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Considering Vulnerability in Disaster Risk Reduction Plans: From Policy to Practice in Ladakh, India

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In Ladakh, India, a mountainous region prone to natural hazards, particularly floods, it is critical to adapt disaster risk reduction (DRR) measures to the local environment. The floods that struck Ladakh in 2010 created momentum for local authorities and nongovernmental organizations (NGOs) to engage in DRR initiatives in order to better prepare people to cope with and recover from emergencies. This paper analyzes the way DRR approaches in Ladakh, from the central government to the district level, take both vulnerability and capacity into account. National and state policies are integrated and reflect the vulnerability concept quite well. However, as the case of Ladakh shows, establishing policies does not guarantee that appropriate practices will follow. Although NGOs' relief efforts in 2010 were praised for building on local communities' context and capacities, most practitioners still view DRR through a hazard-focused lens. Likewise, the policy framework for DRR does not yet address the socioeconomic construction of disasters and is not translated into adequate interventions that build on lessons learned during the 2010 emergency. Development obstacles, such as corruption, may also compromise efforts to translate DRR policies into appropriate and sustainable practices. However, local development projects that enhance the resilience of local mountain communities exist and could be valued as effective DRR. Emphasis should be placed on the practical integration of DRR in sustainable development efforts in order to better tackle disasters.

Keywords: Disaster risk reduction; vulnerability; capacities; hazards; Hyogo Framework for Action; Ladakh.

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Introduction

In the 10 years since the adoption of the Hyogo Framework for Action to build the resilience of nations and communities to disasters (UNISDR 2005), disaster risk reduction (DRR) strategies have gradually come to acknowledge the need to address the underlying factors that turn extreme events into disasters. In contrast to the common emphasis on predicting, controlling, and mitigating hazards, DRR aims to reduce causes of disasters linked to societies' vulnerabilities (Wisner et al 2012). This approach recognizes that the impact of a shock is affected by the vulnerability of the people who experience it and their capacity to survive and recover from it (UNDP 2004).

However, this shift to addressing the social, economic, and political construction of disasters, as inscribed in international policies, has yet to fully come into force at the national level, as many countries' DRR strategies are still essentially hazard centered (O'Brien et al 2006; Gaillard 2010). National policies typically consider disaster management through postevent response rather than mainstreaming DRR in development planning according to people's vulnerabilities and capacities (Schipper 2009).

Using the case of the Himalayan region of Ladakh, India (Leh, 34.10° N, 77.35° E), this paper investigates the extent to which vulnerability is integrated in the policy framework for DRR, from the central government to the district level, as well as in DRR practices and local development projects that seek to enhance the resilience of local mountain communities.

Context and analytical approach

This paper conceptualizes vulnerability to disasters as the combination of geographical exposure to hazards and socioeconomic and political factors that lead to increased exposure and prevent people from acquiring the resources to protect themselves and recover from shocks (Hewitt 1997; Wisner et al 2004). DRR frameworks, revisited in Wisner et al (2012), highlight that effective DRR must not only reduce the impacts of hazards but also:

- Achieve safe conditions by strengthening people's livelihoods and implementing disaster preparedness;
• Reduce the pressure to live in hazard-prone areas by addressing the root causes of people’s vulnerabilities (e.g., challenging unequal power structures and political-economic systems that cause vulnerability);
• Involve local communities in designing interventions appropriate to their cultural, socioeconomic, and political contexts, and build on their capacities.

This analysis thus focuses on the following questions: Do policies acknowledge the importance of taking vulnerability into account when mitigating disaster risks? Has this commitment been translated into practice? To what extent have previous hazards’ impacts and people’s vulnerability and capacities guided DRR interventions? And to what degree are local communities involved in DRR?

The study relies on secondary and primary data collected between 2010 and 2013, through a combination of qualitative methods including document reviews, observation, and semistructured interviews. In total, 23 representatives of development organizations in Ladakh were interviewed about their perspectives on DRR. Efforts were made to achieve gender balance among these interviewees—field workers and senior managers from 3 international and 3 national nongovernmental organizations (NGOs) and 8 Ladakh-based organizations (including 2 informants close to the government). In parallel, 89 semistructured interviews were conducted with residents of 3 different sites to explore potential differences between rural and urban settings: 1 remote rural village affected by floods in 2006 (Phuktse), 1 peri-urban village that was heavily affected by the floods in 2010 (Saboo), and 1 suburb of the capital Leh (Chanspa), also hit by the floods in 2010. In total, 45 men and 44 women were interviewed about their daily challenges and their views on DRR. Approximately half the interviewees had been affected by flooding in 2010 or in previous years.

