Time to change? Technologies of futuring and transformative change in Nepal's climate change policy

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Abstract

This paper calls for a more critical analysis of implicit social values in time-based projections of transformative change in climate change policy in developing countries. The paper argues that transformative change is a form of socio-technical imaginary, in which contemporary visions of social order influence supposedly technical, and apolitical policies and timelines. To analyze these imaginaries, the paper applies the framework of "technologies of futuring," or the processes in which projections about the future are imbued with implicit values, to different theories of change used to propose responses to climate change in Nepal. The paper shows that projections of future change are linked to assumptions about physical risks and social agency that reflect different, and contestable, worldviews. This chapter concludes that discussions about transformative change need to make assumptions about risk and society more transparent when proposing urgent deadlines based on assumptions about the future.

KEYWORDS: transformative change, socio-technical imaginary, Nepal, climate change , STS and time

Introduction: Time to Change?

There's an old joke about a traveler who asks a passerby for the best route to their destination. The passerby thinks for a moment, then says: "I wouldn't start from here." This dialogue is similar to current debates about transformative change in environmental policy. In recent years, expert bodies such as the Intergovernmental Panel on Climate Change (IPCC) and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) have used the concept of transformative change to refer to comprehensive social and economic changes needed to achieve sustainability (Pereira et al. 2019). Commonly, these debates are attached to the question of time and urgent timelines. For example, the IPCC Special Report on Global Warming of 1.5 degrees argued that the world has 12 years to keep warming at this level, or face significantly worse risks of drought, floods, heat and poverty (Watts 2018; Masson-Delmotte et al. 2018).

But are these projections starting in the right place? Various social scientists argue that transformative change requires rethinking how we understand risk; plus how we understand risk requires rethinking how our assumptions about time. These concerns raise three challenges for understanding transformative change. First, how far do current projections of physical environmental *change* allow us to understand how people with diverse capabilities, values, and objectives experience these changes as *problems*? (Pelling 2011; Pelling et al. 2015). Second, how do *current* social values about development and appropriate levels of risk influence projections for *future* and time-based transformative change? (Andersson and Keizer 2014; Andersson and Westholm 2019). And third, does "deadline rhetoric" of urgent timelines undermine the process of seeking this broader understanding of transformative change? (Asayama et al. 2019).

This article contributes to the debate about transformative change in two ways. It places attention onto the generally ignored field of rapid rural change in developing countries, and the options for poorer people in the face of climate change. It also applies the analytical concept of "technologies of futuring" (Hajer and Pelzer 2018) to some of the theories of change used within development interventions to undertake transformative change in Nepal. Technologies of futuring are the practices by which social values are woven into time-based projections for future change, and which need to be made more transparent in order to reflect a broader understanding of climate risk.

The article is divided into four sections. First, it reviews the implicit social values that might underlie visions of transformative change and technologies of futuring in climate change policy. Second, it applies this analysis to general debates about livelihood transitions and projected risks and developing countries, and the theories of change proposed to address these by governments and development agencies. Third, it illustrates this analysis with a more detailed focus on Nepal, using three current reports that project different pathways to transformative change and sustainability.

The article argues that climate change policy in developing countries is beset with assumptions about future transformative change that can restrict how we understand climate risks and potential responses. Moreover, debates about transformative change also produce timelines for risks and responses can hide how those timelines are based on limited values and knowledge. Instead, a greater attention to how technologies of futuring occur and how theories of change can be made more self-critical, will help diversify options for transformative change and its timelines. It will also redirect transformative change from current deadlines based on existing definitions of risk, towards timelines for achieving a more grounded understanding of how climate change impacts on poorer people.

Transformative Change and Technologies of Futuring

Transformative change refers to changes in social behaviors over time that are needed in order to achieve future sustainability. It has been defined as "adaptive actions that have the reach to shift existing systems (and their component structures, institutions and actor positions) onto alternative development pathways, even before the limits of existing adaptation choices are met" (Pelling et al. 2015: 114).

But how do planners identify "alternative development pathways, "or which "existing systems" need to be shifted? These questions produce varying answers from different analysts and organizations (Few et al. 2017). The 2019 IPBES Global Assessment Report seems to assume that objectives are already known, and hence, "goals for 2030 and beyond may only be achieved through transformative changes across economic, social, political and technological factors" (IPBES 2019: 21). Other organizations have urged "transformation processes" to develop "social innovations, including economic and social diffusion processes" (German Advisory Council on Global Change 2011: 322).

