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To cite this article: Pratigya Silwal, Lin Roberts, Hamish G. Rennie & Manfred J. Lexer (2019): Adapting to climate change: an assessment of local adaptation planning processes in forest-based communities in Nepal, *Climate and Development*, DOI: [10.1080/17565529.2019.1586634](https://doi.org/10.1080/17565529.2019.1586634)

To link to this article: <https://doi.org/10.1080/17565529.2019.1586634>



Published online: 17 Mar 2019.



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RESEARCH ARTICLE



# Adapting to climate change: an assessment of local adaptation planning processes in forest-based communities in Nepal

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## ABSTRACT

Since 2000, adaptation has been the focus of the response to climate change in many least developed countries. However, there are recognized overlaps and tensions between mitigation, adaptation and development, and between top-down and community-based approaches to adaptation. This paper explores the approaches used to develop Local Adaptation Plans of Action (LAPAs) by three different programmes in the forest sector of Nepal. The analysis of information drawn from 37 interviews, with government, non-government and community representatives at national, district and local levels, shows that although the LAPAs in Nepal are prepared with limited external and scientific contribution, they are rich with local information. However, the limited knowledge and capacity of local people in relation to specific climate change impacts and potential solutions mean the plans bear little difference to regular development activities. Nearly all the activities identified contributed to adaptation and mitigation, as well as economic development, within a context of environmental sustainability, but appeared not to address the social equity and justice aspects of social sustainability. Moreover, this article argues that the community has greater confidence in plans prepared when donor funding is channelled through existing government mechanisms than through more directly donor funded approaches. It may continue to be necessary to keep adaptation plans separate from development plans until there is a greater understanding of the means to and need for adaptation as part of mainstream development planning.

## ARTICLE HISTORY

Received 22 November 2016  
Accepted 27 November 2018

## KEYWORDS

Local adaptation plan of Action (LAPA); planning approaches; community; bottom-up; forests; sustainable development; vulnerability

## Introduction

The Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) concluded that warming of the climate system is unequivocal, and that most aspects of climate change will persist for many centuries even if emissions of CO<sub>2</sub> are stopped (IPCC, 2013). Consequently, mitigation cannot be the only policy response to global climate change (Buob & Stephan, 2011), and increasing attention has been given to strategies for adaptation to climate change, in both the IPCC Assessment Reports (from the second report onwards) and in the United Nations Framework Convention on Climate Change (UNFCCC) negotiations (Schipper, 2006; Pielke, Prins, Rayner, & Sarewitz, 2007; Pelling, 2011). The Least Developed Countries (LDCs), although contributing the least to global Greenhouse Gas (GHG) emissions, have been identified as particularly needing to develop adaptation responses as they are predicted to be the most vulnerable to the impacts of climate change (Huq, Rahman, Konate, Sokona, & Reid, 2003; Huq et al., 2004; Somorin et al., 2012; Swart & Raes, 2007). Following the Brundtland report, the emphasis has been on pro-poor economic development in the belief that this will lead to sustainable development (Huq and Khan (2006). At the Seventh Session of the Conference of Parties (COP 7) to UNFCCC in 2001, a special work programme for the LDCs was established, which included supporting the preparation and implementation of

National Adaptation Programmes of Action (NAPAs) funded through contributions from Annex II Parties. Since then, fifty LDCs have prepared NAPAs to address the need to cope with the adverse effects of projected climate variability (UNFCCC, 2014).

This inter-relationship, inter-linkage and integration of climate change adaptation and mitigation with sustainable development has been discussed by a number of researchers (Klein et al., 2007; Klein, Schipper, & Dessai, 2005; Wilbanks, 2005; Wilbanks et al., 2003), with emphasis being placed on the benefits and opportunities of integrating (mainstreaming) adaptation and mitigation into development policies (Denton et al., 2014; Goklany, 2007; IPCC, 2014; Suckall, Tompkins, & Stringer, 2014; Swart & Raes, 2007). The governments of developing countries generally see economic development and poverty reduction as a more urgent issue than climate change, so adaptation efforts in these countries tend to have been donor driven (Mertz, Halsnæs, Olesen, & Rasmussen, 2009). Aid agencies (bilateral and multilateral donors) and International and National Non-Government Organisations (I/NGOs) have long been playing a significant role in development efforts (Edwards & Hulme, 1996; Martens, 2005), and are also active in the global climate change debate and in supporting mitigation mechanisms such as UN-REDD<sup>1</sup> and REDD+.<sup>2</sup> Consequently, they have perhaps been quicker to see a

link between lack of development and climate change vulnerability and seek to tackle these in an integrated way (Helgeson & Ellis, 2015). There are now a number of adaptation mechanisms have been developed by different multilateral and bilateral development organizations and international and national NGOs (Mimura et al., 2014).

However, some authors exploring the overlaps and tension between the concepts of mitigation, adaptation and sustainable development have expressed concern that many approaches to adaptation are not sustainable, either environmentally and/or socially (Brown, 2011; Eriksen et al., 2011; Pelling, 2011). Notably, they argue, adaptation planning has tended to focus on enabling existing development practices to continue, rather than seek more sustainable development paths (Brown, 2011; Eriksen & Brown, 2011; Eriksen et al., 2011). The potential for adaptive activities that decrease existing vulnerabilities while supporting broader ecosystem services is instead constrained to enabling the status quo to continue with minimal disruption (Brown, 2011).

The early NAPA prepared by most of the developing countries are based on a top-down, externally driven development planning approach (Huq & Khan, 2006). Such approaches are seen as more likely to result in unsustainable adaptation and technical responses that reflect the lack of community-level involvement in decision-making (Brown, 2011). It has been argued that participatory approaches that engage and empower local communities provide additional local knowledge, enhance understanding of values, enable affected people to be heard, increase the potential for consensus, and add legitimacy to the process (Forester, 1999; Versteeg & Hajer, 2010). Such a 'bottom up' approach may still occur within a supportive, transparent central government guided framework, but the emphasis is on planning by local communities and by the people affected (Huq & Khan, 2006). Local Adaptation Plans of Action (LAPA) emerged as an innovative means to facilitate the adaptation process at the local level and bridge the gap between top-down and bottom-up approaches to planning (Regmi, Star, & Leal Filho, 2016).