The choice of Ladakh made it possible to gain insights from mountain communities that have experienced rapid environmental and social changes. This high-altitude desert region in the state of Jammu and Kashmir is subject to intense rural to urban migration and urban growth, economic development, and mass tourism, which increase pressure on natural resources (Geneletti and Dawa 2009; Anand et al. 2012). Agricultural systems are losing their diversity and no longer sustain increasing demands for water, land, food, and energy (Nüsser et al. 2012). Increasing rural-to-urban migration modifies family relationships and socioeconomic characteristics in mountain villages and nomadic communities (Goodall 2004). People increasingly depend on the modern wage economy controlled by the global market, while increasing interactions with Western cultures through tourism are transforming mountain communities in both positive and negative ways (Michaud 1996; Norberg-Hodge 2000). Ladakh experiences recurrent deadly floods triggered by heavy and sudden precipitation. In 2010, a major cloudburst generated flash floods that affected more than 40 villages and killed 204 people (Gupta et al. 2012; Rasmussen and Houze 2012). Critical water, energy, transportation, and communication infrastructure was partially or totally washed away (TISS-LAHDUC 2010a).

This article focuses on government and NGO approaches to DRR and responses to communities’ vulnerabilities; the latter are conceptualized in Figure 1. The key components of this conceptualization of people’s vulnerabilities and capacities are based on qualitative data that were analyzed using a combination of the sustainable livelihood framework (DFID 1999) and DRR frameworks. The former provided a model to categorize data as natural, physical, economic, human, and social assets, to which we refer in this article as “resources,” that is, as people’s capacities, abilities, and means of living. Factors that enhance or diminish people’s resources are listed in the corresponding parts of the circle in the diagram. The sixth category, political resources, was added to reflect the political nature of disaster risk as well as people’s access to decision-making as a resource that shapes their vulnerabilities and capacities. The categorization of people’s resources helps in understanding to what extent they can protect themselves when facing the impacts of hazards and how far they can recover from disasters. Moreover, DRR frameworks adapted from Wiser et al. (2012) helped to analyze people’s resources according to broader structures symbolically represented around the circle. Socioeconomic, political, historical, and geographical structures, which generally exist beyond local people’s reach, influence their access to a large, resistant, and sustainable set of resources, thus also contributing to shaping their vulnerabilities and capacities to cope with hazards and climate change. The identification of vulnerabilities and capacities in the study area was part of a larger research project (for further explanations, see Le Masson 2013).

**DRR policy and practice**

**Hazard-centered policies**

India’s national, state, and district disaster management policies follow a coherent, decentralized framework that builds on the 2005 Disaster Management Act (NDMA 2005). Moving away from a relief-centered approach to disasters, the policy framework recognizes that vulnerability to disasters affects groups that are economically and socially marginalized and is reinforced by unsustainable development practices (e.g., urbanization, industrialization, and environmental degradation) (Ministry of Home Affairs, GoI 2009: 1).

Jammu and Kashmir state policy emphasizes the need to foster participation by socially marginalized groups in all phases of DRR, led by local authorities, assisted by aid agencies, and involving civil society organizations (DRRR 2011). The policy also acknowledges some of the root
causes of the state’s vulnerability independently from natural phenomena. It recognizes, for instance, that recent disasters in the state have highlighted unplanned development practices leading to increased socioeconomic and physical vulnerability as well as “the lack of well-established institutional mechanisms and techno-legal regime” (DRRR 2011: 8).