But for other analysts, there is a need to beware predefining environmental outcomes, because this can fail to recognize the roles of politics or social circumstances in producing risk, or the timelines that are proposed to address risks (Blythe et al. 2018; O'Brien 2012). In particular, these analysts highlight the social production of vulnerability, such as specialists in disaster risk reduction (Ribot 2011; Wisner et al. 2004). But they can also include social analysts of science, who highlight how projections of risk based on systems thinking, or linear linkages between environmental changes and social impacts, can hide the assumptions used to make such projections (Gillard et al. 2016; Hulme 2010). These concerns are especially challenging, because they demonstrate the tacit role of normative values in how supposedly neutral

indications of risk are made. Moreover, they demonstrate how fixed visions of environmental risk can also close down options for changing current societies in order to make environmental change less threatening.

One infamous example of this challenge is the debate about the book *Limits to Growth* (Meadows et al. 1972). This book is frequently cited because of its explosive impact in the early 1970s. Using a global predictive model, Meadows et al. argued that current predicted rates of resource use, economic growth, and population increases will rapidly overtake the ability of known resources to support this growth. The book concluded with this warning: "Short of a world effort, today's already explosive gaps and inequalities will continue to grow larger. The outcome can only be disaster' (Meadows et al. 1972: 195).

The book appeared at a time when global models such as this were emerging as scientific tools but not as tools of political persuasion (Ashley 1983). The model used was criticized by physical modelers who showed how aspects of natural resources, population, pollution and agriculture were connected to build a global picture, with problematic assumptions of linear causality and the application of simple fixes to symptoms rather than more complex and deep-set causes (Edwards 2010). Social scientists also highlighted how the *Limits* model could only be seen as "global" by assuming all people acted in a profit-maximizing and competitive way: evidence actually shows otherwise (Taylor and Buttel 1992). Meanwhile, a variety of debates have emerged about how societies and individual actors respond to resource scarcity, and the ability of different actors to cope, substitute resources, and/or bypass scarcity altogether by changing activities (Boserup 1965; Mehta 2010). Increasingly, these processes are called transformative adaptation—or when historic scarcities matter less because economic activities and livelihoods now depend on a different set of resources

(Warner and Kuzdas 2017). The crucial point for transformative change, however, is that the timeline and urgent actions recommended by *Limits to Growth* were all based on assumptions about resource use, social agency, and scarcity that have been questioned since. Accordingly, the timeline, and the proposed actions arising, have changed as well.

For these reasons, social analysts of science have argued that the framework of transformative change should also be seen as a socio-technical imaginary, or a "collectively held, institutionally stabilized, and publicly performed visions of desirable futures, animated by shared understandings of forms of social life and social order attainable through, and supportive of, advances in science and technology" (Jasanoff 2015: 4). Understanding transformative change as an imaginary demonstrates how the projection of future change is also based on visions of shared values, which might be cognitive or tacit.

A further analytical framework sees acts of devising transformative change as technologies of futuring, or as "practices bringing together actors around one or more imagined futures and through which actors come to share particular orientations for action" (Hajer and Pelzer 2018: 222). Elements of technologies of futuring can be seen in commonplace activities such as building predictive models (such as *Limits to Growth*), future scenario planning, or in the day-to-day use of theories of change by development organizations to justify policies and interventions. But these very cognitive processes of planning futures can also be based tacitly upon older models, or assumptions about environmental cause-and-effect, which also have simplifications and exclusions. As the next section shows, planning futures based on pre-existing models and assumptions about time? can reproduce selective visions of how futures might evolve. This challenge is even more abrupt in developing countries, where

environmental planning commonly relates to people with high levels of social inequality and limited forms of expression in planning processes.

Environmental Futures and Rural Transitions in Developing Countries

The challenges of timelines and transformative change are well illustrated in discussions of how climate change will impact on rural livelihoods in rapidly developing countries. As with other areas of environmental debate, many studies predict linear impacts of climate change based upon how people currently make a living and protect themselves against scarcity. For example, one study entitled, *Up in Smoke* (Reid and Simms 2007) presented the findings of a coalition of environmental and development organizations including ActionAid, Greenpeace, Oxfam, Practical Action, and the World Wide Fund for Nature. Talking of Asia, the report states: "in a region whose population is still rising, if the ability to grow food is weakened by climate change, the health and livelihoods of millions of people will be at risk" (Reid and Simms 2007: 3). Other statements include: "scientists estimate that future scenarios of water availability would see 59 per cent of the global population facing shortages of water from rivers and irrigation by 2050" (Reid 2014: 50), or "whether climate change brings increasing floods, storms, or worse drought, it will create havoc for poor farmers" (Reid 2014: 63).

