

DISASTER RISK REDUCTION RECONSIDERED

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Keywords: Resilience; Disaster Risk Reduction; Governance; Nepal

Abstract

Increasing resilience has become the favoured approach in efforts to curb the impact of disasters. It is central to the United Nations' International Strategy for Disaster Risk Reduction and to its Sustainable Development Goals, and it is now championed by most of the nations and civil society organisations working with hazards. But who decides what resilience looks like? We explore this question through the Nepali phrase ke garne? (what to do?). Often seen as an expression of fatalism, its true meaning is pretty much the opposite: resilience in the face of adversity. Drawing on the theory of plural rationality, we show how the proponents of Disaster Risk Reduction in Nepal, in making the invalid fatalist assumption, are bent on bestowing resilience on a social and cultural system that unbeknown to them is already, of its very nature, resilient: unnecessary at best; positively harmful at worst. This is not to say that they should not intervene; only that they need to first understand what it is that they are intervening in. And central to that understanding is the indigenous knowledge – in the case of landslides, the ethnogeomorphology – of those they have mistakenly assumed to be fatalistic.

Acknowledgements:

This work would not have been possible without the citizens of Nepal that spoke with us to share their stories and experiences surrounding the evolving DRR governance system. Special thanks to the communities who welcomed us and gave their time when they have much more important things to do. Further thanks to the translators and research assistants Ravindra Gyawali and Manoj Suri who translated and transcribed interviews. Lastly, thanks to CR's PhD supervisors Julian Clark, David Hannah and Fraser Sugden who provided support throughout the design and implementation of data collection.

Ke garne? (“what to do?”) is an expression on many a lip among the people who live in the high mountains (*Himal*), middle hills (*Mahabharat*) and plains (*Tarai*) of Nepal.¹

This question is rhetorical, usually rounding out a story of some hardship. The bus didn’t show up in the village for two days, *ke garne?* Your husband has spent most of your children’s lives working overseas to pay for their schooling, *ke garne?* Your village house is small and has no power, *ke garne?*

Although the English translation gives a sense of futility in the face of adversity, it does not quite have this function. Instead, it is about resilience in the face of adversity – you still got to town, your husband is doing the right thing for the family, your house is all you have. There is nothing you can do to prevent these events, but that is not a reason to let them stop you.

[Gowne 2015]

The same misunderstanding, we will show, holds for landslides, where the proponents and practitioners of Disaster Risk Reduction (DRR) have assumed that fatalism, not resilience, is the only possible response that villagers could have to these events.² In other words, these DRR intervenors are bent on bestowing resilience on a social system that, unbeknown to them, is of its very nature already resilient³: unnecessary, at best; positively harmful at worst. This is not

¹ Along much of the southern slope of the Greater Himalayan Range there is a fourth altitudinal zone: the foothills (*Siwaliks*). East of the Sapt Kosi, however, they are missing, thanks, it has been suggested, to the Sapt Kosi, in the course of its erratic swings back and forth across its alluvial fan, having washed them away (see Messerli and Hofer 1995). Some might wish to add a fifth zone: the *Barbar* (“porous place”), between the *Siwaliks* and the *Tarai*. Much of the water that cascades down the *Himal* and *Siwaliks* slopes disappears underground when it reaches this quite narrow strip, thereby replenishing the groundwater rather than continuing to the Bay of Bengal on the surface.

² That Dor Bahadur Bista’s book on fatalism and development in Nepal (Bista 1991) sparked a heated debate suggests that the assumption of fatalism – in the sense of “Don’t just do something, stand there” – is unlikely to go unchallenged.

³ Resilience, that is, in the sense it was used by its originator, the ecologist C.S. Holling – the ability of a system to cycle endlessly through a number of different “basins of attraction”. This is in contrast to the more recent

to say that they should not intervene; only that they need first to develop a holistic understanding of what it is that they are intervening in.⁴

Methods

This paper uses primary qualitative data that was collected between 2019 and 2020. The interview track for this study explored challenges to DRR and perceived roles of different actors in collaborative DRR in Nepal. In total 36 interviews took places with actors from governments, Non-Governmental Organisations (international and national), United Nations, and communities living in landslide prone areas (Table 1)⁵.

Government of Nepal officials	NGO (international and National)	United Nations	Community members
6	9	2	19

Table 1 Number of Interviews conducted with different actors.

Interviewees were selected using purposive and snowball sampling methods (known actors were contacted via email for interview, after the interview they were asked to nominate key people they work with in DRR; these people were then contacted for interview). A mixed sampling approach was used as DRR governance was in a state of transition at the time of fieldwork, with many actors changing roles and moving departments; this resulted in a focused sample size for the study. However, the actors we interviewed had an extensive history of working in DRR in Nepal, with many working across multiple sectors – government of Nepal, non-governmental organisations, United Nations, Nepal Army and so on – throughout their career; as such, whilst acknowledging the limitations of this focus, we feel confident that our sample captures the key thinking of different actors working in key positions in Nepal DRR at the time.

Interviews took place in person at the participants’ office or neutral location, such as a café. Each interview was recorded with permission of the participant and transcribed by one of the authors (CR). In total over 50 DRR actors (Government, NGOs and the UN) were contacted for interview with only 17 responding. The limitations in the response were due to people no longer being in the same position or being unwilling to talk on these issues. When the interviews

“bounce-back” which Holling called brittleness: the ability of a system to remain in the same basin of attraction (see Thompson 2002).

⁴ Globally, the concept of resilience has been characterised as “the dominate mode of western intervention in the Global South, one which prioritizes the needs of the donor with little regard for the communities on the ground (Pugh,2014). Specifically, in Nepal the concept of resilience is seen as a tool to amplify the importance of the government and NGOs in DRR practices (Rusczyk,2019; Nightengale,2015)

⁵ Community members, as discussed here, were self-defined groups living in far-western Nepal. Please see Martin et.al, 2021 for more details on this study site.

were conducted in Nepali a translator was used during the interview and later transcribed into English; both research assistants working on the project had prior experience conducting field work interviews and with the translation/ transcription of documents. Where upon terms or concepts could not be directly or confidently translated into English a discussion was had between the CR and the research assistant to mitigate, as much as possible, mistranslation or miscommunication of meaning. The transcripts were analysed using NVivo 12 software. The coding for the interviews was guided by the theory of plural nationality, using the four solidarities identified in Figure 1. The focus was on the perceptions of communities' roles in DRR by key DRR actors. The coded data was then used to explore how communities were being perceived and what impact, according to our data, this had on DRR governance.

The Invalid Assumption of Fatalism

The conviction that people in Nepal can only be fatalistic in the face of landslides has a long and undistinguished history: all the way back to the 1972 United Nation's Stockholm Environment Conference.