Despite a political vision that encourages disaster mitigation and the long-term reduction of vulnerability, both national and state policies emphasize a technology-driven DRR strategy, as is often the case in hazard-centered approaches. Most DRR measures rely heavily on scientific knowledge and practices such as using geographic information systems and remote-sensing technology to build hazard maps and vulnerability analyses. Strategies also focus on developing early warning systems; using disaster-resistant construction technology; and monitoring critical infrastructure such as
dams, communication networks, power stations, water storage towers, and river and coastal embankments (DRRR 2011)—which is typical of the dominant approach to DRR (Gaillard 2010). These measures require financing and scientific expertise that might not be available in each district.

No disaster management unit or associated expertise existed within the Leh district government at the time of the fieldwork, although 2.5% of the total district budget for 2011–2012 was allocated to flood control (LADHC 2012). The district disaster management plan (DDMP), enacted in 2011, is hazard oriented, with little attention to the root causes of disasters. For instance, although the hazard assessment is quite detailed, the plan does not include any analysis of vulnerability or capacity. The identification of “vulnerable places” (DCO 2011: 16) is a list of some of the most flood-prone areas (ie areas exposed to hazards) but it does not indicate the reasons why people living in these areas are more vulnerable than others—that is, the socioeconomic incentives that lead them to settle in hazard-prone areas.

Inadequate attention to vulnerability

The DDMP identifies DRR measures that focus on the prevention and control of hazards, such as “construction of checkdams” and “drainage correction” (DCO 2011: 54). These, however, might not always protect people’s lives and goods, but instead might create a false impression of security. Embankments built prior to 2010 along one of the major rivers in Leh did not prevent the flood from washing away a road and a bridge downstream. The DDMP also follows a narrow view of vulnerability in relation to exposure. It recommends the “identification of vulnerable points,” which should lead to “stocking of the sand bags” (DCO 2011: 46). It remains unclear how these vulnerable points will be identified, by whom, and based on what criteria. Above all, this strategy does not address socioeconomic vulnerability. When commenting on the causes of the 2010 disaster, the goba (mayor) of Leh explained that the area of the capital where the flood struck used to serve as a catch basin, where water from torrential rains would flow: “Because the road has been built, then people think if there is a road, there are business opportunities. So they build along there, villagers and outsiders.”

In this area, buildings that were destroyed in the flood were being rebuilt in the same locations 1 year later (Figure 2). Commenting on why the authorities were letting people resettle in the same place instead of controlling urban planning as part of a disaster preparedness strategy, several interviewees referred to corrupt practices among local authorities (Box 1). Hence, the identification of flood-prone areas—which could be undertaken in advance as part of urban planning, with efforts to enforce zoning codes—is impeded by development obstacles such as corruption (see also Morup 2010) and rapid unplanned urbanization. One study on migration patterns in Ladakh identifies factors that push villagers to migrate. These include paid labor, education prospects for migrants’ children, seasonal circular migration of nomadic communities, and other “diverse, community-specific factors such as institutional arrangements, normative forces, economic incentives, and psychosocial motivations” (Goodall 2004: 225); accounts shared by participants in this study (Box 1) further highlight land grabbing and the use of land for guest houses, processes that shape people’s vulnerabilities and capacities but remain overlooked by the DDMP.

Inadequate attention to socioeconomic vulnerability is further illustrated by rehabilitation efforts after the 2010 disaster, when media attention, combined with the need to house flood survivors before the onset of winter, likely pressured authorities to undertake quick and visible rehabilitation projects. As described in Kaur (2011), the prime minister’s office and Indian state-owned companies offered prefabricated single-room temporary homes to about 170 homeless families (Figure 3). The families were also given a relief payment of INR 200,000 (approximately US$ 3200) to build homes, but many laborers had died in the floods or left the region, and the labor shortage prevented families from building new houses before winter. Accounts from resettled families in the suburbs of Leh suggested a severe mismatch between the government’s top-down intervention and people’s context and needs. The rooms were not sufficiently insulated for winter temperatures in Ladakh (where temperatures drop well below −10°C), and they did not have chimneys, which made it impractical to use a local stove (bhukari). Freezing temperatures and indoor pollution made the rooms inhospitable and led dozens of families to use them as storage space or simply lock them up, rent accommodation elsewhere, or move in temporarily with relatives.