While statements like these point to the unquestioned need to be concerned about the impacts of anthropogenic climate change, they are also very vague. They do not discuss how far impacts might be mediated by adaptive capacity (or more specifically, the creation and support for adaptive mechanisms). Moreover, they do not refer to underlying processes of transformative adaptation and what that really entails—or how social and economic change influences how which livelihoods are affected by environmental changes, and who is at risk. Transformative adaptation is rarely a uniform change affecting all people in a society. Rather, it demonstrates the dynamism

by which projected environmental changes actually become risks for people engaged in different activities. For example, in Thailand, government agencies currently predict that future climate change will expose rural farmers in hill zones to enhanced flooding and landslides, and consequently government agencies have tried to mitigate these risks by attempting to stabilize hillslopes through tree plantations (Anond Snidvongs, 2009). Research among villagers, however, has shown that this strategy assumed farmers used still adopted old forms of agriculture, and the main risks faced by farmers were limited access to new livelihoods based on economic diversification or migration (Forsyth & Evans, 2013). The government's method of reducing climate risks therefore failed to address local risks, because tree planting limited the availability of agricultural land, and actually encouraged younger generations to migrate to cities.

The challenge of risk projections such as in Thailand or the *Up in Smoke* project is that they project a timeline of risks and impacts arising from climate change based on assumptions about how biophysical changes will present universal risks to people. But they fail to acknowledge an even more important transition in how exposures to specific environmental changes vary because of dynamic transformations in socio-economic circumstances, including people's search for new livelihoods and lifestyles.

Theories of rural transition

Can discussions of transformative change acknowledge a more diverse approach to socio-economic change and risk? Much research and policymaking about rural development have been influenced by frameworks that acknowledge future social or economic transitions. But these are also challenged.

One such example is the so-called agrarian transition. This framework has dominated debates about rural development since the 1950s (Lewis 1954), and predicts that rural zones will undergo inevitable economic and social modernization

once these zones are opened up to free markets and inward investment. According to this framework, as rural zones become more affected by markets, traditional farming will transform typically from predominantly small landholdings focusing on the production of low-value crops using high levels of human labor to larger farms offering economies of scale and more valuable produce. At the same time, higher national wages will draw manual laborers out of agriculture into industrial and urban sectors (Hazell et al. 2010). Indeed, some analysts have argued that these changes will also increase food production, and access to food, for millions of people. These changes might occur within a matter of years once the appropriate economic reforms have been made (Collier and Dercon 2014).

Research, however, has indicated that the agrarian transition might not occur in this way. In particular, smallholder agriculture might persist despite modernization and access to markets; indeed in Southeast Asia, research has suggested that the numbers of farms are growing, and their average size is declining (Rigg et al. 2018: 327; Rigg et al. 2016b). Analysts have theorized that farm ownership is not just influenced by economic returns, but also by legal, emotional and cultural reasons. Moreover, the ability to transform livelihoods might depend on the availability of alternative occupations, and the ability of poorer people to access them rather than changes in labor and land prices alone (Belton and Filipski 2019: 167; Bryceson et al. 2000).

Another example is the so-called forest transition (Mather 1992), which has been proposed as the point when a country can increase its food production without reducing its forest cover: this transition can take centuries as countries become more modernized. This principle has been used to design climate change policies using Reduced Emissions from Deforestation and Forest Degradation (REDD+)—which is the intention to integrate forest protection and planting into national carbon targets

(Angelsen and Brockhaus 2009). Yet, the narrow definition of this "transition" has been questioned for simplifying how food can also be supplied through trade; how forest degradation can be driven by numerous factors outside of food; and how some poorer forest users have undeveloped capacities for intensifying agriculture, including different property rights over land (Springate-Baginski and Blaikie 2007).