Population growth ... is forcing farmers onto ever steeper slopes, slopes unfit for sustained farming even with the astonishingly elaborate terracing practised there. Meanwhile, villagers must roam further and further from their homes to gather fodder and fuelwood, thus surrounding most villages with a widening circle of denuded hillsides. Ground-holding trees are disappearing fast among the geologically young, jagged foothills of the Himalayas, which are among the most easily erodible anywhere. Landslides that destroy lives, homes and crops occur more and more frequently throughout the Nepalese hills. [Eckholm 1976]⁶

This conviction was at the heart of the environmental orthodoxy – now known as THED (Theory of Himalayan Environmental Degradation) – that was disproved at the Mohonk Mountain Conference in 1986 (see Ives and Messerli 1989). This upset was largely thanks to some research, at the International Institute for Applied Systems Analysis (IIASA) that was intended to provide the United Nations Environment Programme (UNEP) with a “systems overview” of the entire environment-and-development problem of the Himalayan Region (Thompson et al 1986). However, as they set about trying to pin down the various vicious and interlocking circles of environmental degradation that were being driven by the axe-wielding zeal of all

⁶ The book itself came four years after the conference, but its argument – with this Eckholm/Stockholm verdict on the villain-of-the-piece – was central to it. Further iterations of this argument, along with increasing evidence for its invalidity are set out in Thompson and Gyawali 2007).

those ignorant and fecund Nepali peasants, it soon became clear that there was no validity – none at all – in this widely accepted orthodoxy. Decades of research, along with millions of aid dollars, had been expended on resolving what was, without doubt, not the problem: a text-book example of bad science for public policy (Thompson 1993). And yet this history threatens to repeat itself, as public policy decision making around DRR continues to focus on top-down scientific understandings of *how to do* resilience without taking the time to understand the people and practices they are bestowing it on.

So we will start unpacking Disaster Risk Reduction by taking a look at some of the resilient behaviour of Nepalis in relation to the risks, landslides among them, that they face: behaviour that is denied by those who have assumed fatalism. These risks are rooted in the truly stupendous forces – gradational and tectonic – that are inherent in the places where they live. Pre-eminent among the gradational forces is the erosion, mostly by water (in its liquid and solid states), that is wrought by the region's often torrential monsoon rains and prodigious snowfalls. The tectonic forces are then responsible for the earthquakes (along with the rockfalls, avalanches, landslides and so on that they provoke) that are the consequences of the South Asian tectonic plate forcing its way under the Eurasian plate. At such a rate, moreover, as to continually raise up the Himalayan peaks faster than they can be worn down by the gradational forces: hence all the deep V-shaped valleys and their steep, and frequently unstable, sides. Furthermore, those tectonic forces, by pushing the Himalaya even higher into the earth's atmosphere, have been largely responsible for the emergence of the monsoon itself and for its seasonality.⁷ So, if you are going to live in such a place, you are going to have to cope with all these events: *ke garne?*

The High Mountains (Himal)

An extensive hazard-mapping exercise (a part of the United Nations University Highland-Lowland Interactive Systems Project) was carried out, starting in 1978, in the Khumbu area (directly below Mount Everest) and landslides and rockfalls were among the hazards it mapped. Others included avalanches, *bishyaris* (landslips that dam rivers in the typically V-shaped valleys only to fail catastrophically once the impounded water overtops the debris) and GLOFs (Glacier

⁷ Each year, as the albedo effect builds up on the Tibetan Plateau, it eventually causes the jet-stream to jump across from the north to the south side of the Greater Himalayan Range, thereby triggering the onset of the monsoon, with the opposite happening later in the year. Climate change, some fear, may put a stop to that “punctuated cycle”, with likely catastrophic consequences for a major fraction of humanity. (See Raymo and Ruddiman [1992]; for the paradigm shift within geomorphology that was occasioned by the recognition of the tectonic forces see Tranvik et al [2000].)

Lake Outburst Floods)⁸. The human settlements – villages, monasteries and so on – all turned out to be sited well clear of the extensive high-risk areas that were coloured-in in red on the researchers’ maps. In particular, while fields are cultivated right up to the riverbanks, homes are always sited a hundred or so metres higher. So, even in the absence of science and of public policy based on that science, the people of Khumbu have been able to quite accurately assess all these risks, landslides among them, and take effective steps to minimise them (even, in the case of *bishyaris*, when working in the “red zone”: the fields beside the river; if you notice that the river has suddenly dried up, drop your hoe and head for the high ground!). They also have in place institutional arrangements that ensure that infrastructure – wooden bridges and paths – that are destroyed by those natural hazards are quickly replaced.⁹

The Middle Hills (Mahabharat)

In the Kakani District (just over the western rim of the Kathmandu Valley), where the local geology has rendered the quite densely populated and intensively cultivated landscape particularly unstable, a series of research projects has revealed that the initial assumption – that the farmers were inevitably at the mercy of these natural processes – was very wide of the mark. The first project, staffed by geomorphologists, mapped the many landslides that occurred over the 12-month study period and, by measuring the overall area of agricultural land that had been destroyed, was able to arrive at a rather precise description of the precariousness of the livelihoods of these Kakani farmers. This gloomy verdict also fitted well with the then-prevalent (and afore-mentioned) “environmental orthodoxy”: the Theory of Himalaya Environmental Degradation, in which a mushrooming population is seen as setting in motion a series of interlocking vicious circles, with farmers forced to deforest and terrace ever-steeper slopes, thereby losing valuable topsoil while simultaneously reducing their own resource base, silting up the dams and clogging the turbines of any hydroelectric installations that are in the way, and eventually worsening the downstream flooding on the Gangetic Plain: the *Tarai*.

The following year, one of the scientists, while on a fortuitous stop-over in Kathmandu, went up to Kakani to revisit this ravaged landscape. To his amazement, he could find no trace of any of the widespread landslides that he had mapped just the year before. All, it turned out, had been quickly and expertly repaired and were back in cultivation. A second project was therefore

⁸ There is no specific word for these in the local languages, perhaps because they are seen as one kind of *bishyari* (see Dixit 2002, especially pp. 28-29). Expatriate geomorphologists originally dubbed them *jökulhlaups*, after not dissimilar phenomena in Iceland. But GLOF has now displaced this usage.

⁹ There are usually stands of decades-old trees, close to the bridges, that have been reserved so that they are available when needed. All this research is well summarised in Ives (2004). More detailed expositions, and accompanying maps, can be found in Messerli et al (1993).

initiated, but this time with a preponderance of social anthropologists. The focus was on the *ethnoscience*: the “home-made” geomorphological knowledge that had enabled the farmers to manage, and make the most of, the unstable landscape on which they were living (and had been living, for several hundreds of years). This indigenous knowledge, it turned out, was sufficiently sophisticated to enable them to assess just which slopes were most at risk. Moreover, their indigenous system of *land-use classification* – essentially *khet* (level and irrigated terraces), *bari* (gently sloping and rain-fed terraces), pasture (unterraced) and *ban* (forested and unterraced) with *khet* as the most productive and valuable – provided them with a simple and effective risk management strategy. A slope that was assessed as becoming high-risk could be shifted one or more places down the classification. For instance, converting *khet* terraces to the less valuable *bari* got rid of the impounded water that, in infiltrating the underlying strata, increased the likelihood of slope failure. Similarly, shifting down from terraced ploughed fields (*khet* or *bari*) to uniform and forested or scrub-covered slopes (*ban*) lessened the risks still further, whilst still retaining some use-value. But even this was not the end of it.