Interviews conducted during this study with people affected by the floods who were relocated by the government (albeit not necessarily in prefabricated houses) expressed mixed opinions about the adequacy of the disaster relief they received. One family said that although they were allocated a temporary apartment by the government, they preferred to stay with relatives until they could build a new house. They chose to be located in a safer place and closer to the center of Leh, where they could make a living more easily by renting their rooms as accommodation for tourists. In contrast, one inhabitant of Saboo, whose house was washed away, indicated that she was thankful to the government for the financial support she received to build a new house using locally available materials and labor.

The choice by the first respondent’s family to decline the temporary apartment emphasizes the interconnections between vulnerability and access to
resources and livelihoods; the latter heavily influences people’s choices about where to settle. A shortcoming of the financial support for rebuilding, which the second respondent gladly accepted, is that many new houses appear to have been built without consideration of whether the new site (for example, a field belonging to a family member) was prone to flooding.

Growing awareness of local contexts and capacities
In contrast to the central government’s quick, costly, and questionable strategy, efforts by local NGOs supported the most vulnerable households by paying for temporary rented accommodations or providing them with bhukaris and fuelwood to help them through the winter. Many affected families temporarily returned to their home villages and rented a place to live or lived with relatives or neighbors. In the meantime, NGOs supervised and cofunded the building of new traditional mud-brick houses adapted to the Ladakhi climate. The majority of NGOs involved in the rehabilitation thus relied on local Ladakhi communities’ strong social resources in the short term while privileging long-term reconstruction strategies even if the process took longer. Many of the new houses are earthquake resistant and use passive solar technology (Kaur 2011; LEDeG 2011).

BOX 1: Development obstacles to safe urban planning

Representative of a national organization:
The problem is people are not listening to the administration. And the administration, politicians, they look after their bank [accounts]. There are people who will pay them, influential people, you know. After the flash floods, people got a lot of money to construct these things. There is not a strong political will and the administration is also very, very weak compared to these people who are more influential, and a lot of black money must be involved into it you know, bribing some people and doing it.

Villager in Saboo:
If you have any problems, it takes a long time to [resolve]. But if you know someone or officials in the block, then it will get done very fast.

Participants in a group discussion in Saboo:
Corruption is a big problem.
People who have money, they can pay easily, but people who don’t have money, no matter how much they are cultivating the land, it doesn’t matter, they don’t have much choice.

Villagers in Leh:
Corruption is coming slowly and people are sharing lies, treacheries.
There is a lot of new construction. There are no extended-family homes, the sons go and build their own houses. So the coming generations won’t have any cultivable land left. It will only be houses or guest houses. Due to tourism in Ladakh, there are many changes, we are building guest houses and shops on the fields. So we face many problems.

Participants in a group discussion in Leh:
What do you do when you need more agricultural land?
[Woman]: We take barren land on the hills.
[Elderly man]: Even all the barren land is taken, so it is very difficult.
[Interpreter]: Where do you take the barren land?
[Man]: The nearest place to your house, you can take it. There is always some barren land around your house or your land, and you can extend the boundary, that is how you take it.

The consequences of the 2010 flood resulted in wider recognition for DRR in Ladakh and increased political will to act (and be seen to act) to reduce the risks of future disasters (see Box 2). Initiatives such as the organization of workshops on DRR enabled local authorities to discuss options with NGOs and improved participants’ understanding of DRR principles and tools. Participants agreed that scientific expertise needed to be combined with traditional knowledge, which had thus far been overlooked, and that strategies must build on the Hyogo Framework for Action.

Although these acknowledgements have yet to be addressed in the district policy framework, many NGOs have successfully integrated disaster preparedness within their rehabilitation projects. Save the Children planned to undertake key DRR strategies when designing the construction and operation of new schools, including participatory vulnerability and capacity analysis, village disaster management plans, and school safety planning. Earthquake-resistant new houses built by the Ladakh Ecological Development Group and supported by SEEDS India are another example of integrating traditional construction with hazard mitigation techniques while using local materials and labor (Sharma et al 2014). Most NGO members interviewed for this study stressed the
need for preparedness and rehabilitation projects to be appropriate to the local context and affordable by local communities in order to be sustainable.