In this article, we analyse and shed light on the process of preparing LAPAs as a pathway to mainstreaming community-decided, community-level adaptation to climate change in three forest-based communities in Nepal. Nepal is seen as pioneering LAPA (Mimura et al., 2014) and consequently, its experience provides opportunities to inform the development of LAPA elsewhere. We explore the complexities inherent in adaptation planning in Nepal as a bottom-up approach, and reflect on the distinctions and overlaps between adaptation, development and mitigation in the context of forest-based initiatives in a developing country. By comparing the cases from three different LAPA programmes, the paper contributes to the broader discussion on the institutional context within which LAPAs are prepared, the differences in adaptation planning processes and the involvement of forest-based organizations and communities in LAPA development and implementation. Following an initial introduction to Nepal's approach to planning for adapting to climate change, we review key theoretical debates that influenced our research methodology before setting out the results and discussion and drawing general conclusions.

## Nepal's approach to adaptation planning

Nepal, as a least developed country, followed the generic global guidelines and produced a NAPA in 2010 as a national adaptation strategy (Ojha et al., 2016). The NAPA sets out nine adaptation priority areas, the first being the promotion of community-based adaptation through integrated management of agriculture, water, forest and biodiversity sectors (Chaudhury et al., 2014; MoE, 2010). To advance this first priority area, the Government of Nepal produced a National Framework on Local Adaptation Plans for Action (GON, 2011a) and the Climate Change Policy 2011 (MoE, 2011). The Framework is a guideline document setting out procedures for the development of local adaptation plans, and the Climate Change Policy is a national policy to achieve climate-friendly physical, social and economic development by mitigating and adapting to the impacts of climate change. The framework defined seven major steps in LAPA preparation: sensitization, vulnerability and adaptation assessment, prioritization of adaptation options, formulation of the adaptation plan, integration of the adaptation plan into regular planning processes, implementation of the adaptation plan, and progress assessment (GON, 2011a). Each of these steps included in its objectives the promotion of local adaptation planning processes that responded to local needs. The LAPA are prepared locally at the level of the Village Development Committee (VDC).

The advent of LAPA in Nepal has led to several aid agencies providing funding and technical assistance to government and non-government agencies to plan and implement adaptation strategies (Regmi et al., 2016). As a result, there is now a variety of adaptation programmes in Nepal. Of these, three large-scale initiatives featuring LAPA preparation and implementation are the National Climate Change Support Programme (NCCSP), the Multi-stakeholder Forestry Programme (MSFP) and the Hariyo Ban Program (HBP). Two of these, the MSFP and HBP, are focused on the development, livelihoods and adaptation of forest-based communities and are carried out by multiple NGOs in collaboration with the forest sector. The HBP has a particular interest in biodiversity conservation. The NCCSP is administered by the Ministry of Science, Technology and Environment (MoSTE) and is solely focussed on LAPA preparation and implementation, and is more generic, addressing adaptation across all sectors. It is also better resourced than the other two (Silwal, 2016). In 2016, NCCSP was working on LAPA implementation in 14 districts in Western Nepal. The MSFP programme operated in 23 districts preparing full LAPA programmes, and the HBP in 33 districts that were biodiversity corridors and bottlenecks within the Terai Arc and Chitwan Annapurna Landscapes. All three programmes were intended to reinforce the wider objective of reducing vulnerability and improving the livelihoods of people of Nepal.

Nepal's approach has been criticized on a number of grounds. For instance, Ojha et al. (2016, p. 428) found that Nepal's 'technocratic, top-down, and aid-driven adaptation policy is not sufficiently capable of capturing locally specific – and often contested – realities of biophysical change, social dynamics, and the vulnerability of people on the ground'. Similarly, Chaudhury et al. (2014) criticize Nepal's NAPA approach for representing a top-down assessment of generalized national

needs with inadequate consideration of local-level realities. LAPA are promoted as emphasizing a bottom-up approach that might address such concerns, but Regmi et al. (2016) found that, in practice, institutional, technical and funding barriers fostered more of a top-down approach, at least in Nepal. They concluded that a move away from a donor-driven project-oriented funding approach and toward a multi-stakeholder approach was necessary for LAPA to be effective. However, Nightingale (2014) argues that to be truly adaptive LAPA must allow social transformation that addresses the needs of the very poor and the disadvantaged (e.g. women). While generally being positive about the participation of local peoples, she and Regmi et al. (2016) note the risks of reinforcing local political power structures if LAPA processes do not incorporate a broader understanding of sustainable adaptation. Nightingale (2014, pg. 220) argues that the development-driven participatory approaches of Nepal forestry 'have now been re-branded as "climate change adaptation and mitigation" programmes with a stronger techno-engineering focus' that is not socially transformative.

The role of science and technology in adaptation planning processes has emerged as a key issue within the top-down/bottom-up debate. Climate science provides an understanding of climate change, potential impacts and future prospects that can be used for developing future scenarios that support decision-making (Dilling & Lemos, 2011). However, the uncertainty involved in the predictions, and the skills needed to understand the implications of that uncertainty, makes decision-making difficult. Burton and Mustelin (2013) and Few, Brown, and Tompkins (2007) argue that the uncertain nature of climate science makes public participation very complex. It has also been argued that local people lack the knowledge, skills and resources for adaptation to climate change, so the adaptation planning must be approached by external experts from a socio-politically 'higher' level (Nightingale, 2014). Moreover, climate science can only be fed into decision-making when it is available. For instance, in Nepal there is a severe lack of reliable meteorological and hydrological data at the local level (Jones & Boyd, 2011), in part due to Nepal's topographic complexities, making it difficult to project future climate scenarios at the local level, and hence only coarse model projections are available (ICIMOD, 2009; Mainali & Pricope, 2017; Tiwari, Kar, & Bhatla, 2018). Consequently, there is limited information on location-specific impacts of climate change and adaptation approaches, and hence local knowledge plays a significant role in understanding the impacts as well as determining adaptation strategies (Kettle et al., 2014; Vij, Biesbroek, Groot, Termeer, & Parajuli, 2018).

We have chosen to focus particularly on the forest sector, because healthy forests are recognized as critical both to the economic wellbeing of the people in Nepal and to mitigation efforts globally. This focus therefore allows exploration of the links and overlaps between adaptation, mitigation and development. Afforestation and reforestation increase carbon sequestration and so are encouraged as mitigation and may attract REDD+ funds to a country. Such planting may also be seen as both a development and an adaptation action through the provision of new sources of income (e.g. production forestry or forestry by-products). This new income enables further

development, but also may enhance livelihood resilience through cushioning individuals and communities against short-term financial loss caused by more frequent or intensive hazard events that are consequences of climate change. The plantings also physically aid resilience through reduction of erosion and flooding in severe weather. However, tree planting or protecting and maintaining existing forests may also be seen as preventing alternative land uses that, in some contexts, might be more sustainable forms of adaptation (e.g. pastoralism). Thus, differentiating programmes that address adaptation or mitigation from those that address development may be difficult. Overlaps (or the achievement of multiple positive outcomes) are recognized and encouraged through integrated approaches, although they may create problems for organizations whose funding is targeted at just one of these three goals.