As with *Limits to Growth*, the agrarian and forest transitions give a supposedly factual prediction of linear and inevitable change relating to resources and livelihoods. But these representations of transition are also socio-technical imaginaries that protect future outcomes based on a vision of what is considered appropriate by modelers. Their assumptions are also simplistic, and threaten to overlook how changes present hazards to people who are most vulnerable by presenting risks, changes, and outcomes in simple, universal terms.

Theories of Change

A more specific means of projecting transformative change is in the concept of theories of change (ToCs). Theories of change are a long-standing model in development organizations as a way to connect their activities with intended outcomes. They are "a theory of how and why an initiative works" (Weiss 1995: 65), or "an explanatory model that links actions with results via causal mechanisms and pathways" (Brooks and Fisher 2014: 16). For example, the theory of change of an organization seeking to achieve long-term transitions to low-carbon energy might include various steps of providing low-carbon technologies and educating users about their benefits. Theories of change can be developed by an organization or government using its own expertise, or collaboratively with stakeholders.

According to some debates in environmental policy, "broader adoption of theories of change in sustainability science is a crucial step towards realizing the transformative

ambitions and expectations of science in the 2030 Agenda" (Oberlack et al. 2019: 110). According to these authors, theories of change can allow for the possibility of future transformative change through a variety of steps. For example, the process of developing theories of change can establish a shared and participatory vision of attainable sustainable development. They can provide a platform for articulating how scientific knowledge can be implemented through societal transformations, usually within the time limit of a project or other form of development intervention. They help solve so-called attribution gaps in terms of which actors should take responsibility, or how change is made. Yet, simultaneously, theories of change also need to achieve learning and reflection about experiences and potential surprises in order to improve the underlying assumptions and actions adopted by theories of change and within organizations (Oberlack et al. 2019: 108-109).

But theories of change, patently, are also technologies of futuring. They foresee projected changes in the future as the result of interventions in the present. Moreover, they are usually based on linear and teleological ideas about how future change occurs as a result of current assessments of what causes problems. Some development analysts, however, argue that theories of change can acknowledge these challenges and become more inclusive and transparent. According to one analyst, theories of change are "an ongoing process of reflection to explore change and how it happens" (James 2011: 1). Critics, however, have suggested this is "an illusory process" (Valters 2014: 18). They ask whether stakeholder engagement actually involves targeted beneficiaries, and if theories of change are driven more by donors than local people (Weiss 1995: 87; Rogers 2014).

Consequently, there are many important questions to ask about how far debates about transformative change in developing countries reflect local values, or carry tacit

assumptions. These models and projections for transformative change are technologies of futuring because they carry ideas for how to shape future change based on processes such as orientations of temporality, awareness and accommodation as well as visions of appropriate life or socio-technical imaginaries. There is a need to question how far discussions about transformative change under future climate change can be made more transparent and more inclusive of different values and priorities. A core part of this is to consider how far projections for transformative change include alleged facts about climate change impacts, or social behavior under socio-economic transitions (e.g., the so-called agrarian and forest transitions), which need to be questioned and reanalysed.

Example: Rural Development Under Climate Change in Nepal

Nepal is officially classified as one of the world's least developed countries.[i] It is especially exposed to anthropogenic climate change on account of its mountainous landscape and annual weather, which experiences a long wet-monsoon period from June to September and relatively dry months at other times. The country's dependency on rain-fed agriculture and hydro-electric power, and its high levels of poverty also make the country highly vulnerable to likely changes in climate (Karki et al. 2012; Nightingale 2018; Rigg et al. 2016a).

Yet, despite these significant challenges, Nepal has also been the site of long-standing debates about the cause-and-effect of environmental problems. During the 1980s, various analysts pointed to what they called the Theory of Himalayan Environmental Degradation, and the commonly heard belief that population growth in the Middle Hills (the areas below the High Himalaya) was driving deforestation and intensive land use, which in turn were enhancing landslides and soil erosion. These factors then encouraged hill farmers to undertake more deforestation. All of these

changes led to a long-term downward cycle of environmental degradation in the Middle Hills, which contributed to sedimentation and flooding in the lowland Ganges basin (including Bangladesh), and the likely long-run degradation of living conditions throughout Nepal. A classic summary of this cycle was expressed in the 1970s:

> Population growth in the context of a traditional agrarian technology is forcing farmers onto even steeper slopes, slopes unfit for sustained farming even with the astonishingly elaborate terracing practiced there. Meanwhile, villagers must roam further and further from their houses to gather fodder and firewood, thus surrounding villages with a widening circle of denuded hillsides (Eckholm 1976: 77).