This increased awareness is, however, undermined by persistent hazard-centered perspectives on DRR. Despite NGOs’ successful approach to building on people’s capacity to recover from disaster, practitioners’ views of effective DRR strategies remain ambivalent. For instance, when explaining the damages resulting from the disaster, a few NGO representatives focused on the characteristics of the hazard, a tendency illustrated by the first 2 respondents quoted in Box 2.

This point of view considers the 2010 disaster as being caused by the hazard itself, which explains why the majority of NGO representatives identified disaster risk preparedness strategies that do not conceive of the vulnerability of communities in terms of their marginalization or access to resources, but which focus on hazards. These shortcomings illustrate that the window of opportunity for change created by the disaster did bring stakeholders together around a shared awareness of risk (Christoplos 2006), but unsustainable development practices creating vulnerability remain largely unaddressed in Ladakh.

FIGURE 2 Area in lower Leh bazaar flooded in August 2010. (A) Destroyed buildings and survivors’ tents; (B) new constructions on the same site a year later. (Photos by Virginie le Masson)
The role of local communities

DRR policies at national and state levels recognize the role of communities as first responders in times of crisis and the importance of local knowledge and coping mechanisms. They also call for the development of community-based DRR building on traditional village-level institutions. Likewise, at the district level, the Leh Autonomous Development Hill Council is reviewing its DDMP to better integrate local communities in all DRR phases, from hazard, vulnerability, and capacity mapping to designing district- and village-level DRR plans (Spalbar 2012a, 2012b). At the time of writing, this vision had not yet been confirmed in a new DDMP for Leh.

Concrete DRR strategies, as part of the DDMP or of NGO projects, still appear to primarily consider communities as receivers of information rather than as sources of knowledge that could be included in decision-making. For example, the DDMP encourages development of early warning strategies. Not only does the rarity of flash floods on high plateaus make them difficult to predict (Rasmussen and Houze 2012), but focusing on developing early warning systems does not build on the local capacity to act quickly and take refuge on higher ground that was described in official reports and in accounts of villagers affected by the floods. Leh and Saboo inhabitants interviewed for this study said that their first reaction during the cloudburst was to run uphill and seek refuge on higher ground near religious landmarks such as the Shanti Stupa or a monastery. The absence of an early warning system in 2010 did not prevent most people from spontaneously escaping their homes, which suggests that DRR strategies should not focus on making villagers aware of what they must do in case of an extreme weather event.

Accounts from NGO workers also echo DRR policies that aim to increase people’s awareness of measures to minimize disaster risks. Most NGOs tried to increase people’s awareness of hazard-prone locations or alternative building techniques, as emphasized by the third respondent quoted in Box 2. Despite the benefits of awareness campaigns, this approach means that NGOs might not address root causes of disasters—that is, the reasons some people settle in flood-prone areas in the first place. Increasing the awareness of local communities, or, for instance, requiring that “in high risk areas, all buildings should incorporate earthquake resistant features,” as recommended by the DDMP (DCO 2011: 55),

**BOX 2: Practitioners’ views on causes of disasters and corresponding DRR needs**

| Member of an international organization: |
| As soon as the flood happened, people started speculating about the cause of the flood, and so many different reasons came up, you know, more trees, more tourists, human intervention, everything possible was suggested, but no one can really pinpoint the reason why the flood occurred. So some sort of scientific monitoring needs to be done. |
| [Interviewer]: Why do you think the flood caused so much damage? |
| [Respondent]: That was because of sand, because the rain fell in one area and came down dragging a lot of sand, boulders, trees, everything and it just kept crushing everything in its path. |
| [Interviewer]: How can you explain that so many people died and so many houses were destroyed? Do you think it is just because of the power of the cloudburst and flood? |
| [Respondent]: Yeah, I think so. … If it is water, there is a way of getting out of it, but when you are caught in slush, in mud and trees, and entangled in things, even if you are alive you probably won’t make it. |

| Member of a national organization: |
| What do you think should be the main priority for action to avoid a disaster such as the one in 2010? |
| [Respondent]: I really don’t know, but there are some scientific kind of things, like as of now we really don’t have any data and any sophisticated equipment to measure things saying that there will be a flood, heavy rainfall or snowfall, so that could be arranged with help from the outside. … We need to study those floods, we need to know the characteristics of those floods and then go for a little bit of awareness kind of program and then think of strategies, you know. You have to have some kind of disaster management program and statistics. As of now we don’t have a department, we don’t have anything. |