A focus on the forest sector also allows an exploration of the links and overlaps between environmental, economic and social sustainability. Just as for development to be *sustainable* development, it needs to address both environmental and social sustainability, Eriksen and Brown (2011) and Brown (2011) argue that for adaptation strategies to be *sustainable* adaptation, they must contribute towards both social equity and environmental integrity. Concerns about social equity in the community controlled forests of Nepal have been raised by Thoms (2008) who argues that significant disparities in wealth, access to forest products and power within communities means that socially equitable development opportunities are not occurring. We were therefore also interested to explore whether the LAPA process was effective at identifying the vulnerabilities of the poorest citizens and developing adaptation plans that were likely to reduce those vulnerabilities and so enhance social equity, while also addressing environmental and economic sustainability.

## Study approach

A comparative case study approach, examining the processes used and plans prepared by three different organizations, was used to gain an understanding of the effects of different facilitating organizations on LAPA. Three villages with similar biophysical and socio-cultural characteristics were chosen to reduce the likelihood of multiple intervening variables affecting the analysis. The cases were the LAPA of Bela VDC under NCCSP, the LAPA of Gadhawa VDC under MSFP and the LAPA of Dahakhani VDC under HBP support. Bela VDC and Gadhawa VDC both lie in Dang district, which is 425 km south-west of Kathmandu. Dahakhani VDC lies in Chitwan District, which is 100 km south-west of Kathmandu.

Data for the case studies were obtained from in-depth interviews. These were conducted at three different levels (i.e. central, district and community) to obtain a range of viewpoints on LAPA preparation and activities. A total of 37 semi-structured interviews were conducted, involving 10 participants from central level, 12 participants from the district level and 15 participants from the community level. Out of these, 14 respondents were from government, 15 from non-government organizations and 8 were community people. The participants from both national and district level organizations were selected using purposive sampling as this helped to ensure the most relevant participants. The participants from



communities were selected using a combination of purposive and convenience sampling. Emphasis was placed on interviewing people either directly involved in the LAPA preparation process or those with knowledge of ongoing adaptation processes in Nepal or having influence at the policy level. The interviews were mainly focused around questions on how the LAPA process was carried out, the knowledge used in the process, the role of different organizations in the process, adaptation and development activities planned, and financial stability and sustainability of the plan. Interviews were conducted by the first author in Nepali and the length of each interview varied from thirty minutes to one hour. In addition to the interviews, documents such as government reports and policy documents and adaptation plans from the case study areas were reviewed to acquire an understanding of the nature of the adaptation strategies, management perspectives of the process and policies on adaptation issues.

The field interviews were conducted shortly after the devastating 7.8 magnitude earthquake of April 2015 centred at Gorkha, Nepal. Unfortunately, the events made travel to case sites difficult and the advent of the rainy season also reduced the opportunity to interview as many members of the local communities as was originally intended.

The interviews were translated and transcribed for ease of analysis. Content analysis was used to interpret information from interviews and document reviews. This technique is useful in interpreting information from texts into different themes and categories related to the context (Gubrium & Holstein, 1997). Categories used for analysis were: the planning steps of LAPA, local people and external involvement, nature of adaptation activities, implementation modality, scaling up and consolidation of adaptation, coordination approach with stakeholders and capacity building of stakeholders. These categories were developed on the basis of the research questions and document reviews and were useful in synthesizing the information.

## Results

The results presented here are based on the interviews, which drew on the experience and knowledge of stakeholders at the community, district and national level. Figure 1 gives an overview of the timing and sequence of events of the LAPA programme in each case and Table 1 summarizes each case's key characteristics. The results are reported under the following headings: approaches to the planning process, adaptation activities vs development activities, and organizational role in the LAPA process.

### Approaches to planning process

Before initiating the LAPA preparation process at the VDC level, the facilitators undertook training provided by their respective organizations. The training began with 'climate change sensitization' which involved general information and knowledge on climate science, policies and strategies from global to national level, followed by training on the process of LAPA preparation. Once out in the villages, the trained facilitators used several participatory tools (e.g. historical timelines

of hazards, seasonal calendars, impact risk analyses, adaptive capacity assessments) as described in the national framework, to engage the local community and stakeholders in the process.

Analysis of the planning processes used at each village under the different programmes, based on the documents available and interviews, found that they contained elements of both top-down and bottom-up approaches at different stages of the LAPA preparation and projected implementation schedules. The facilitators were guided by the National Framework, but the processes used enabled local input and decisions. This is illustrated through the vulnerability assessment. In the interviews, programme participants (facilitators and NGO staff) consistently stated that each programme used some form of vulnerability assessment to select the VDCs for LAPA development. NCCSP used the District Development Committee's (DDC's) Disadvantaged Group Mapping<sup>3</sup> data and discussed the results with stakeholders at the district level to select the most vulnerable communities for LAPA preparation within these districts. In Dang district, after NCCSP had selected the eight most vulnerable VDC for LAPA, MSFP selected villages from the remaining VDCs by applying its own working criteria.<sup>4</sup> The vulnerability assessment part of this also used Disadvantaged Group Mapping. HBP selected specific VDCs for LAPA preparation from within the Terai Arc and Chitwan Annapurna Landscapes using an 'Underlying Causes of Poverty and Vulnerability Analysis' (UCPVA)<sup>5</sup> tool.

The interviews provided information on the vulnerability and adaptation assessments conducted at the local level, and how they varied in the stage at which they were carried out (Figure 1). For instance, in Bela a household vulnerability assessment was conducted in all nine wards with the help of a 'ward citizen forum' at the beginning of the process, followed by a three-day workshop at VDC level. This assessment ranked households according to their vulnerability, based on the five asset typology (social, natural, human, physical and financial) used in sustainable livelihoods analysis (see DFID, 1999). In contrast, due to financial constraints, this detailed household level assessment was not performed before the VDC planning workshops in Dahakhani and Gadhwara, but was performed 17 and 22 months later respectively, largely to satisfy process requirements.