The researchers discovered that the ethnoscience, unlike the explicit global science they were accustomed to, was heavily reliant on what is called “tacit knowledge”¹⁰. Further, it was of such quality that farmers, in certain circumstances, could deliberately trigger landslides. These, as they ran out onto less steep slopes, could then be readily stabilized and converted into *khet* terraces: the most valuable of all the land-use categories.¹¹ On top of that, as well as being stable, they could be much larger, thanks to the low slope-angle. So the farmers, through their skilled interventions in the natural geomorphological processes, were not lessening their resource base. If anything, they were expanding it. All of which suggests that Mark Twain, with his famous advice “Buy land; they don’t make it anymore”, should have taken a trip to Nepal.¹²

The Plains (Tarai)

We can now see that the assumption that people are just sitting there waiting for their lives to be made less precarious is not tenable. People, unless they are fatalised, are *responsive*. Nor, as our final example will show, do they all respond in the same way; they are *plurally responsive*.¹³

¹⁰Knowledge, that is, that, instead of being explicit, is embedded in specific practices (as when a craftsman, when asked by an observer “How did you that?” replies “It’s the way you hold your mouth”).

¹¹ These indigenous (and local) land-use categories do not map well onto the scientific (and global) ones that are used by the proponents of “eagle’s eye science” (see Gyawali and Thompson 2016). Nor, of course, is the “flickering mosaic” – the endless transferring of small plots of land between these various categories – evident in the models and maps that are being produced by those eagle’s eye scientists.

¹² Again, this Kakani work is well summarised in Ives (2004). For the ethnoscience see Johnson et al (1982).

¹³ It is plural responsiveness that enables *resilience*:

Even if the intervenor “aims off” getting it more right for some will inevitably be getting it more wrong for others. And this, as Ajaya Dixit has shown, is what is happening in the case of the 95 million cubic metres of solid material that is brought down from the high mountains and middle hills each year by the Kosi River (Dixit 1997; Thompson and Gyawali 2007).

- *Silt*, for Bihar’s Department of Irrigation, *is a danger to be controlled*. This *hierarchical* outfit is charged by the Indian establishment with a single mission: a mission that was sanctified, way back in the 1940s, when Jawaharlal Nehru declared dams to be “the temples of the Modern Age”.¹⁴ This mission is to build embankments, irrigation canals, dams and related hydraulic structures wherever its expertise-embedded departmental procedures deem deserving and needy. To such a hierarchy, river waters are seen as *public goods* to be controlled and allocated by establishing proper rules. In the early 1950s, it clearly saw that the solution to the Kosi’s silt problem lay in “jacketing” the river with long embankments on each side, with a barrage on the border with the upper riparian (Nepal) as the main hydraulic-controlling structure. Irrigation was added on later, so as to make the project more attractive for funding, and the entire undertaking was seen as a temporary solution. This stop-gap was a way of controlling the problem until the massive Kosi high dam was built, farther upstream, at the Barhakshetra gorge in Nepal, to provide the permanent solution. This expensive dam, in one of the poorest and seismically most active parts of the world (southern Nepal-northern Bihar), like all the others that, during the Age of Aid,¹⁵ have been proposed along these hills/plains transitional zone, is nowhere in sight. But the implementation of the temporary solution has locked the Department of Irrigation into this permanent solution. Only if the Kosi high dam is built will the risks posed every year by piled-up silt be removed. “All of Bihar’s problems will be solved if the Kosi high dam is built” is the refrain of Bihari politicians across party divides. There is, as a British prime minister who was famous for drowning out other voices once said, no alternative!

The jacketing of the river has caused it to deposit its massive sediment load between the two embankments, instead of across the much wider floodplain (it has also, of course,

¹⁴ One of us (MT) discussed this with Nehru, in 1958, around the time he was beginning to have second thoughts about those “temples of the Modern Age”, they both happening to be on holiday in the then-idyllic small town of Manali in the Kangra Himalaya. This was before the building of the road over the Rhotang Pass and the construction, further downstream, of the Beas-Sutlej Link, both of which interventions have markedly increased the landslide risks, and introduced technological “lock-ins” and path-dependencies that are not easily escaped from (see Gyawali et al 2017).

¹⁵ This Age started in the immediate aftermath of the Second World War and ended, in 1989, with the collapse of the Soviet Union (see Gyawali et al 2017).

put a temporary stop to the river's self-diverting processes which propel it westwards, and eventually back eastwards, across its enormous alluvial fan). The river is now "perched" high above this floodplain, chronically attacking both embankments and diverting a significant proportion of its silt into the irrigation channels beyond those embankments. Because the Department of Irrigation is in the business of controlling, the biggest risk, so far as it is concerned, is a *loss of control*. It therefore looks to the esoteric knowledge and skills of its certified experts. In the view of these experts, the best control structure, and therefore the best solution – a solution to which everyone, Indians and Nepalis, should consent and adhere – is the massive Kosi dam in the lower Nepali hills (which would function as a silt trap) followed by government sponsored afforestation measures in the middle hills (which would stop all those ignorant and fecund Nepali peasants from cutting down the trees). This solution, moreover, is triply attractive because, as well as removing the risk that is continuously building up, it provides huge amounts of electricity, and a great volume of regulated water (which will provide flood control, and possibly advance the irrigation cause too).

- *Silt*, for the Zamindars (large landowners) is *opportunity*. Long practised in the *individualistic* art of keeping himself free from any form of *raj* – British, Indian Congress, or BJP—the Zamindar looks on the bright side of life. If silt is a problem, then it can probably be by-passed by using tube-wells. He has the capital, understands the technology, and has the personal network needed to gain permission for their installation. Such technological innovations may even do away with the need for the Kosi high dam (and all the irksome hierarchical controls that would come with it). And, if the dam does not come about, he will continue to make money by obtaining petty contracts for the removal of silt from the irrigation channels (and, perhaps, not-so-petty contracts for digging out the perched bed of the river itself). On the other hand, if the dam does come, there will be plenty of other contracts with more lucrative prospects. To him, water belongs to the realm of *private goods*, to be harnessed and used by those who are capable of innovating solutions with the requisite technology, and creative enough with finances to afford it.
- *Silt*, for the Ganga Mukti Andolan (the Ganges Liberation Campaign) is *a diversion from other evils in our midst*. This activist movement aims to capture the moral high ground and, like the canary that falls off its perch when the methane level in the coalmine rises above a certain level, raises the alarm about impending dangers. Growing straight out of the tradition that goes back to Gandhi himself, in his early struggles in

the Champaran district of northern Bihar, these *egalitarian* activists (and the many other local groups like them) argue that the poor do not benefit from either of these solutions: the hierarchical (controlling silt) or the individualistic (taking advantage of silt, one way or another). The silt is natural (and therefore should not be characterised as a problem). It would fill up the Kosi high dam in a very short time, rendering all that huge investment useless, and perhaps even dangerous if the dam gave way under all that weight. And the danger this dam would pose to the downstream areas if it were to fail following an earthquake or high flood renders it wholly unjustifiable. Neither solution addresses the real problem, which is the high risk inherent in the proposed technology, not silt, together with the inequitable social relations that are sustained by the structural corruption in the canal works. This, they argue, is the “stitch-up” by which the hierarchical and individualist solidarities convert what are rightfully *common-pool goods* into *club goods* from which the poor (including the marginal fisherfolk) are excluded, pushing them further into poverty.¹⁶