| Member of a local organization: |
| Once we explain these things, you know, floods, the structure of houses, the location, then we can reduce the mortality. … If we plant trees in the river, then it will damage their homes, so if you say water needs to flow easily it will reduce the damage. And also they should not build the houses along the streams, it should be in safer places. … We have to mobilize people so that they help each other … and then, if the flood comes, they need to know where to go. … Maybe there are some people in the villages that can do morale boosting, you know, so that people don’t feel distress. |

| Member of a local organization: |
| Now everyone feels there must be some sort of disaster management or preparedness. |
does not explain how a household that lives below the poverty line will have the financial means to make its house earthquake resistant.

Some NGO staff also suggested that disaster preparedness efforts should mobilize local communities so that people help each other during an event. Interviews with villagers suggested that communities are already the primary actors during an emergency and highlighted that most Ladakhi households benefit from strong social resources (acknowledged by many NGOs working on rehabilitation). All interviewees affected by the disaster stressed that local people were the first to come to rescue those trapped in their houses when the flood struck and the first providers of relief. Interviews also highlighted that many of those rendered homeless and suffering trauma were instantly provided help, shelter, and moral support by their neighbors, relatives, and monks in their village. Therefore, awareness campaigns to inform people about actions to undertake during a crisis might seem meaningless given inhabitants’ capacities. They also do not appear to follow a vulnerability approach to disasters that considers the involvement of local communities crucial in designing interventions that are appropriate to their cultural, socioeconomic, and political contexts in order for them to assert greater control over strategies affecting their lives (Abarquez and Murshed 2004).

Discussion: Tackling the root causes of risks and therefore of unsustainable development

Despite the tendency of practitioners to identify DRR measures that reflect a hazard-centered approach, accounts from a few NGO representatives also referred to causes linked with the social dimension of disasters. Answers provided by NGO representatives clearly underscore that, although little can be done to prevent a cloudburst, factors affecting the resulting damage can still be addressed. This consists of addressing the reasons people settle in flood-prone areas. Such reasons go beyond local people’s allegedly low awareness of risks. Geographical and socioeconomic processes occurring in Ladakh encourage many families to migrate from rural areas to the urban area of Leh. They are often attracted by greater livelihood and employment prospects, higher wages, health care, educational opportunities, better communication infrastructure, and access to more diverse food items and manufactured goods (eg Goodall 2004). In order to settle in the capital, migrants either have to rent a place to live or grab a piece of available land and build their own house. However, given the high level of population growth, especially in the capital (Goodall 2007), land is expensive and highly sought after by developers or used by local
families to build new houses for their children or for accommodating tourists. Therefore, available and affordable land is often in hazard-prone barren areas (see Box 3). Evidence in Box 1 also indicates that people are ready to pay bribes in order to bypass zoning regulations. Therefore, DRR strategies that remain focused on the hazard or on the need to educate communities do not recognize the socioeconomic structures that help put people at risk. Yet the disaster literature has highlighted the limits of DRR approaches that do not address the social dimensions of disasters (Wisner et al 2012).

On the one hand, one could ask how much NGOs and local authorities can do to tackle people’s vulnerability, because root causes depend upon wider social structures linked to macroeconomic processes. On the other hand, projects that NGOs have implemented in Ladakh for the last 3 decades to improve rural inhabitants’ livelihoods address people’s vulnerability by enhancing their access to resources. One example is the building of houses with passive solar design, which uses insulation and other simple technological elements to collect, store, and distribute solar energy in the form of heat. Most interviewees living in a passive solar house said that they saved time formerly spent collecting fuel (chopping and collecting wood or collecting cow dung), which enabled them, particularly women, to undertake other activities, as well as saving money otherwise spent on fuel. This also leaves more cow dung for use as manure and therefore decreases use of chemical fertilizers. Moreover, passive solar houses contribute to improved health—particularly for women, children, and older people, who spend more time indoors and near the stove—through warmer indoor temperatures and reduced indoor pollution (GERES 2011; Le Masson 2013). These outcomes enhance people’s economic, human, and physical resources. Therefore, although it is not advertised as such, the building of passive solar houses as a development project contributes to reducing people’s vulnerability, especially because the targeted beneficiaries are the most marginalized and impoverished rural inhabitants (GERES 2011). It might also create an incentive for them to remain in their villages rather than migrating to more hazard-prone peri-urban areas.

