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MEETING REPORT

Disaster Risk Reduction in Kullu district, Himachal Pradesh, India*

The rugged landscape of the Indian Himalayan region elevates the risk of hazard events and holds back socio-economic development opportunities for remote and vulnerable communities. Particularly notable are landslides, floods, forest fires and earthquakes. A recent international assessment of disaster impacts (1996–2015) revealed that India as a whole suffered the fifth largest mortality, especially related to flood events[1]. The 23–24 September 2018 floods which impacted the Beas River watershed in Kullu district, Himachal Pradesh highlight the significant damages (to infrastructure and environment), disruption and costs that disaster events inflict upon us. It is therefore important for society to develop a better understanding of how the magnitude, frequency and impacts of these hazards are shifting in the context of climate change and variability, land-use change, and increasing mountain populations[2,3]. Challenging these risk conditions, international, multinational and national disaster risk reduction (DRR) frameworks (e.g. The Sendai Framework 2015–2030 (ref. 4); Asian Regional Plan, re-appraised at the July 2018 Asian Ministerial Conference on Disaster Risk Reduction[5], and Indian National Disaster Management Plan 2016 (ref. 6)) are driving transitions to resilience, in which people and communities are central to achieving disaster reduction. Resilience is defined as: 'The ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner, including

*A report on a multi-stakeholder meeting in June 2018 in Kullu to discuss and develop local disaster risk reduction approaches.

through the preservation and restoration of its essential basic structures and functions through risk management'[7]. In order to be effective, policy makers and practitioners need to translate these ideas into local action, to deliver reduced vulnerability and increased resilience to hazard and risk conditions.

In this context, G. B. Pant National Institute of Himalayan Environment and Sustainable Development (GBPNIHESD, Kullu), Bath Spa University (BSU, UK), other Indian and Canadian Universities, Indian Government agencies, NGOs and local communities have together been exploring interrelated aspects of flood hazard, local vulnerability and resilience to disasters and DRR development in Kullu district.

Here, we report on recent activity which is delivering novel insights into local disaster knowledge and local engagement with DRR, following Johnson *et al.*[8]. In June 2018, meetings between local communities, GBPNIHESD and BSU took place in mountain villages, followed by a one-day workshop in Kullu (hosted by GBPNIHESD; Himachal Regional Centre), attended by more than 30 delegates from local communities, Government agencies and local/international NGOs. Together we:

(1) Delivered an interim synopsis of research findings from the village discussions.
(2) Screened a Hindi version of a trilateral (India, Canada, UK) research film on flood disaster impacts, local knowledge and local DRR development in the Phojal Nalla catchment (Beas River tributary).
(3) Considered opportunities for enhancing DRR in Kullu district, through the District-Level Disaster Management Plan.

The meeting panel of the 2018 Kullu DRR Workshop (academic and Kullu district Government officials) collectively emphasized the need for:

(1) Enhanced collaboration and coordination among scientists, villagers, policy planners and practitioners to improve DRR in the mountain regions.
(2) The value of multidisciplinary, multi-national, participatory and collaborative approaches to underpin DRR.
(3) A need to compile improved understanding of past hazard events to better manage future risks (e.g. the UGC-UKIERI-funded project HiFlo-DAT [2018–2020], which is an in-development flood database for Kullu district).
(4) The importance of local knowledge and village-level awareness in the DRR partnership.

Objectives 1 and 2: Discussions with five village groups in the Phojal Nalla catchment (i.e. Kathi/Kukri, Neri, Phojal, Runga and the Dobhi Tibetan community), used a short film (see later) to initiate focus group discussion. These provide important observations for forward DRR development, namely:

(1) Existing local knowledge of floods and landslides. This revealed clear understanding of past hazard event cause, location, time and impacts. It demonstrated how local knowledge has much scope to supplement and enrich official knowledge sources, which are otherwise fragmentary and incomplete.
(2) Environment and community challenges of importance to the local community. Common concerns include water supply, forest health and service provision, including education.
(3) The existing resilience measures in villages. These centre on traditional architectural styles, land use (avoiding streams and planting trees), and the value of modern communications. However, many types of resilience are not fully recognized by the village community, revealing a need for further awareness and empowerment schemes.
(4) Knowledge of aspirations for a Village Disaster Management Committee (VDMC). At present, there is limited awareness regarding proposed VDMC, but villagers seek a partnership approach to developing them. These need to explore the value that local communities commonly place on official knowledge above their own knowledge.

Objective 3: All attendees engaged in break-out group and plenary (whole group) discussions, to further examine DRR in Kullu district. These discussions considered: existing examples of DRR best practice in the district; the formation and role of VDMCs; how film, information leaflets and mobile-phone technologies could be used to share local and official knowledge to improve resilience, and how academic research and collaborative activities could assist future development of the Kullu District Disaster Management Plan. Detailed analyses of these discussion outcomes are ongoing, and form part of our forward recommendations.

The meeting concluded with an emphasis on the importance of promoting integrated approaches towards DRR, actively involving a diverse array of stakeholders, including those living in the region and beyond. In addition, all participants agreed that disasters cannot be averted, but their impact can definitely be minimized through a much closer interaction of local communities, responsible agencies and wider science teams. Accordingly, it was resolved to:

(1) Extend the outreach of the important DRR message using films, social media, traditional media and public engagement alongside government agencies at important religious festivals (e.g. Kullu Dussehra). We take this opportunity to invite discussion (via the UK author contact) from the *Current Science* readership, about the issues, challenges and opportunities showcased by our DRR film, hosted on the Kullu District Government webpage (https://hpkullu.nic.in/pathways-to-resilience/). The medium of films is societally accessible, connecting hearts and minds, which is necessary to galvanize collaboration in taking the effective next steps in improving resilience to disaster risk.
(2) Extend international partnerships and networks to bring new/diverse knowledge perspectives to this global challenge, and provide opportunities to develop the next generation of critical academic researchers. We agreed to target large-scale international research funding and invite new academic/NGO members to our research partnership.
(3) Assist the iteration of the Kullu District Disaster Management Plan in partnership with government agencies, via publication of a policy-practice discussion note on the development of resilience in Indian Himalayan village communities – which we hope

provides a catalyst for the improvement of DRR in the region and beyond.

These represent significant steps to help transform the policy positions into practice, by engaging with and valuing the knowledge of a broad consistency of stakeholders, and upscaling current efforts. They also serve to demonstrate the importance of multidisciplinary approaches in scientific endeavour.

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