In all cases, at the VDC planning workshops, various other vulnerability assessment and participatory tools were used. Knowledge and information were collated about changes in weather patterns already observed locally that might be attributed to climate change. These changes included rises in temperature with longer summer and shorter winter periods, a shift and decrease in the monsoon period, and longer periods of cold waves in the study areas. Location-specific impacts were also identified (e.g. floods, drought, river-bank erosion, forest fire, and crop diseases). Historical timelines of such local hazard events and their impact on people were also constructed (for example at Bela, Appendix), drawing on the relevant life experiences of the locals in the specific location and engaging the senior citizens in the process. Interviewees noted that the planning process for LAPA in all three cases was carried out by NGOs and involved limited or no technical contribution from government line agencies. The only notable difference lay in the HBP's inclusion of ecosystem variables in the case

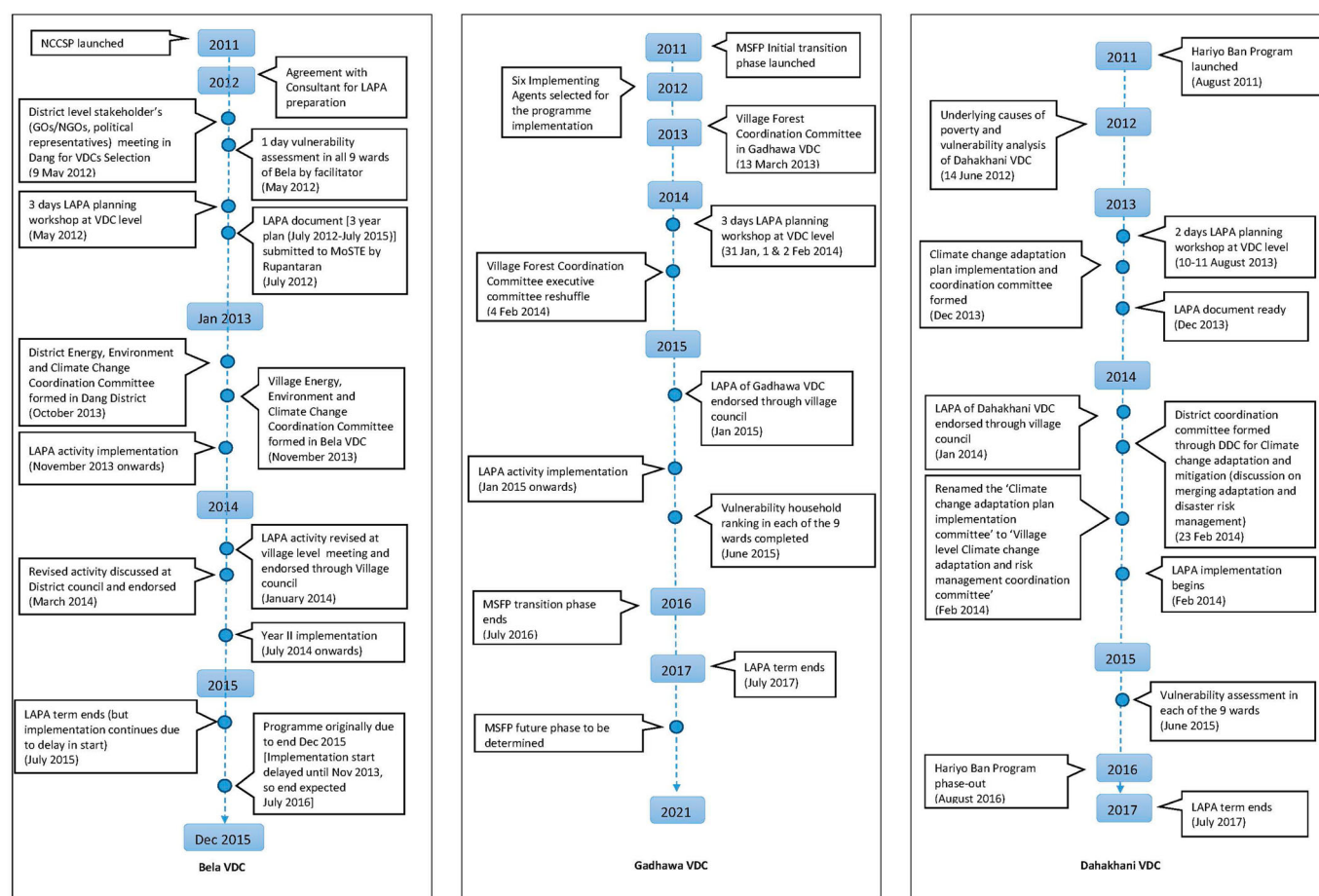


Figure 1. Timelines of LAPA planning process in each case.

of Dahakhani. A district level NGO staff member justified this inclusion, saying,

... while the analysis of vulnerability of people and livelihoods due to climate change is important, the vulnerability of different ecosystems especially forest, agriculture and water is equally important because of people's dependence on these ecosystems services for their living.

However, the activities in the Dahakhani/HBP final plan do not reflect anything specifically related to ecosystem vulnerability. Interviewees involved in this LAPA preparation programme said that the tool was too complex to be understood and effectively used by the facilitator.

Once the potential impacts and vulnerabilities were identified, potential adaptation options were generated (e.g. planting

Table 1. Key characteristics of the LAPA programme in each case.

	NCCSP/Bela	MSFP/Gadhawa	HBP/Dahakhani
Project funding	DFID/EU/UNDP	SDC/DFID/Government of Finland	USAID
Project objectives	Support NAPA objective and climate change policy	Support development through livelihoods improvement and climate change adaptation	Support climate change adaptation, mitigation and biodiversity conservation
LAPA planning process	<ul style="list-style-type: none"> <li>1 day orientation and vulnerability assessment in each of 9 wards and 3-day workshop at VDC</li> <li>Used participatory tools as mentioned in LAPA framework</li> </ul>	<ul style="list-style-type: none"> <li>3-day workshop at VDC</li> <li>Used participatory tools as mentioned in LAPA framework</li> </ul>	<ul style="list-style-type: none"> <li>2 day workshop at VDC</li> <li>Used participatory tools as mentioned in LAPA framework with additional tools, such as Livelihood Impact Analysis, Ecosystem Vulnerability Assessment (agriculture, forest and water) and climatic data (temperature and rainfall) analysis</li> </ul>
Implementation mechanism	Funding channelled through government line agencies at district level	Funding channelled through NGOs for the preparation and implementation of LAPA; Government involved in other elements of programme	Funding channelled through NGOs for the preparation and implementation of LAPA
LAPA implementation priority area	LAPA implementation with all six thematic areas identified in NAPA	LAPA implementation support, mainly on agriculture, forests and water resources	LAPA implementation support, mainly on forests and biodiversity and water resources

trees in landslide and flood-prone areas, extension of irrigation canals, construction of conservation ponds, and training on alternative livelihoods).