Another example of adequate development practice is the government-sponsored Mahatma Gandhi National Rural Employment Guarantee Act, which aims to enhance rural livelihoods by guaranteeing 100 days per year of paid unskilled labor to adult household members (GoI 2005). The majority of rural households in Ladakh have asked to participate in this scheme, because it not only provides opportunities to generate income where they live but also allows them to identify what work should be done in priority for the development of their own village (TISS-LAHDCC 2010b). Most villages have identified the development of agricultural infrastructure and rural connectivity as their priorities. In Phuktse, people prioritized the renovation of water channels and the construction of new roads. The improvement of road infrastructure was also considered a priority in Saboo, along with improvement of irrigation (TISS-LAHDC 2010b). The scheme thus allows villagers to work at the community level on issues that they have themselves identified. Such positive outcomes advocated by community-based approaches have the potential to address the root causes of development problems, including factors that exacerbate people’s vulnerability to hazards or longer-term environmental changes.

Construction of water reservoirs, cash-for-work schemes, and educational scholarships are all examples of existing development projects that can also serve as DRR strategies because they provide people with means to alleviate their own vulnerability. Authorities also have a key role to play to address some of the daily constraints that people face—for instance, fighting the corruption of administrative officials, which was highlighted by the majority of interviewed villagers as one of their primary daily challenges. By recognizing and punishing bribery, authorities would prevent the possibility of individuals bypassing urban regulations and building hotels, businesses, and homes in flood-prone areas. However, this has to be accompanied by effective and informed urban
planning on the one hand and policies that tackle poverty-driven migration and unsustainable tourism practices on the other, not only at the local but also at the national level.

**Conclusion**

The way vulnerability is conceived in policies and practices at each level of decision-making remains strongly influenced by the dominant approach to disasters. The policy framework, despite having shifted from a relief-centered approach to a more proactive strategy to mainstream DRR within development planning, focuses on technocratic measures. These focus on hazards, exposure, infrastructure, or the lack of awareness of at-risk populations, rather than tackling the root causes of people’s vulnerability and drawing on existing local knowledge and capacity. At state and district levels, authorities express willingness to apply community-based DRR strategies, but have yet to do so.

Evidence from Ladakh shows that translating principles into policies does not guarantee that appropriate practices follow. Short-term postdisaster government interventions provide aid while ignoring the environmental context and traditional mechanisms of coping, and thus fail to efficiently address people’s vulnerability and promote recovery. NGOs and local authorities provide examples of good postdisaster practices (see also Sharma et al 2014), but presidest DRR efforts seem to replicate the same top-down, hazard-focused measures already criticized in the DRR literature for having failed to render communities safer, not only in mountain areas but also globally (Hewitt 1983; Wisner et al 2004; Gaillard and Kelman 2012).

In contrast, many local development projects could also serve as DRR strategies because they contribute to reducing people’s vulnerabilities. Likewise, NGOs have a role to play in scaling up best practices in order to initiate institutional change and mobilize political commitment to enforce policies (Lewis and Kanji 2009). Numerous evidence-based studies, however, raise the challenge of turning successful initiatives into policies and governmental actions (eg Twigg 2005; UNISDR 2006; Venton et al 2007; Mehta 2009). The gap between recommendations from research studies, policies, and actual practices remains pervasive, as the international agreement on disasters, the Hyogo Framework for Action (a 10-year plan), has now come to an end. Its successor, the Sendai Framework for Disaster Risk Reduction adopted in March 2015, recognizes that greater disaster risk governance requires more transparency, accountability, and the participation of stakeholders at all levels (Wilkinson 2015). However, the adoption of the Sendai framework does not guarantee the implementation of adequate DRR adapted to mountain environments (Zimmermann and Keiler 2015). Beyond policies and methodologies agreed at the international level and in the NGO sector, there is a need to mainstream attention to the socioeconomic and political construction of vulnerability in practice.

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