- Finally, *silt*, for the Ryots (the sharecroppers on the Zamindars’ lands, landless labourers, and victims of debt bondage) *is one among a host of woes about which we can do nothing in this life*. At the bottom of the discourse heap, and seldom heard, are those who find themselves marginalised by the organisational efforts of those who are able to make themselves heard – the hierarchists, the individualists, and the egalitarians. The Ryots, busy coping with their everyday problems of survival, elect to be *fatalistic*: to not devote any of their efforts to changing things that they are powerless to change. Silt is only one of the many adverse, day-to-day conditions to which they are subject, and it is coped with as and when it comes: in the extreme, by migration or death.

Choose just one of these co-definitions of problem and solution – which, of course, is what policy orthodoxy and most science-for-public-policy urges us to do – and you inevitably discard all the wisdom and experience that is contained within the other three. You also pile up for yourself all sorts of difficulties in implementation and governability, since those who do not share your chosen definition of the problem are unlikely to consent to its solution. The egalitarian activists in Bihar, for instance, come out at night and dismantle the hierarchists’ embankments, thereby progressively “re-naturalising” the Kosi (and demonstrating, to all save those

¹⁶ Those bridges and paths, up there in Khumbu (and their reserved stands of mature trees), by contrast, are common-pool goods that have not been converted into club goods.

who define all such behaviour as sabotage, that there *is* an alternative).¹⁷ Hubris – the denial of the uncertainty that is so clearly revealed by this four-fold plurality among all these silt-receivers – then results in all sorts of surprises (and technological lock-ins) that could have been avoided had this single solution not been imposed. The alternative, of course, is not to choose just one solution – just one social construction – thereby recognising the true scale of the uncertainty and instituting the “argumentative style” of decision-making: the style that, in steering us towards what are called clumsy solutions, is supportive of, rather than erosive of democracy (see Verweij and Thompson 2006).

Now, having made it all the way down from the high mountains (*Himal*) to the middle hills (*Mahabharat*) to the plains (*Tarai*), we are in a position to unpack Disaster Risk Reduction.¹⁸ We have four forms of social solidarity – *hierarchy* (the Department of Irrigation), *individualism* (the Zamindars), *egalitarianism* (the Ganges Liberation Campaign) and *fatalism* (the Ryots) – each defining the problem of unwanted silt, and its solution, in a way that contradicts the other three (Figure 1). And we have the normative prescription: move away from *elegance* (taking just one definition of problem-and-solution as right and rejecting the other three) and towards *clumsiness* (encouraging compromises to emerge from the constructive, but messy and noisy, engagement of all four of these *plural rationalities*).

¹⁷ So one man’s sabotage is inevitably another man’s NBS: Nature Based Solution. NBSs, it so happens, are increasingly being touted by the European Union in relation to a wide range of environmental risks, but without any awareness, it seems, of the inherent conflict with the other “schools of engineering thought” (see Gyawali et al 2019; Thompson et al 2019; Linnerooth-Bayer 2021).

¹⁸ There is, we should mention, a precedent for this “unpacking” that we are about to embark on. This was a project that investigated the different types of poor people and the different strategies by which they coped with, and sometimes overcame, that condition. It looked at officially poor people in the US (Washington DC and rural West Virginia), the UK (London’s East End) and Israel (Jerusalem). Being well-funded, it was able to do things rather more thoroughly than has been possible for us in Nepal, and so its findings can provide our work with some more solid underpinning (Thompson and Wildavsky 1986).

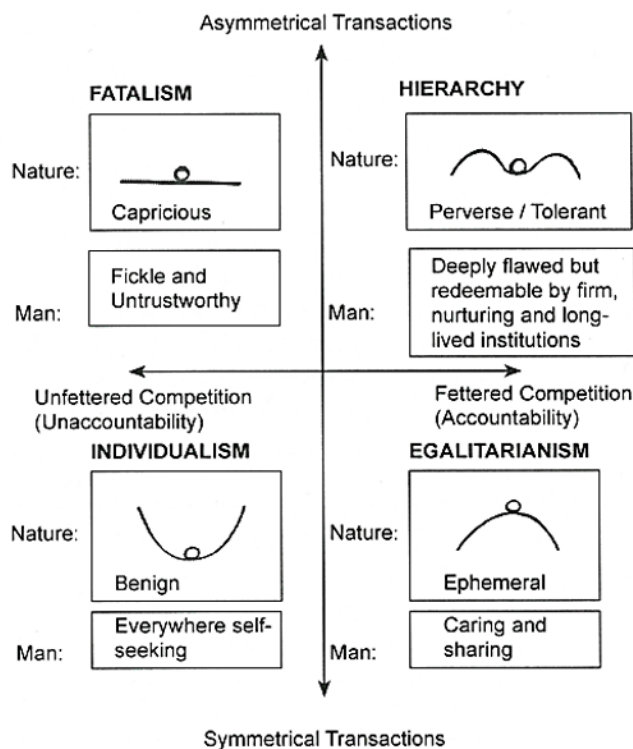


Fig. 1: The Four Forms of Solidarity and their Associated Social Constructions. (Source Thompson 2008:22)

THE ORIGINS OF DRR

DRR has not emerged from the grassroots. Rather, it is something that has winged its way into Nepal from the international level: an input that, throughout its quite short life, has been wholly dependent on international aid, mostly ODA (Official Development Assistance (Jones et al 2013; 2016). The focus, back in the 1980s, was on *response and recovery* (Jones et al 2014; Watson 2017; Vij et al 2020), typified by the Nepal Calamities Relief Act, which saw disasters as the direct result of hazards encountering human populations (GON 1972; Gaine et al 2015). With disasters being seen as natural and inevitable, policies and institutions became focused on response and relief aid. Things then shifted, in the 1990s, with the introduction of the *risk reduction concept*: a shift that was in line with some major policy changes in the United Nations: evident in the emergence of the International Strategy for Disaster Risk Reduction, for instance, and the subsequent Yokohama Plan of Action (United Nations 1994). These changes were then boosted, within Nepal, by a spate of disasters that included the 1988 earthquake along with

increases in heavy flooding and landslides (Vij et al 2020). Dedicated departments for water-induced disasters were instituted and building codes and shelter policies were introduced. These changes were also accompanied by the increased salience of *vulnerability science*, with risk reduction becoming more prominent, along with the adoption of “vulnerability mapping”. The most recent shift, again emanating from the global bureaucracy, has been the *integration of DRR into climate change concerns*. In the wake of Nepal’s signing up to the United Nations Framework Convention on Climate Change (the Kyoto Protocol) in 2005, a profusion of legislation and “plans of action” emerged, all aimed at addressing DRR through climate change adaptation.¹⁹ At the same time, within Nepal, the shift to a federal structure resulted in a new Disaster Risk Reduction and Management Act (2017) that was aimed at devolving DRR activities to a more local level, along with the inclusion (on paper, at least) of actors from all sectors (Oxford Policy Management 2020; Russell et al 2021).