According to the LAPA framework, the fifth of the seven steps in plan preparation and implementation is meant to be the integration of the adaptation plan into the regular development planning process. This is aimed mainly at ensuring the continuity of adaptation activities even after the completion of the fixed term LAPA projects. The NAPA document of Nepal and the national framework on LAPA both discuss the importance of integration of the adaptation plan into the planning process. In addition, most of the respondents at district and national level interviewed for this study commented on the desirability of the mainstreaming of climate change into the regular planning processes. For example, a key respondent from a district-level government agency explained,

The whole idea of LAPA is to integrate climate change adaptation into the development planning process so that the continuity of adaptation activities is sustained. At present, it functions as a cross cutting issue similar to 'Gender Equality and Social Inclusion', such issues must be mainstreamed in every planning process ...

However, the respondent then qualified this by noting that this mainstreaming process should not occur,

... until the people are fully aware and the demand for adaptation activities emerge from within the community people. So the [current separate] LAPA planning and implementation must be continued until we achieve this objective.

This view seemed common to respondents, and suggests acceptance that there is a consensus at both national and district levels of government that LAPAs at this stage need to be maintained as separate plans, in addition to regular development plans, until such stage that the community has recognized and taken on board the need to incorporate adaptation into the regular development plans.

### **Adaptation activities vs. development activities**

The adaptation activities identified in all three cases were common, for example, water source conservation, irrigation canal construction and maintenance, improved cooking stove installation, plantation, flood control structures ('check-dams'), bio-gas installation, free health camps and climate change awareness programmes. These activities are largely similar to the regular development activities. When asked about the difference between adaptation and development activities, a response from a community participant was:

There is little difference in the type of activities between the LAPA and annual development plans, but the government has a very small budget and human resources to fulfil the need of the whole VDC, so it is through these plans that we can reach the most affected community and people.

Likewise, many of the NGO participants reported that the difference lies in the perspective of people and the method of implementation of the same activity. Their comments suggested that many proposed LAPA activities are common development activities that meet the immediate needs of people for the development of the region, but the adaptation activities

aim at sustainability using climate smart technology or management (e.g. use of biochar as a fertilizer, promoting organic farming, bioengineering on landslide prone areas). This was clearly expressed by one of the NGO programme participants:

... the difference lies in the presence of climate essence in it, for instance, construction of a conservation pond is a regular activity, however, it serves the purpose of adaptation to climate change in times of water scarcity ... it is identified as an adaptation activity in the LAPA after an in-depth vulnerability assessment of the area and the location of its implementation is specified.

The government interviewees agreed there was a lack of scientific research and ground level studies on climate change in Nepal, and that there were inadequate knowledge and technical capacity specific to climate change adaptation at all levels. A key respondent from the central level expressed the view:

The Ministry of Science, Technology and Environment is supposed to be the technical expert in this matter but the plans prepared at local level have minimum inputs from the experts. The staff at district level might have surface knowledge because this is a hot issue, but that basic knowledge is not sufficient for planning and generating adaptation strategies.

The LAPA involves activities that arise from a collective discussion at the local level, based on participants' knowledge and experience, which leads to the activities with which they are acquainted. One of the LAPAs reviewed identified the key impacts due to climate change on 'forests and biodiversity' as diminishing species (both flora and fauna), low productivity of forest products (e.g. fuel wood, fodder, medicinal herbs), outbreaks of invasive species, low forest regeneration and forest fires. Analysing the activities, all three LAPAs have 'fire line construction' and 'awareness workshop on forest fire' as common activities. However, these are regular forest management activities carried out in every community forest and already supported by District Forest Offices. In the case of Dahakhani, the LAPA includes the analysis of climatic data from the nearest meteorological station. However, this analysis was done later in the process, well after the planning process was completed, so had no impact on the adaptation activities planned.

### **Organizational role in LAPA process**

The interviews undertaken at different levels for this study demonstrate that the institutional structures and their functions are still evolving in the context of LAPA. Although the Ministry of Science, Technology and Environment (MoSTE) is the designated focal point and lead Ministry to coordinate and implement overall climate change adaptation activities in Nepal, the Ministry does not have a local level presence. The Ministry of Federal Affairs and Local Development (MoFALD) has a physical presence and governance structure down to the local level with District Development Committees (DDC), Municipalities and Village Development Committees (VDC). However, interviews with its staff indicate that it has a limited role and influence on LAPA at the central level and considers climate change as a cross-cutting issue (see also Nightingale, 2017; Maharjan & Maharjan, 2017). In contrast, at district level, the local government (the DDCs) are involved in the LAPA implementation. Similarly at village level, the VDCs

are involved throughout the planning process. According to the provisions of the Local Self Governance Act (LSGA) 1999, the DDCs are accountable for the management of natural resources within the district, but according to the Forest Act 1993, the District Forests Offices (DFOs) are responsible and hold the authority to manage forests in the district. However, the national framework on LAPA has resolved this apparent confusion by designating DDCs and VDCs as the key agencies at local level for adaptation planning.

Discussing the LAPA process with the government officials, it was apparent that they consistently referred only to the programmes they have been involved in (i.e. NCCSP) and appeared to treat other programmes involved in LAPA development with less seriousness and familiarity. In the areas without NCCSP, the local government did not seem to even have a record of LAPAs prepared by other programmes and undergoing implementation. In addition, when asked about the role of DDC in LAPA processes, a government district level respondent explained:

It is less likely for us to look after each case and activity carried on in the district by different organisations, since we have limited staff and each have their role to fulfil. The non-government organisations are mainly involved in LAPA processes and are working as per the donor's mandate.

The three cases under three different programmes were different in the way that LAPA was implemented. In Bela VDC, the NCCSP case, there was a perception of higher accountability to the community and greater confidence that the programme and adaptation plan would continue. There appeared to be two main reasons for this. One reason, advanced by government and NCCSP staff, was that the vulnerability assessment was more thorough (a total of 9 days, one day in each of the wards making up the village, followed by a 3 day workshop at VDC level), and the household vulnerability assessment occurred earlier in the process than in the other two cases. It was considered important that the information on household vulnerabilities was available before the adaptation options were identified so that these vulnerabilities could be taken into account. In contrast, in the cases from MSFP and HBP, the ward level household vulnerability ranking was done later in the process and so did not make any difference to the plan. It was merely to fulfil the steps as indicated in the LAPA framework.