These concerns have, however, been widely criticized for simplifying the uncertainty of environmental change in the Himalayas, or how local people lived with environmental change. For example, one of deforestation estimates between 1965 and 1981 revealed these projections varied by a factor of 67, even after excluding some apparent typing errors (Donovan 1981). Accordingly, the range of projections could imply a series of timelines from the belief that the Himalayas would "become as bald as a coot overnight"—requiring urgent interventions to stop current land uses—or "sink beneath the greatest accumulation of biomass the world has ever seen" (Ives & Messerli, 1989, p. 76; Thompson *et al.*, 1986),

Anthropological work also showed, for example, that landslides and erosion did not necessarily carry the same threats for local farmers as ecologists predicted and at the same speed because farmers allowed for land failure in their planning, and some even took the opportunity of landslides to build rice terraces, or renew the fertility of soil (Kienholz et al. 1984). Multiple observations such as these led some analysts to identify the Theory of Himalayan Environmental Degradation as a social artefact that

persisted within policy circles despite the absence of persuasive evidence that it was a persistent or universal reality (Ives and Messerli 1989). According to some social analysts of science, the Theory of Himalayan Environmental Degradation persists within policy debates because it allows experts and expert organizations a specific worldview to simplify the underlying uncertainty of environmental change by selecting measurements that reflect their viewpoint (Thompson et al. 1986). Others have proposed that the Theory is another example of a so-called environmental narrative, which allocates ideas of cause-and-effect, blame and responsibility to different actors, and which have become accepted as unquestioned truth, especially concerning the alleged "ignorant and fecund peasant" cutting trees on fragile hill slopes and deforesting the Himalaya (Hajer 1995: 65; Forsyth 1996; Thompson et al. 1986). Under these conditions, it is important to ask how the Theory still remains unchallenged; which individuals and organizations uphold it and why; and what alternative explanations of environmental change might exist, with different implications for policy. They also influence timelines: for example, proponents of the Theory have urged that population be controlled in Nepal to avoid future limits to growth; or that rural development be managed carefully to slow down the agrarian transition (Gyawali *et al.*, 2017).

Elements of the Theory of Himalayan Degradation affect debates about transformative change and climate change in Nepal. Different organizations and experts interpret water supply in contrasting ways. For example, some policymakers have claimed that Nepal has already achieved high levels of access to drinking water in the Middle Hills because they have invested in PVC piping between springs and villages. Alternative research based on field surveys has shown, however, providing pipes has not yet impacted on United Nations' targets defined in terms of a fetching time for water of less than 15 minutes, leading to a supply of at least 45 liters per person per day

(Pokhrel 2017; Gyawali and Thompson 2016: 181-182). There is also growing concern that water springs in the Middle Hills are going dry because of climate change. But analysis is showing that other drivers are responsible, such as the increasing use of PVC pipes and electric pumps, and agricultural changes (including a move away from dryland maize and millet into water-intensive marketable vegetables) (Sharma et al. 2016). Research also shows that the availability of groundwater has also been negatively affected by the decline in livestock in the Middle Hills, with an according decrease in wallowing ponds for buffaloes, and by local authorities filling in wallowing ponds to fight malaria, or to build new schools or similar buildings (Gyawali and Thompson 2016: 182).

The point of these criticisms is not to suggest that Nepal, or other vulnerable developing countries, do not experience significant problems arising from environmental change. Rather, it is to highlight how ideas about the nature, cause, and ways of solving environmental risks get stabilized within policy processes in ways that can be reductionist. These representations of risk frequently reflect visions of who is at risk, and why. They also lead to proposed solutions that can be ineffective in addressing the causes of risk, and even pose restrictions on local people's livelihoods and ability to respond (Forsyth 2003; Forsyth and Evans 2013). There is consequently a need to consider how far discussions of transformative change addressing risks connected to climate change carry problematic, fixed visions of risk—with implications for the urgency and timelines of proposed solutions—and to devise ways to see how risk and associated social agencies are linked.

This challenge has been noted in relation to interventions seeking to build resilience to climate change in Nepal. One study (Ayers et al. 2011) conducted research on what resilience meant to different people in zones where the World Bank Pilot

Project on Climate Resilience had undertaken projects. The World Bank investment had mainly been used on maintaining Nepal's infrastructure such as the Guija bridge to ensure that transport and economy could continue working in the event of severe storms or floods. While these interventions were obviously important, the research found that local citizens defined resilience in terms of the ability to access medical care for family members during weather events, which these interventions did not achieve. Moreover, engineers and World Bank representatives did not see these social development concerns as relevant to their immediate concerns.