These shifts, clearly, have left the over-arching hierarchical hegemony unchanged. Indeed, we see much the same happening, over much the same period, with Official Development Assistance: basic needs, structural adjustment programmes, public-private partnerships and so on (Gyawali et al 2017). So what we have, despite all the rhetoric, are superficial “flavours of the month”, not far-reaching shifts of paradigm. Many actors are therefore not wrong when they conclude that “It doesn’t matter who you vote for, the government always gets in.” *Ke garne?*

FROM GOVERNMENT TO GOVERNANCE: PLURAL RESPONSIVENESS AND DRR

Climate, it is often said, is what you expect; weather is what you get, and much the same holds for the crucial distinction between government and governance (Ney 2009; Thompson 2008). Government is what those who are in charge expect to happen; governance is what actually happens. So we can unpick this far-from-straightforward distinction in terms of a fourfold scheme: “Who’s looking” and “Who’s in charge”. We can start with the least troublesome permutation.

- *Hierarchy looking; hierarchy in charge*. Nature, for those who speak with the hierarchical voice, is manageable: *stable within limits*: limits, moreover, that can be determined by certified experts; hence the icon of a ball nestled in the trough between two peaks (Figure 1). Everything will therefore work out just fine, so long as those who are

¹⁹ An endeavour that is now much-ridiculed in Nepal as in “My water buffalo didn’t give any milk this morning; it must be climate change”.

being protected trust those who, thanks to their expertise and “correct” moral sense, are steering the optimal course by ensuring that the ball does not get knocked over either of the peaks. That trust, however, will likely be eroded if the risks turn out not to be manageable in this way, which of course will be the case if nature turns out to be any one of the other three ways (Figure 1).

As long as nature stays the way it is expected to be, those with the appropriate scientific knowledge and correct moral sense will be able to predict shifting weather patterns, anticipate increases and decreases in rainfall, monitor seismic activity, gauge slope stability, build polders to protect from flooding and so on. In this way, through careful development policy and well-judged technological interventions, cities can be made more resilient, buildings hazard-resistant and policies adaptive and robust. All this requires the correct type of scientific knowledge and is best achieved through top-down directives, measurable goals and robust institutional structures (Cheek and Chmutina, 2022; Gunewardena, et.al, 2008).

DRR – “build back better”, for instance – being crucial if the future impact of hazards is to be reduced, has to be managed by experts; it cannot be left to anarchical markets or to hopelessly utopian cooperatives. Firms, NGOs and other civil society organisations are seen as having their parts to play in all this, provided they conform to the hierarchical worldview. However, migrant communities – those displaced by disasters, for instance – are often seen as “non-compliant” because of their poor knowledge of the hazards in their new location.

- *Individualism looking; hierarchy in charge.* The upholders of individualism, with their ball-in-a-basin icon telling them there are *no limits* (Figure 1) tend to see disaster as opportunity (Pelling and Dill 2010). Ever alert to the funding that is flowing into DRR, they are able to exploit the specialist knowledge that is incorporated in the hierarchical discourse of safety and security into a selling tool: as with hazard-resisting housing companies that market their products in terms of that discourse but often in the absence of effective regulation and accountability.

The market, in consequence, finds a place for itself in the development process, but not in a way that would have met with Adam Smith’s approval. This is because, contra his “hidden hand”, these market actors do well even when others do not benefit. A prime example is the ever-proliferating “dozer roads” which, while seeming to mesh with livelihood diversification, infrastructure provision and improved access to centres of commerce, actually exacerbate landslides (Sündmeier-Rieux et al 2019) and encourage

relocation from the low-risk *dandas* (high, rounded ridges) to the high-risk *basis* (the bottoms of the V-shaped valleys that separate the *dandas*). “Future-proofing” by way of disaster insurance can all-too-easily do the same, promoting self-interest at the expense of community cohesion.

NGOs, though they usually profess to speak with the egalitarian voice, can easily be lured away into individualism, as is evident in the oft-observed increase in their numbers whenever a disaster strikes: a temptation that is further stimulated by the tax-loopholes that are available to NGOs in many countries, Nepal among them (see Gyawali et al 2017). As a DRR staff member in Bangladesh remarked to one of us in the context of discussing the additional funding and opportunities for NGO’s that arise in the aftermath of a disaster (CR) “Disasters are loved by NGOs; they are an NGO’s best friend”.

- *Egalitarianism looking, hierarchy in charge.* Those who speak with the egalitarian voice are adamant that there are *no safe limits* (the ball on an upturned basin in Figure 1). Disasters are not the result of bad luck or proximity to this or that hazard. Rather, they are the reflection of a catastrophic failure in the overall man-nature system. The focus, in consequence, is on disproportionate risk exposure, systems vulnerability and poor resilience capacity, all of which stem from the inequalities that are responsible for poverty, exploitation, misogyny and a long list of other evils that are then made even worse by poorly implemented development interventions.²⁰ Disasters, therefore, are political, not natural (Chmutina and von Medina 2019). Western countries, in having emitted far and away the most carbon dioxide, thereby exacerbating the geographical processes associated with hazard-intensification, should pick up the bill for their remediation. This perception is strongly linked with the loss-and-damage discourses that now loom large in climate change movements.

DRR approaches must therefore be radically re-imagined. The solution is not more technocratic top-down prescriptions and box-ticking exercises. Instead, DRR has got to come from the ground up: it must be rooted in indigenous knowledge and be sensitive to the political and cultural discourses of the localities it is aiming to reach. Communities that live in hazard-prone areas are in the best position to know what their needs are. They should be included in the decision-making process and should lead DRR initiatives from the start (Cheek, 2020).

²⁰ These can also lead to aid rejection and civil strife. Nepal’s Maoist insurgents, for instance, during their murderous 10-year “People’s War”, destroyed all those aid projects that they judged were not benefitting “the poorest of the poor” (Medina et al 2014). Since many providers of ODA see themselves as engaged in conflict resolution, they tend to be resistant to the idea that they are responsible, in part, for that conflict.