The second reason given for greater confidence in the NCCSP programme, advanced by interviewees from local government, NGOs and community, related to how and by whom the funding to implement LAPA activities was allocated, and whether it was integrated into the regular local government processes. In Nepal, the Village Development Committee (VDC) and the District Development Committee (DDC) are the lead agents for planning at the local level. In the MSFP and HBP programmes, the allocation of the LAPA implementation fund was carried out by the local NGOs, but in the NCCSP the LAPA implementation fund was controlled by the DDC and channelled through relevant government line agencies. This led to government officials, programme and NGO staff and community members reporting they had greater confidence that the funding allocators in the NCCSP

programme were accountable to the community and that the initiatives would continue, compared to the areas where funding allocation was controlled by NGOs with much weaker long term association with, or accountability to, the community.

In the case of Gadhawa VDC (under MSFP), a Village Forest Coordination Committee (VFCC) had been formed at village level and the fund for LAPA implementation was channelled directly through the NGO. A village level participant of the LAPA process from Gadhawa VDC highlighted,

Although the LAPA document has been endorsed through the VDC council, there has not been any significant contribution, financially or technically from the government line agencies like DDC, DFO or any other in the implementation of LAPA in Gadhawa. DDC does not take the responsibility for executing the plan like they do for Bela VDC. Only a few activities have been implemented with the support of Rupantaran Nepal [NGO] due to the inadequate budget, through a team called VFCC.

In Dahakhani (under HBP), the fund for LAPA activities implementation was channelled through existing community forest users' groups. However, a community participant, who was also a member of the forest users' group, commented,

... there is a lack of guidance and leadership for LAPA implementation.

## Discussion

The results provide insights into the development of LAPA in the three cases. Although the planning process followed by all three cases seems similar, the main differences lie in the implementation funding mechanism and this in turn established the level of accountability and confidence in the continuity of LAPA. Notable also is the limited use of scientific knowledge and experts' involvement.

### Local knowledge and science

The NAPA was developed based on the vulnerability assessment of the country prepared using the vulnerability assessment framework of the IPCC. It provides information concerning overall climate variability and projected changes in Nepal. The impacts were identified based on the thematic areas, such as agriculture, forests, water resources, health, climate-induced disaster and urban settlement, rather than location. However, the NAPA states that due to data limitations, expert judgement had been used in ranking the vulnerability of districts (MoE, 2010), illustrating the limitations of the available scientific information for use in the process. The NAPA also notes the need for LAPA to reflect location-specific impacts and adaptation needs (MoE, 2010), but if local scientific data is not available then the robustness of the LAPA process is dependent on its ability to draw out relevant and reliable knowledge from the local community.

This study illustrates that the participatory approach used in all three LAPA enabled the gathering of local knowledge at a level of detail that would not be accessible by other means. This enabled a sense of what type and scale of hazards climate change might cause or exacerbate. The whole LAPA exercise also reminded the community participants of their resilience



and how they have coped in the past, and this became the basis for the prediction of what might happen and how they should respond in the future. While there was no assumption by any of those involved that higher status external scientific ‘experts’ were essential, the lack of external expertise had the disadvantage that it constrained the adaptation space to that which was already known by the communities. Nightingale (2017) has similarly noted a lack of novelty in adaptation projects. External experts in substantive adaptation (cf. facilitative planning) may have introduced or sparked new ideas or means for adapting.

To some extent, one might expect some of the tools developed by external experts that were used for assessing vulnerability might help overcome the absence of experts. However, in Dahakhani VDC, the ecosystem assessment tool provided by the HBP programme for use was too complicated for the facilitator to understand and deliver successfully to the community people, and using it did not translate into the plan being noticeably different from the LAPA prepared by the other two communities. Similarly, the vulnerability assessments at two of the locations were carried out more as a means of completing the full process than as tools to help inform their process.

Similarly, potential impacts identified during the discussions (e.g. loss of species, low productivity of forests and the outbreak of invasive species) were not addressed in the activity plan. This appeared to be because the local stakeholders and the facilitators had limited technical knowledge about what options there might be to address these risks. However, it may also reflect the low importance of these events based on past histories and a perceived ability to cope. Both facilitators and participants lacked the forward-looking lens that global science, local science and applied science can contribute in generating realistic multi-hazard scenarios and potential adaptation pathways and novel strategies.

While the bottom-up, participatory approach has been valuable, the effective use of experts’ knowledge could make the process richer and identify more varied, innovative and resilient results. A more truly co-productive approach, with a two-directional flow of knowledge, may have identified a number of useful avenues that were not thought of or analysed in these processes.

### *Climate change discourse: adaptation, mitigation and development*

The LAPA processes are clearly funded as adaptation responses and integrated these with development planning. While the differences between mitigation and adaptation may be apparent at high level corporate or government offices, at the community level the question arises as to the extent to which the two approaches can, and should be, seen as distinct, or whether adaptation is simply seen locally as a means to acquire funds for ‘sustainable’ development from whatever is the latest donor fashion. Nightingale (2014, 2017) has drawn attention to the current mitigation and adaptation donor funded projects as being essentially the same projects as those that would be funded under development-as-usual. Analysis of the activities that resulted from the LAPA reported here supports this view.

However, the distinction between mitigation and adaptation appears of limited or semantic value in this context. The adaptation activities identified in the LAPAs (Table 2) can be seen as addressing adaptation, mitigation or development, depending on the perspective from which they are viewed. They are also multi-scalar, some having very localized effects while others have impact far beyond the immediate area. For example, ‘bio-engineering’ (use of plants-shrubs/grasses and small structures to reduce landslides and the impacts of floods) and ‘plantation’, have benefits beyond the local level and are long term.

**Table 2.** Activities identified in the LAPAs studied and how they contribute to adaptation, mitigation and/or development.

Examples of activities identified in the case study LAPAs	Adaptation	Mitigation	Development
Fire-line construction in the forest/ Fire-fighting tools supply	Fulfils adaptation objectives as forests are the main source of livelihoods of the people and protecting forests from fire builds the adaptive capacity of people. Due to the limited annual budget for development, not all forest areas are covered so this activity acts as a supplement to the development objectives by reaching areas that line agencies could not.	Can fulfil mitigation objectives in long-term by protecting the forest stands from fire. Forests acts as both source and sink of carbon. Forest fires release carbon that had been stored throughout the trees’ lifespan.	Regular development activity in Forest Operational Plan carried out annually by Community Forest Users Groups and District Forest Offices. Forests are the main source of livelihoods of the people.
Awareness/ sensitization activities on forest-fire control	Knowledge and information plays important role in building adaptive capacity of people. (Supplemented now by additional information on how it contributes to climate change).	Fulfils mitigation goal with the control of forest fires.	Regular development activity only when and where necessary. Awareness of how unintended/intended forest fire can be caused, control of forest fire, safety measures. Forest sector goal of increasing the forest area, timber products as well as NTFP for livelihood support.
Plantation (for erosion control, flood control, livelihoods)	Plantation in barren land within forest areas as support for income generation targeting the poor and vulnerable people. Promoting Non-timber Forest Products (NTFP) for livelihoods support. Plantation in landslide and flood prone areas (bio-engineering).	All kinds of plantation support mitigation objectives in the long run.	
Improved cooking stove/Bio-gas installation	Less use of fuel wood and reduced dependency on timber for firewood. Improves health of women. Saves time which can be utilized in income generation.	Lowering community dependency on forests for firewood increases the forest stands and hence the source of carbon sink.	Lowens the dependency on forest for fuel wood. Forest increment and timber production. Improves health of women