The authors of these various critical studies agree that long-term anthropogenic climate change poses significant threats. But focusing only on climate change alone as a driver of risk threatens to foster "the delusion that, if it wasn't for climate change, all would be fine" (Gyawali and Thompson 2016: 182). Other sources of vulnerability—local values about how to manage change, and social inequalities—are overlooked or simplified in these analyses of environmental change, water scarcity, or resilience. In particular, it is important to note how rural people's livelihoods are changing rapidly because of economic change. For example, outward migration for long- or short-term employment is radically changing how many rural households achieve livelihoods. By 2017, Nepal had the fifth highest ration of remittances to national gross domestic product in the world, of approximately one third of national income, and in some areas of up to 50 percent (Sapkota 2013). This income has implications for the extent to which rural people depend on traditional rice terraces. It also affects which people are exposed to traditional hazards such as landslides (frequently it is women who stay behind while partners work overseas). It also affects how people respond to hazards and with what speed (i.e., quickly or slowly): after the 2015 earthquake in Nepal, remittances almost doubled to help families respond (Maher 2018).

These new socio-economic trends are still being acknowledged in national assessments of risk and vulnerability. In 2001, the United Nations Framework Convention on Climate Change (UNFCCC) created a work programme for least developed countries, which included creating National Adaptation Programmes of Action (NAPAs). In the UNFCCC text, the purpose of NAPAs was to "focus on urgent and immediate needs… for which further delay could increase vulnerability or lead to increased costs at a later stage."[ii] The text also asserted "the NAPA process includes participatory assessment of vulnerability to climate change variability and extreme events." Yet it also stated "NAPAs should use existing information; no new research is needed." The desire to address local vulnerability in a participatory way—yet exclude new information—seems to be a contradiction, and to misunderstand how participatory research aims to yield new information. Of course, many international agreements and policy processes include statements that look questionable under a microscope. But there has been concern about whether NAPAs, or similar attempts to deal with vulnerable people, sufficiently challenge existing narratives or work to represent less powerful voices (Huq and Khan 2006; Nightingale *et al.*, 2019).

In Nepal, the challenges of participation in the NAPA process were addressed through the strategy of holding participatory workshops, and identifying so-called reference groups to address different themes of concern (Ayers 2010: 171-173). Yet, concern was expressed that too much discussion was held without sufficient knowledge of likely climate change impacts on biodiversity and forests. There was also concern that too much discussion was focused on projections of risks from glacial lake outflow floods, when participants believed these risks were overstated (Ayers 2010: 160-162). According to one of the participants, these concerns led to a rather muted approach to future projections. She wrote, "The result was an emphasis on existing climatic stresses,

and an emphasis on knowledge of vulnerability and development, rather than projected climate change impacts" (Ayers 2010: 188).

At the same time as the NAPA process, Nepal also developed Local Adaptation Programmes of Action (LAPAs). These were intended to be more localized platforms for understanding how climate change posed risks for vulnerable people. The government of Nepal could then integrate this information via the Local Self Governance Act, 1999 to create a more locally-focused form of planning (Chaudhury et al. 2014: 23). By 2012, this process had identified local priorities including agriculture, livestock and food security; forest management and biodiversity; water resource and energy; livelihoods and health (UNDP 2012). This information has, in turn, influenced various projections for how Nepal can undergo future development, or transformative change.

Theories of Change, Technologies of Futuring in Nepal

The question posed by this article is whether transformative change for climate change should really start from its current assumptions. This challenge is shown in some examples of projected future risk management in Nepal; how projections are shaped by assumptions about risk; and the implications for how change is projected across time..

Many government projections in Nepal focus on predicted changes in physical factors such as rainfall and temperature. Climate change scenarios, for example, include projections that average annual precipitation and average temperatures are likely to increase across Nepal; yet rainfall intensity will grow, meaning that numbers of rainy days are projected to decrease. Duration of warm spells for more than six days will also increase, as cold spells will decrease (Government of Nepal 2019; Rajbhandari et al. 2017). These projections, in turn, indicate the same kind of harsh impacts on rural livelihoods as those discussed above in the *Up in Smoke?* report (Reid and Simms 2007),

which calculated impacts by taking future projections for climate change and relating these to current livelihoods.