- *Fatalism looking; hierarchy in charge.* Centuries ago, the Nepali term for disaster was *Daibi Prakop* (God-sent). Disasters were seen as things that just happen; they were not caused by man, nor had man any remit to prevent, limit or protect from them. No doubt there were others who did not share this view but, even today, the more recent usage *Bipad* (bad luck event) suggests that disasters just happen to unfortunate people. Humankind's role in this story is to pick up the pieces that have been left behind and try and start again: all of which suggests that, as with *ke garne?*, fatalism is more like a realistic, but temporary, resting-place than a final destination. That recovery, however, can all too easily be hampered by inequity in the delivery of DRR and by the fickleness of development assistance in general (all those afore-mentioned “flavours of the month”).

Those who are of the fatalist persuasion therefore see themselves as having no political power: no ability to influence the decision-makers who are controlling the mitigation of risk and implementing all the vulnerability measures. Fatalistic actors therefore concentrate on dealing with the situation at hand. Their aim is to survive – by going to work in the Gulf States, for instance, so as to provide for their families – and they see little point in wasting their time in trying to engage with the DRR activities in their area.²¹

PLURAL PERCEPTIONS OF FATALISM

The upholders of the fatalist solidarity, unlike those who are upholding the other three solidarities, all of whom are able to learn (each in its distinctive way), are not able to learn (beyond their unifying conviction that nothing you could do to would make much difference). If the world operates with neither rhyme nor reason – push the ball this way or that or the flat surface and the feedback is everywhere the same (Figure 1) – then that is that. The result is that the fatalist voice tends not to be heard in the policy debate: an unfortunate outcome in that it excludes the fatalist wisdom that tells us there is no point in wasting time and money in trying to do things that cannot be done or undone: crying over spilt milk, shutting stable doors after the horse has bolted and so on. First, however, we need to look at how DRR, rather than trying to harness this fatalist wisdom, is actually driving people who are not in fact fatalised into fatalism: actually adding to the ranks of those who need to be included.²² So this, as we will see, is pretty

²¹ There are, of course, a further 12 permutations – those that accompany the other three kinds of elegance – but, since we are concerned with just hierarchical elegance, we do not need to consider them here (but see Ney and Thompson 2000; Verweij 2011).

²² Since social exclusion in Nepal has long been identified as a major cause for concern (as it is in any democracy), DRR, when made operational in this way, is hardly a step in the right direction (Medina et al 2014).

much a re-run of the “blame the victim” diagnosis that, 40 or so years ago, was embedded in the infamous THED: Theory of Himalayan Environmental Degradation.

According to actors at the national level, the role of communities in DRR is a passive one. Communities are seen as “end-users”: people who are just sitting there waiting for their lives to be made richer, healthier, longer, safer, more resilient and so on.

“As of now the community, their role are of the recipient rather than the decision-making body in Nepal” (NGO 03).

This characterisation persists, despite DRR having now been decentralised (the Disaster Risk Reduction Management Act) and despite it being seriously out of line with Nepal’s constitution (Oxford Policy Management 2020; Vij et al 2020).²³ The reasons given by our participants for this unconstitutional rejection of community cluster around three themes: knowledge, capacity, and responsibility.

- *Knowledge.* With communities seeing disasters as natural (God-given) they lack any ability to reduce their attendant risks. This, in part, is seen as stemming from their lack of experience of disaster risk management in action. In other words, communities are not yet properly prepared: not yet in a fit state to play any effective part.

“They have an understanding ... disaster is natural, but it’s not always ... I’m talking about the local minds and the ground communities. They know there could be a disaster, they know, ok I have flood every year in my country or I could have earthquake anytime in my country, but they don’t know what could actually make it less, make them less vulnerable” (NGO 05).

“DRM was not that big a concern for local people, maybe to their local government as well because ... unless you don’t see things happen to you don’t really feel happy to be [have] incidents policy ... Because now they have seen the disaster right in the eye, they have that fear somewhere, but again I don’t know what could actually make it less, make them less vulnerable” (NGO 05).

This inability to retain any knowledge from their experiences is then compounded by the re-location process that is so often triggered by landslides and other disasters.

“If you migrate one ... group of people [they cause] harmful from the disaster area, that migrated population, because they don’t know the local risks. So

²³ “Indeed, Nepal’s Constituent Assembly, elected in 2008 to frame the country’s new constitution, debated the development model in these plural rationality terms and concluded that it would have to be led by all three of these primary forces: market, state and cooperatives” (Gyawali and Thompson 2016:184).

people living from generations, they know what are the risks but when they are in a new place, they don't know the risks" (GON 01).

"... there are traditional knowledge, people used to build their houses on the raise's infrastructure, and the lower part of the house used to be vacant for the free movement of water, you understand. And they would remain safe ... but people are losing those ideas now. And others, they used to migrate, if in the cold season to the hot area, in the hot areas in the summer they used to go to the cold area, and now people go they are left to migrate, and they face the problems" (GON 02).

In other words, according to these DRR practitioners, as well as knowledge being quickly lost even when communities remain in the same locations, it is actually wiped out when they find themselves forced to change location.

These, to put it mildly, are highly suspect assertions. Yes, indigenous knowledge *is* acquired in a specific location but (a) it does not fade over time (if it did it would not be termed "traditional") and (b) it readily transfers (with appropriate and quickly achieved modification) to other locations. The research on how community-level forest management practices were revived, 40 or so years after they had been wiped out by the ill-judged nationalization of Nepal's forests is perhaps the most compelling refutation of the first assertion (Gilmore and Fisher 1993; Byers 2021); a study of how Sherpas from the Khumbu region acquired their impressive and highly practical knowledge of the risks inherent in a different location (the South Face of Annapurna, 150 or so miles to the west) completely demolishes the second assertion (Thompson 1982).²⁴

- *Capacity*, in the hierarchical perspective, is measured against what is seen to be best practice for DRR: a managerial approach that is rooted in plans and quantifiable outcomes and guided by expert and global knowledge. Capacity, in consequence, is not acknowledged if it does not fit in with this way of seeing things.

"It is the capacity, because they don't have the skill or knowledge or expertise developing the planning that is required by the planning commission of the ministry of finance. You have to make it in the proper format. And for that you need the proper planning, and that planning is not taught. My simple explanation is that we have not taught out local leaders, our local employees, our local people

²⁴ Indeed in 2015 (some four decades later) one of us (MT), together with one of those Sherpas, Per Temba, gave a lecture on precisely those risks to a packed audience in Oxford's Sheldonian Theatre and, on the following night, to a similarly packed audience at the Royal Geographical Society's premises in London.

about the planning, we asked them to submit the plan, but we have not taught them how to develop the plan.” (NGO 04)

This lack of capacity at the community level is then linked to the mismatch in forms of knowledge as we move from there to the higher levels.