Besides the limitation of knowledge on potential measures to deal with the impacts, the other reason for this similarity to development activities may be because the national LAPA framework is based on NAPA. Nepal's NAPA is set within the country's development objectives (MoE, 2010), and LAPAs, therefore, tend to be a vehicle for development. Even the use of scientific climatic data and ecosystem assessment tools in the case of Dahakhani could not produce adaptation measures that differed from development-as-usual, and the same outcome is found in the other two cases. Hence, the intersection of adaptation and mitigation with climate change in the cases we studied lies in the development, and this appears to be a key component for acceptance of LAPA at the local level. This supports the findings of other researchers with regard to food security (Nagoda, 2015) and forestry (Nightingale, 2014) in Nepal. However, the LAPA preparation processes used in all three cases did not meet Nightingale's test for sustainable adaptation as they were not transformative of social structures, in fact did not even consider social structures, with the possible exception of the project which targeted improved cooking stoves for women.

However, this finding must be placed within a broader context. In this study, it was noted that several different types of district level vulnerability assessments which considered aspects such as socio-political marginalization and social exclusion were used to select the VDCs for LAPA assistance, and in one case (Bela), the plan preparation was preceded by (and therefore hopefully informed by) an assessment of vulnerability at the household level. These approaches appear to fit the context-informed type of vulnerability assessment called for by O'Brien, Eriksen, Nygaard, and Schjolden (2007) and Nagoda (2015). However, the use of such assessments did not appear to generate ideas for actions focused on addressing why some individuals or households were more vulnerable than others.

With the exception of the initiative to provide improved cooking stoves that were partially justified as improving the health of women, there were no actions identified which could be categorized as addressing social equity or challenging existing power balances within the community. The possibility of new alternative ways to achieve sustainable livelihoods was not even raised during the LAPA development in these villages. In this respect, the results parallel those found for LAPA in the agriculture sector of Nepal (Nagoda, 2015), and may reflect reluctance by both the community and facilitators to challenge local political power structures as noted by Nightingale (2014), or a lack of focus on such issues in the facilitator training. Data collected through the vulnerability surveys identify the community poor, but not the causes of their poverty. The actions identified by the LAPA process were generic, technical, and output-oriented in nature, and as Nightingale (2014) argues, technically oriented solutions may be expected to benefit the better-off in communities rather than the most vulnerable.

### ***Mainstreaming climate change for sustainable development***

Mainstreaming has been promoted as a means to integrate adaptation and mitigation into development policies and strategies (Klein et al., 2005) as part of ongoing planning processes,

regardless of scale. A key objective of the NAPA of Nepal is to mainstream the outcomes of the NAPA process into the national development agenda. It envisions that 'mainstreaming climate change into national development agenda will contribute to poverty reduction, livelihood diversification and building community resilience' (MoE, 2010, p. 7).

Although the LAPAs reviewed in this study were intended eventually to be integrated into the development planning process, this was found to be a major challenge in terms of knowledge, capacity and funding at all levels. Hence, all three LAPAs under the different programmes stand as separate fixed term projects without an appropriate mechanism for sustaining them into the future and for scaling up or mainstreaming. Moreover, the 'ownership' of a project or programme at the interface between the national/international and the local is important for increasing the likelihood that adaptation projects are sustained. LAPA which have a connection to regular government processes through the DDC at the district level and the National funding stream of line departments were considered by those interviewed at all levels, and regardless of whether they represented government, NGOs or community, to be more likely to be enduring than those developed through the NGOs. However, this view was not because those involved in the government-mediated programmes were thought to be more skilled in either planning or implementation, but rather because the government agencies were seen by interviewees, consistently, to have a higher degree of perceived and real permanence, and more power and authority in Nepal at the local level. The recognition and ownership of LAPA by the government to some extent also rely on their access to and control over the fund to implement these LAPAs. This appears to support Mingate, Rennie, and Memon's (2014) finding in Kenya that INGOs can 'come and go' and are not seen as being so firmly rooted in the local area or nation, but their projects can live on.

### **Conclusion**

In this paper, we have argued that the LAPA process in Nepal followed a participatory approach to planning, with decision-making resting with the local community despite initial top-down framing of the issues to be considered. However, the plans were created with limited scientific input and technical assistance and limited stimulus to challenge existing causes of poverty. The process enabled the documentation of local knowledge and information on local impacts of particular types of weather-associated events that are likely to be exacerbated by climate change. However, we argue that if the communities had been able to co-produce knowledge with relevant external experts, they may have identified new pathways to adaptation rather than be limited to existing practice and knowledge. This finding supports Nagoda's (2015) argument that the adaptation approaches in Nepal have little new to offer over the development-as-usual approaches. In addition to the constrained knowledge and capacity of local people on climate change issues and adaptation, the country's sustainable development goals may have played a significant role in INGO and government agencies supporting and accepting adaptation plans that reflect (sustainable) development-as-usual. There

was no consideration of alternative sustainable adaptation approaches that might alter the underlying social processes that contribute to vulnerability, but it cannot be argued that the lack of such options was due to explicitly exercised social mechanisms constraining what was considered viable adaptation. The need for communities to develop in a sustainable manner had already formed part of the national goals for the development of Nepal and its forest sector (for example, see GON, 2011b; GON, 2013), and to the extent that sustainable development was already incorporated into community projects, it would be natural that the LAPA, in proposing more of the same type of development, would in fact be building on, and integrating with, existing mainstream approaches. Effectively the new LAPA funding was merely a new way of delivering sustainable development assistance.

