.e., mirror and traditional fire systems, call for prayer, herder, shouting, whistling, and running downstream). The traditional system of fire signalling ('phumbarrash') for example was used by upstream communities to communicate the danger of flash floods at night to downstream communities. In daylight, gunfire was used – and this system has been reported elsewhere in Northern Pakistan (Iturrizaga 1997, 2005). These traditional warning systems of imminent hazards in Chitral and surroundings have something in common: they are all set up on an ad hoc basis (i.e., not in a systematic way) 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 has obviously been first and foremost related to religious activities. Therefore, 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 the weakness as much as the strength of the system. Indeed, this 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. The traditional warning systems were also very well adapted to and in tune with the local sociocultural context, ensuring some level of acceptability, trust, and cost effectiveness (e.g., use of the mosque). The Chitral district is now in a transition period, leaving many villages in an institutional vacuum: as a local respondent summarised: "the old system is gone and the new system is not working." 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 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 these new technologies. The early warning systems might, therefore, contribute to increasing socioeconomic disparity among households and villages because not every village and household can have access to and, 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 two places. 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 to the development of dependency.

(Source: Dekens 2007b)

Man sitting on rocks deposited by a flash flood on the road from Chitral towards the Lawari Pass, Lower Chitral.

Did you know? Increasing vulnerability to earthquakes in a village of Nepal

Jigyasu (2002, p xxx) describes the process of increasing vulnerability to earthquakes of Bungamati village in the Kathmandu Valley in Nepal following the transformation processes in traditional rural communities in buildings, land-use and ownership patterns, occupational structure, cultural practices, and governance systems. He argues that the traditional systems of rural settlements like Bungamati based on private and collective agricultural land demonstrate various aspects that used to contribute towards mitigating, preparing, and recovering from the impacts of earthquakes. Income produced from the cultivation of common agricultural land ('guthi' lands) was used to carry out religious and other collective activities. However, nowadays, various transformation processes in Bungamati are affecting the use of private and collective agricultural land, thereby increasing the community's vulnerability to earthquakes. Some of the major changes include densification of the village as private vegetable gardens are being used for construction, a decreasing level of cooperation among villagers due to increasing social and economic segregation, and weak governance at the village level due to lack of financial resources and the concentration of political power on the village development committee.