“Community people have one set of problems, issue, and challenges that they are facing in their everyday life. Which is not yet been analysed deeply by the policy making bodies, or the political bodies even. So that is why we are seeing the differences. When we talk about DRM, we find a different set of understanding at the community level; that is why their capacity, to cope with disaster is low because they are not provided with sufficient knowledge and they are not trained; they are not linked to policy institutions; they are not linked to the formal body who is actually responsible to provide all support to the community people, they are not formally linked.” (NGO 01)

Communities, it is being argued, as well as not knowing how to plan for DRR, have a different understanding of what the DRR problem *is*. This is indeed so, but what is crucial is how that mismatch is to be dealt with. Is it something that will have to be handled elegantly: by re-education, for instance? Or is it a potentially constructive confrontation of mutually incompatible, but equally valid, wisdoms: something that can be harnessed into a clumsy, resilient and essentially democratic solution? The latter, we would say; a choice that has the added advantage of meshing with, rather than undermining, Nepal’s constitution

- *Responsibility*. The fatalisation that is entailed in the approach taken by the providers of DRR to, knowledge and to capacity is compounded by their perceptions of community responsibility of who or what is to blame, that is. The individual Nepali, in this perception, is his or her own worst enemy and does nothing to reduce risk or to promote safety. This fecklessness, moreover, does not stem from their having been excluded from the political process, it is the fault of the communities they comprise:

“They buy land and then they start asking the government agencies, ok you protect us from floods.” (GON 01)

Throughout out interviews, this perceived lack of responsibility was mirrored by the victims – the communities – being cast as a burden on, and a barrier to, effective DRR, thereby justifying still further elegant and top-down intervention.

“Now our priorities, policies they have focused on the communities, there we have sensitised the communities, we have to make them resilient, we have to use our knowledge, capacity, the policy are there.” (GON 02)

CONCLUSION

Now, having completed our analysis through the lens of plural rationality, we can see that DRR, as currently conceived and implemented in Nepal, is far from satisfactory. At best, as with so much foreign aid, it is a bureaucratized irrelevance (Gyawali and Thompson 2016). At worst, it is the Fifth Horseman of the Apocalypse: eroding an already fragile democracy, undermining the country’s constitution, riding roughshod over the widespread and highly practical indigenous knowledge, and imposing fatalism on communities that were once suffused with resilience. The solution, of course, is to shift things from elegance to clumsiness, and from a one-way and top-down government to a plural and multi-directional governance. And a first step in that direction is to defend democracy by ensuring that DRR, as it wings its way in, is brought into line with Nepal’s constitution.

This is not to say that there should be no DRR interventions; only that those who are providing these interventions need to have an adequate understanding of what it is that they are intervening in. And there are now many well-worked out case studies – all the way back to the demolition of THED (the Theory of Himalayan Environmental Degradation) back in the 1980s – of how that can be, and has been, done.²⁵ Nor, we would stress, is this just opinion. If the micro-level is plurally responsive – some complex interplay, that is, of those four contending solidarities we have been unpacking – then the control system (DRR) will have to contain a variety equal to that which exists within what it is aspiring to control. This – *the law of requisite variety* (Ashby 1968) – holds true regardless of what the elegance-mongers may have set their hearts on (see Thompson et al 1990:16).

REFERENCES

- Adams, J. and Thompson, M. (2002) Taking Account of Societal Concerns About Risk: Framing the Problem. A report for the United Kingdom Health and Safety Executive. Available at <https://www.hse.gov.uk/research/rrpdf/rr035.pdf>.
- Ashby, W.R. (1968) Variety, constraint and the law of requisite variety. In W. Buckley (ed) *Modern Systems Research for the Behavioural Scientist*. Chicago: Aldine: 129-36.

²⁵ Perhaps the most useful set of case studies – it being focused on development in Nepal and not just DRR – is Gyawali et al (2017).

- Beck, M.B., Gyawali, D. and Thompson, M. (2019) Societal drivers of food and water systems 2: applying plural rationality to some wicked problems. In T. Allan, B. Bromwich, T. Colman and M. Keulertz (eds) *The Oxford Handbook of Food, Water and Society*. Oxford, Oxford University Press.
- Bista, D.B. (1991) *Fatalism and Development: Nepal Struggle for Modernization*. Mumbai: Orient Black Swan.
- Byers, A.C. (2021) The greening of the Khumbu. *Nepali Times*, Kathmandu, 16 January.
- Cheek, Wesley. "The Paradox of Community Involvement: Rebuilding Minamisanriku." *Disaster prevention and management* 29.6 (2020): 893–907.
- Cheek, Wesley, and Ksenia Chmutina. "'Building Back Better' Is Neoliberal Post-disaster Reconstruction." *Disasters* 46.3 (2022): 589–609. Chmutina, K. and von Meding, J. (2019) A dilemma of language: "Natural Disasters" in academic literature. *International Journal of Disaster Risk Science*, **10**:283-292.
- Dixit, A. (1997) Indo-Nepal water resources development: cursing the past or moving forward. In J.K. Ray (ed) *Indo-Nepal Cooperation Broadening Measures*. Department of History, University of Calcutta Monograph 13. K.P. Bagchi and Company: Calcutta, India.
- Dixit, A. (2002) *Basic Water Science*. Nepal Water Conservation Foundation: Kathmandu, Nepal.
- Eckholm, E. (1976) *Losing Ground*. New York: Worldwatch Institute, W.W. Norton.
- Gaire, S., Delgado, R.C. and Gonzaley, P.A. (2015) Disaster risk profile and existing legal framework of Nepal: floods and landslides. *Risk Management and Healthcare Policy*, **8**:139-149.
- Gilmour, D.A. and Fisher, R.J. (1991) *Villagers, Forests and Foresters: The Philosophy, Process and Practice of Community Forestry in Nepal*. Kathmandu, Nepal: Sahajogi.
- Gowne, L. (2015) *Ke garne?* The linguistic expression of Nepali resilience. *Superlinguo*. <https://www.superlinguo.com/post/117720051513/ke-garne-the-linguistic-expression-of-nepali>.
- Grove, K. (2012) Pre-empting the next disaster: catastrophe insurance and the financialization of disaster management. *Security Dialogue*, **43**:129-155.
- Gunewardena, Nandini., and Mark Schuller. *Capitalizing on Catastrophe : Neoliberal Strategies in Disaster Reconstruction* / Edited by Nandini Gunewardena and Mark Schuller. Lanham: AltaMira Press, 2008.
- Gyawali, D. and Thompson, M. (2016) Restoring development *dharma* with toad's eye science. *IDS Bulletin*, **47(2A)**:179-190.
- Gyawali, D., Thompson, M. and Verweij, M. (eds) (2017) *Aid, Technology and Development: The Lessons from Nepal*. London: Earthscan-Routledge.
- Ives, J.D. and Messerli, B. (1989) *The Himalayan Dilemma: Reconciling Development and Conservation*. London: Routledge.
- Ives, J.D. (2004) *Himalayan Perceptions: Environmental Change and the Wellbeing of Mountain Peoples*. London: Routledge.