The likelihood of the projects continuing beyond the life of the external funding was perceived to increase the more closely linked to or supported by formal government organizations the individual projects might be. This suggests that LAPA should be prepared as part of normal sustainable development planning, and funded through centrally channelled funds, if the effects are to be enduring, rather than as a stand-alone process. It was notable that it was the central government that required vulnerability assessments to be undertaken at a community level before LAPA were developed, which supports Nightingale's (2014) argument that top-down approaches in some aspects of the planning are important. The value of that external top-down approach is further highlighted by the consideration given to biodiversity issues in the one programme funded by a donor with a strong biodiversity conservation interest. However, the local bottom-up approach and lack of technical external expertise dominated the final outcome and the LAPA showed no significant differences in their recommended actions.

In conclusion, 'forest and biodiversity' is a major theme in the NAPA, and forests can contribute to both mitigation and adaptation. However, for the LAPA programmes in the forest sector in Nepal, there is no distinction between mitigation and adaptation. Funds made available for local community adaptation may also be delivering mitigation that is of regional or global benefit. These actions, made possible through LAPA funding, inherently assist development by promoting climate-smart and climate-resilient activities. As adaptation planning provides a means to tap into new external funding which might not otherwise be forthcoming, one can understand why developing countries may choose to begin such planning as a separate process. In the long run, however, our results suggest that integrating climate change adaptation into normal sustainable development planning should lead to more durable and sustainable outcomes by making thinking about and planning how to be resilient in the face of a changing climate a normal mainstream activity. However, this conclusion is dependent on the extent to which normal sustainable development protects environmental integrity and incorporates socially transformative development pathways for the most vulnerable.

## Notes

1. UN-REDD is the United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation

in Developing Countries, a multilateral body launched in 2008. It provides support to developing countries in implementing and meeting REDD+ requirements <http://www.un-redd.org/>

2. REDD+ is a voluntary approach by Parties to the UNFCCC to mitigate climate change through incentivising conserving and enhancing forest carbon stock and sustainable forest management. Developing countries receive financial payments for results-based performance in such activities <http://www.unredd.net/documents/redd-Nepal's-Approachpapers-and-publications-90/un-redd-publications-1191/fact-sheets/15279-fact-sheet-about-redd.html>.
3. This was based on disadvantage indicators (such as household food sufficiency, socio-political marginalisation, access to public services and gender discrimination).
4. MSFP criteria included: geographical remoteness, vulnerability assessment, forest coverage, number of community forestry users groups in the area and number of households dependent on forests.
5. UCPVA is a tool developed by CARE (an INGO) and is intended to identify the poor, vulnerable and socially excluded people and to identify and understand the root causes of poverty and vulnerability of any location.

## Acknowledgements

The first author wishes to acknowledge the funding for her studies from the Mingma Norbu Sherpa Memorial Scholarship (WWF, The Greater Himalayan Trust and Lincoln University).

## Disclosure statement

No potential conflict of interest was reported by the authors.

## Funding

The first author wishes to acknowledge the funding for her studies from the Mingma Norbu Sherpa Memorial Scholarship (WWF, The Greater Himalayan Trust and Lincoln University).

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## Appendix. Timeline of historical events in the Bela VDC prepared by the Bela LAPA participants.

Year	Events	Impact	Major Historical Interventions for Coping
1978	Hailstorm	Caused significant damage to crops worth NRs 500000 (US\$ 5000) value, killed 3 cows, uprooted trees, blew away house roofs	Renovated sheds, land revenue waived by the Government, received loan from landlord, provision of food from Koiralabas VDC.
1978/1980	<i>Aaulo</i> [endemic Diarrhoea]	Human casualty of 36 people in Materiya, 3 in Khardariya and 1 in Bankatti	Sprayed DDT [dichlorodiphenyltrichloroethane] [presumably to kill insect vectors of the disease], consulted witch doctor, and used local herbs.
1982	River bank erosion	17 households displaced in ward no.1 of Bankatti, approximately 18ha agricultural land eroded by river, 250 metre long irrigation canal damaged.	<i>Mana-muri</i> system adopted to provide food for displaced households, landslide debris removed, gabion dam filled by community.
1983	Loss of <i>Khar</i> [ <i>Saccharum spontaneum</i> – tall perennial grass]	Problem in making house/ cattle shed roofs in ward no.1, 2, 3 and 4.	[No actions recorded]
1985	River bank erosion	Agricultural land eroded by river with approximately 11ha in ward no. 2, 40 ha in ward no. 5, 4 ha in ward no. 6 and 2 ha in ward no. 4 7 houses washed away in ward no.9, 16 in ward no.6 were displaced, 10 metre irrigation canal washed in Marari River.	Fund collected by the villagers and constructed check dam in ward no. 2 and 3; 16displaced households of ward no. 6 migrated to Satbariya VDC.
1986	Drought	Significant loss in crop production leading to scarcity of food.	Received loan from principal village landlord and bought rice from Lalmatiya and Sisahaniya.
1986/1987	Fire	13 houses burned to ashes in Bhaisahawa ward no.8, 3 cattle burnt in ward no.3	Fire extinguished by the community, renovated/built houses with support from the community.
1988–2012	River bank erosion	Cultivable land eroded by river in all wards damaging at least 33 ha land, 200 metre long road damaged, Secondary school washed away, 15 households displaced in ward no.9	An amount of NRs, 510,000 (NZD 7100) and gabion wire provided by government, school renovated by community contribution
1989	Drying up of water resources	4 households of Sinhawa ward no.4 affected, canal dried up in ward no.1	Bamboo species planted with support of NRs.50, 000(NZD 3500) from VDC
From 1990	Disappearance of local crops and natural species	Indigenous species gradually lost and displaced by new species	Chemical fertilizer and improved and hybrid seeds used to increase productivity
1991	Flood and landslide	Canal washed away in ward no.2 (500 m of long), 3 (100 m) and 4(15 m)	Low cost dam built
1991	Diarrhoea	Human casualty 13 people in Maararikhola ward no.3 and 3 in ward no.4	Health check-up by the team of Gadhwaha health post
Annually from 1991	Forest fire	Timber and fire wood burnt, wild animal displaced	Fire line constructed, fire extinguished by users
1998	New disease in livestock	500 goats and 150 cows died in Naka ward no.3	Could not be cured by veterinary doctor
2001	Flood in Rapti river	5 people drowned in Bhaishawa ward no.8	[No actions recorded]
2007	Disease in crop	Reduced productivity	Use of pesticides
2012	Drought	Reduced productivity	[No actions recorded]
2012	Storm	2 electric poles uprooted in ward no.8, roofs of 20 house were blown by the storm, a total of 300 trees were uprooted in the VDC	[No actions recorded]

Note: Translated by lead author from pages 8–9 of the LAPA document of Bela VDC. For more detail, see Silwal (2016).