The government analysis of scenarios does not propose a theory of change (ToC) about the temporal impact on livelihoods though it focuses on physical transitions. Other reports do propose future transformations in social and economic practices, but with different interpretations of pathways.

The Climate Alliance of Himalayan Communities (Sherpa et al. 2015) connects future climate change scenarios with additional information from different districts of Nepal. But it does so with an emphasis on tradition and community. It writes: "For thousands of years mountain communities have maintained a close relationship with the environment, depending on ecosystem services for their agrarian livelihood" (Sherpa et al. 2015: 6). It also draws on notions of environmental degradation familiar to the Theory of Himalayan Environmental Degradation:

> Drying of natural springs, ponds, rivers especially during winter season is adding stress on women and children because they are forced to travel far to collect water. Extreme monsoon rainfall on the other hand is causing flash flood, excessive soil erosion and frequent landslides threatening the livelihood. … Firewood is the prime source of energy in the mountains, due to decreasing forest cover, women and children are now forced to travel far to collect firewood (Sherpa et al. 2015: 108).

A further report by the Food and Agriculture Organization of the United Nations carefully reviews likely physical risks and ongoing socio-economic transformations (Selvaraju et al. 2014). It highlights the risks to food security of a more extreme weather system, especially where agricultural ecosystems are fragile or easily impacted by events such as landslides. The report highlights ongoing agrarian transitions, especially

commercialization of agriculture, and trends for remittances (Selvaraju et al. 2014: 109-110). These transitions offer both risks and potential means of managing food insecurity and household vulnerabilities. The emphasis is on identifying general trends in environmental and economic changes, and using these to advise areas where both can be managed.

A further analysis of development futures in Nepal is from the initiative known as BRACED (Building Resilience and Adaptation to Climate Extremes and Disasters). This initiative has been funded by the United Kingdom Department for International Development (DfID) and has comprised 15 projects across the African Sahel and South and Southeast Asia (BRACED 2015). BRACED, as such, is not an overview of all changes affecting different regions in Myanmar: it is a focused series of interventions to address climate risks in a number of districts in western Nepal (Lovell 2019). BRACED, however, adopts a different theory of change for interventions, by focusing on building social capacities and agencies among men and women who are affected by both environmental and economic changes. By so doing, BRACED's objectives are not driven by urgent timelines to beat project biophysical changes in the Himalayas, but instead by socio-economic criteria such as access of people to freshwater or livelihoods. The BRACED work in Nepal has implemented this approach by seeking to build capacities for greater economic agency by smallholders (including women) to participate in new initiatives of climate-smart agriculture (IDE 2017). This work, in turn, reflects more general actor-focused development work on building resilience in developing countries, which might include enhancing the so-called 3As of anticipatory capacity (of knowing in advance when hazards come), absorptive capacity (dealing with hazards), and adaptive capacity (longer-term lessons for reducing vulnerability) (Bahadur et al. 2015).

While this discussion of these three reports is relatively brief, the point is to highlight how different projections about future action can look so different, and adopt such varied, yet unquestioned assumptions. Each report has adopted different starting points for making suggestions about risk management and future (or transformative) change under the shared framework of anthropogenic climate change. Yet these different perspectives also carry co-produced visions of risk and social agency, which in turn have implications for the timelines of proposed risks and recommended actions. The Climate Alliance of Himalayan Communities emphasized notions of community and tradition, as well as a vision of risks that reflects earlier thinking about the Theory of Himalayan Environmental Degradation. Accordingly, its key objectives are to protect fragile and traditional communities against risks that threaten them. Here, the main message is the urgent transitions occurring to traditional communities and landscapes, which in turn indicate urgent requirements to slow down that change and revert to the orders of the past.

The report from the Food and Agriculture Organization focused instead on transformations to society and economy. It highlighted longer-term agrarian transitions and commercialization and the ways these transitions will impact on risk or solutions to risk on a macro-scale. In this case, the pathway to solutions lies in appropriate national planning and management of economic opportunities and changes for overall development. This report does not adopt a normative position about whether the past is preferable to the future; instead, the vision of future transformative change is presented in the neutral language of technical management.