- Johnson, K., Olson, E.A. and Manandhar, S. (1982) Experimental knowledge and response to natural hazards in mountainous Nepal. *Mountain Research and Development*, **2**(2):175-88.
- Jones, S., Aryal, K. and Collins, A. (2013) Local-level governance of risk and resilience in Nepal. *Disasters*, **37**:442-467.
- Jones, S., Owen, K.J. and Wisner, B. (2016) A comparison of the governance landscape of earthquake risk reduction in Nepal and the Indian State of Bihar. *International Journal of Disaster Risk Reduction*, **15**:29-42.
- Linnerooth-Bayer, J. (2021) Looking back and looking forward: nature-based solutions for integrated disaster risk management. *IDRiM 2021*, Tokyo, September.
- Martin, J., Khadka, P., Stefan, Russell, C., Vij, S., Parajuli, B., Sheskya, P. and Linnerooth-Bayer, J. (2021) Living with landslides: perceptions of risk and resilience in far western Nepal. *Journal of IDRiM*.
- Medina, L-A.B., Manandhar, M.D., Thompson, M. and Jerve, A.M. (2014) Social exclusion and nation building: why is this an important research agenda for Nepal? In M.S. Tamang and M.T. Tuladhar (eds) *Social Inclusion Research: A Source Book*. Kathmandu: Mandala Book Point, pp. 13-32.
- Messerli, B., Hofer, T. and Wymann, S. (1993) *Himalayan Environment: Pressure, Problems, Processes*. Institute of Geography, University of Berne, Switzerland.
- Messerli, B. and Hofer, T. (1995) Assessing the impact of anthropogenic land use change in the Himalayas. In G.P. Chapman and M. Thompson (eds) *Water and the Quest for Sustainable Development in the Ganges Valley*. London: Mansell.
- Murphy, C.N. (2015) The last two centuries of global governance. *Global Governance*, **21**:189-196.
- Nightingale, A.J., 2021. Challenging the Romance With Resilience: Communities, Scale and Climate Change. *Pract. Fem. Polit. Ecol.* 6
- Ney, S. (2009) *Resolving Messy Policy Problems*. London: Earthscan.
- Ney, S. and Thompson, M. (2000) Cultural discourses in the global climate change debate. In *Society, Behaviour and Climate Change Mitigation* by E. Jochem, J. Sathaye and D. Bouille (eds). Dordrecht: Kluwer, pp. 65-92.
- Oxford Policy Management (2020) Disaster risk reduction and management in Nepal: delineation of roles and responsibilities.
- Pelling, M. and Dill, K. (2010) Disaster politics: tipping points for change in the adaptation of socio-political regimes. *Progress Human Geography*, **34**:21-37.
- Pugh, Jonathan. "Resilience, Complexity and Post-Liberalism." *Area* (London 1969) **46.3** (2014): 313–319.
- Raymo, M.E. and Ruddiman, W.F. (1992) Tectonic forcing of late Cenozoic climate. *Nature*, **359**:117-122.
- Russell, C., Clark, J., Hannah, D. and Sugden, F. (2021) Towards a collaborative governance regime for disaster risk reduction: exploring scalar narratives of institutional change in Nepal. *Applied Geography*, **134**, 102516.

- Ruszczuk, H.A., 2019. Ambivalence towards discourse of disaster resilience. *Disasters* 43, 818–839.
- Sudmeier-Rieux, K., McAdoo, B.G., Devkota, S., Chandra Lal Rajbhandari, P., Howell, J., and Sharma, S. (2019) Invited perspectives: mountain roads in Nepal at a new crossroads, *Natural Hazards and Earth System Science*, 19: 655-660.
- Thompson, M. (1982) The problem of the centre: an autonomous cosmology. In M. Douglas (ed) *Essays in the Sociology of Perception*. London: Routledge and Kegan Paul, pp. 302-328.
- Thompson, M., Warburton, M. and Hatley, T. (1986) *Uncertainty on a Himalayan Scale*. London: Ethnographica. (Expanded second edition, 2007, Lalitpur, Nepal: Himal Books.)
- Thompson, M. and Wildavsky, A. (1986) A poverty of distinction: from economic homogeneity to cultural heterogeneity in the classification of poor people. *Policy Sciences*, 19:163-199.
- Thompson, M., Ellis, R. and Wildavsky, A. (1990) *Cultural Theory*. Boulder, CO: Westview Press.
- Thompson, M (1993) Good science for public policy. *International Development*, 5(6):669-679.
- Thompson, M. (2002) Man and nature as a single but complex system. In T. Munn (ed-in-chief) *Encyclopedia of Global Environmental Change*. Chichester: John Wiley, 384-393.
- Thompson, M. and Gyawali, D. (2007) Introduction: Uncertainty revisited or the triumph of hype over experience. In M. Thompson, M. Warburton and T. Hatley, *Uncertainty on a Himalayan Scale*. Second edition: Lalitpur, Nepal: Himal Books.
- Thompson, M. (2008) *Organising and Disorganising*. Axminster: Triarchy Press.
- Thompson, M., Beck, M.B. and Gyawali, D. (2019) Societal drivers of food and water systems 1: The approach by way of material flows, household consumption styles and contending schools of engineering thought. In T. Allan, B. Bromwich, T. Colman and M. Keulertz (eds) *Oxford Handbook of Food, Water and Society*. Oxford: Oxford University Press.
- Tranvik, T., Thompson, M. and Selle, P. (2000) Doing technology and democracy the pack-donkey's way: the technomorphic approach to ICT policy. In C. Engel and H. Keller (eds) *Governance of Global Networks in the Light of Differing Local Values*. Baden-Baden: Nomos:155-195.
- United Nations (1994) Yokohama Strategy and Plan of Action for a Safer World Guidelines for Natural Disaster Prevention, Preparedness and Mitigation. *World Conference on Natural Disaster Reduction*, Yokohama, Japan, 23-27 May.
- Verweij, M. (2011) *Clumsy Solutions for a Wicked World: How to Improve Global Governance*. Basingstoke: Palgrave Macmillan.
- Verweij, M. and Thompson, M. (eds) (2011) *Clumsy Solutions for a Complex World* (revised edition). Basingstoke: Palgrave Macmillan.
- Vij, S., Russell, C., Clark, J., Parajuli, B.P., Shakya, P. and Dewulf, A. (2020) Evolving disaster governance paradigms in Nepal. *International Journal of Disaster Risk Reduction*, 50.

Watson, I. (2017) Resilience and disaster risk reduction: reclassifying diversity and national identity in post-earthquake Nepal. *Third World Quarterly*, 38:483-504.

Statements and Declarations

Funding

This project was supported by the Natural Environment Research Council fund Science for Humanitarian Emergencies and Resilience (grant number NE/P00038X/1) and the International Institute for Applied Systems Analysis Young Scientist Summer Programme.

Competing interests

The authors have no relevant financial or non-financial interest to disclose.

Author Contribution

All authors contributed to the study and conception and design. Material preparation, data collection and analysis were performed by Caroline Russell. The first draft of the manuscript was written by Caroline Russell and Michael Thompson. All authors commented on previous versions of the manuscript. All authors have read and approved the final manuscript.