The BRACED work, instead, focused on the connections between communities and broader economic transitions,. For BRACED, the pathway to a more sustainable future lay in a more malleable idea of community agency and capacities. Unlike the Food and

Agriculture Organization, it focused on the local experience and responsiveness to risks. But unlike the Climate Alliance, it perceived community agency to be a project of future change rather than protection of traditional livelihoods and lifestyles. Under this scenario, the risks posed by environmental and economic change are not fixed because communities and individuals will be better able to transcend them if they have the appropriate skills and capacities. Reducing vulnerability, rather than responding to fixed risks, is the objective of BRACED. Change over time is only considered meaningful in so far as it impacts upon the vulnerability of local people.

Each report rightly highlights the potential risks in Nepal that are likely under anthropogenic climate change. But each report has a preoccupation, or development perspective, that couples different interpretations of risk simultaneously with different visions of social agency, and which impact on the timelines that also organize their recommendations. For example, by most accounts, Nepal is likely to experience more landslides in the Middle Hills because of more intense rainfall in the future. What is not certain is how far those landslides represent risks when some households are not as dependent on agricultural land as they used to be. Asking this question transforms the timelines and ultimate objectives that result from different risk assessments. For example: do new economic changes mean that old physical risks such as landslides are no longer as threatening? Are there specific people who are unable to participate in new changes, and hence remain vulnerable? What new risks are faced by people who engage in socio-economic transitions? And how do underlying assumptions about social order influence what we think is a risk?

These questions are shaped by, and in turn influence, how analysts make assumptions about time. Visions of ecological fragility are informed by, and reinforce, similar visions of a more stable past and the need for urgent policy in the future.

Alternatively, seeing risk as a function of social vulnerability challenges the image of the past as benign, but also redefines how we identify progress in the future, Much international discussion of environmental problems in Nepal have tended to focus on ecological fragility and the need for rapid action (see the Climate Alliance of Himalayan Communities). The work of BRACED, however, reflects much thinking within recent development studies about reducing social vulnerability through building capabilities and economic agency over a long-term basis (Ellis and Freeman 2005). Yet, failing to question how to treat time, and presenting future transformations simply as a function of projected economic changes (as with the Food and Agriculture report), might arguably leave the current trajectories of economic change unquestioned, along with neo-liberal visions of world order (Chandler and Reid 2016).

Hence, rather than rushing to predict what changes are needed to make the future more sustainable, there is a need to look more critically at the hidden assumptions in projections—who is at risk, for what assumed reasons—and to reassess these simultaneously as asking how these assumptions are also shaped, and influence, approaches to time. Theories of change are, in effect, technologies of futuring.

Conclusion

This article adopts the perspective of the opening anecdote. Much discussion about transformative change adopts a position of urgency and timelines. But, rather than rushing to achieve those timelines there is also a need to ask, should we start from here? Projections about climate *impacts* are different from predictions about rates of physical environmental *change*. We need to ask how and why do we assume that changes become impacts, and how these assumptions in turn influence our perceived timelines. Building scenarios for transformative change can also adopt models of impacts that can hide the social spaces under which environmental changes are

experienced as hazardous. Moreover, there is a need to see how current discussions of environmental risks carry predefined ideas of environmental cause-and-effect, or the social character of people at risk, which need to be updated. As Andrea Nightingale (2018: 141) has noted in relation to Nepal: "A sense of urgency over adaptation needs is not conducive to careful scrutiny. Rather, it forces local people, facilitators, and national-level project managers to move faster than their confidence allows."

The analytical frameworks of socio-technical imaginaries and technologies of futuring offer insights to show how projections of future change can replicate and hide current social values about appropriate levels of risk, expected agencies of affected people, or historic narratives of environmental degradation. This is especially relevant for rapidly developing countries with high levels of social inequality and change such as Nepal. There is a need to understand that responses to risks such as climate change "should be done with a deeper awareness of the social, economic, cultural, and political factors that frame [people's] actions, incentives, opportunities, and limitations for action" (Christoplos et al. 2009: 3). But there is also a need to consider how the assumptions and objectives of different analysts, organizations, and research networks might influence common understandings of risk, and the urgency of requested responses (Hulme 2010; Thompson et al. 1986; Hajer and Pelzer 2018). It is extremely likely that urgent action on climate change is indeed required. But there is also a need to develop more effective ways to make assumptions and implicit values more transparent, so that projections about tomorrow are not curtailed by how we see the world today.

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