Tracking Adaptation and Measuring Development in Nepal

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Front cover photo: Women at the health post, Rukum District, Nepal
Credit: Susannah Fisher

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Acronyms

CFUG	community forest user group
CRM	climate risk management
DDC	District Development Committee
DHM	Department of Hydrology and Meteorology
DRR	disaster risk reduction
FUG	forest user group
IDS-Nepal	Integrated Development Society-Nepal
IIED	International Institute for Environment and Development
LAPA	Local Adaptation Plan of Action
LFP	Livelihoods and Forestry Programme
LGCDP	Local Governance and Community Development Programme
M&E	monitoring and evaluation
MCPM	Minimum Conditions and Performance Measurement System
MoE	Ministry of Education
MoFALD	Ministry of Federal Affairs and Local Development
MoFSC	Ministry of Forest and Soil Conservation
MoSTE	Ministry of Science, Technology and Environment
NAPA	National Adaptation Programme of Action
NCCSP	National Climate Change Support Programme
NPC	National Planning Commission
PPCR	Pilot Program for Climate Resilience
TAMD	Tracking Adaptation and Measuring Development
TCC	TAMD Coordination Committee
VDC	Village Development Committee
WCF	Ward Citizen Forum

Executive summary

Tracking Adaptation and Measuring Development (TAMD) is a twin-track framework that evaluates adaptation success. Track 1 assesses how widely and how well countries or institutions manage climate risks, while Track 2 measures the success of adaptation interventions in reducing climate vulnerability and keeping development on course. This twin-track approach means that TAMD can be used to assess whether climate change adaptation leads to effective development, and how development interventions boost communities' capacity to adapt to climate change. Importantly, TAMD offers the flexibility to generate bespoke frameworks for individual countries that can be tailored to specific contexts and applied at different scales. This report compiles the results of TAMD feasibility testing in Nepal.

The TAMD study in Nepal sought to assess the resilience benefits of two different interventions working on community-based planning. Two interventions were selected to test the TAMD methodology – the Local Governance and Capacity Development Programme (LGCDP) and the Livelihoods and Forestry Project (LFP). Integrated Development Society-Nepal undertook the feasibility study in close collaboration with the UK's International Institute for Environment and Development and under the overall guidance and advice of the TAMD Coordination Committee, which is chaired by Nepal's Ministry of Science, Technology and Environment.

The TAMD study compared changes in resilience over time in two districts (in 2 village development committees (VDCs) in each district) to understand the additional contribution to resilience from a particular intervention. The team selected two districts (Rukum and Nawalparasi) that had several adaptation-relevant interventions and identified VDCs within each district that were similar in terms of facing the same climate hazards and had similar socio-economic profiles. Changes were compared over time between these matched VDCs. The study used scorecards to assess the institutional context in each community and VDC, developing local theories of change to consider the contributions of each intervention to building resilience. Changes over time in community resilience were assessed using household data collected through a survey and differences between communities with and without a particular intervention were analysed using a difference-in-difference approach. Existing climate data was then used to understand the results over time in the context of climate challenge.

The results of the study show that climate risk management can easily be tracked in Nepal through some simple tailored scorecards and this information is useful for governments and would help in tracking and monitoring national progress. The results of the resilience assessment show that differences can be identified between matched VDCs and certain key indicators were useful in picking up small changes between VDCs. These were for both VDCs – number of sources of income and months of food self-sufficiency – and for Nawalparasi also livestock holdings, housing assets and income from cash crops/fruit trees. The results showed that the LFP districts did have improved outcomes in certain key resilience indicators although the extent to which this led to broader changes in resilience differed between the two districts. The results also showed that it was important to understand these indicators within the context of the external environment and any climate shocks so as not to misinterpret any trends. The research design and use of climate data and local narratives to explain changes over time address two of the challenges of monitoring and evaluating adaptation: attribution and contextualisation.

The study tested specific tools for monitoring and evaluating climate change adaptation – institutional scorecards, community focus groups and household surveys – and made these relevant to the Nepalese context. Such tools can help Nepalese policymakers target their interventions and support within the country and demonstrate the effectiveness of these interventions to external audiences.

The study team also propose two overall approaches for checking the effectiveness of climate adaptation in Nepal based on this pilot. These are firstly, tracking the key indicators from the scorecards and identified resilience indicators through existing systems within the Ministry of Science, Technology and Environment (MoSTE) to assess changes at a high-level for national monitoring. Secondly, the design of this pilot could be used to develop an in-depth evaluative approach for a particular district to identify the resilience indicators for their context and to understand the changes in community resilience. Applying these approaches to government programmes or incorporating them into development partners' initiatives would start to build a more cohesive and integrated national framework for tracking climate change adaptation progress in Nepal.

1 Testing the feasibility of TAMD in Nepal

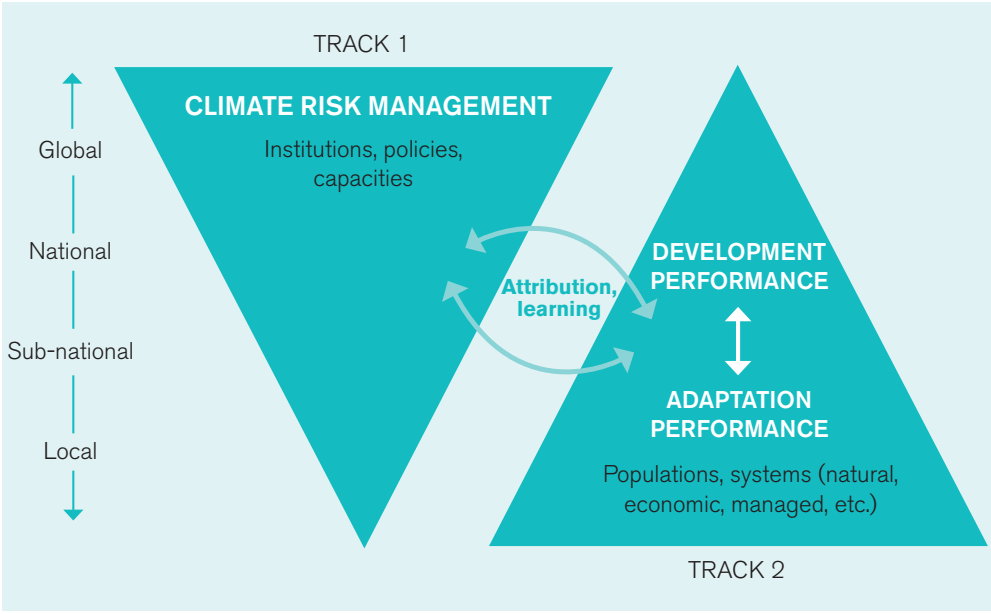
1.1 Introduction

Governments and development partners have been investing in climate change adaptation as climate effects increasingly challenge development progress. A number of countries have made efforts to scale-up adaptation responses through: national climate change policies and plans; sectoral strategies; sub-national planning systems; institutional mainstreaming; and programme/project and project-based interventions.

As investment in adaptation has increased, so has the need for evaluative frameworks that can determine the effectiveness of adaptation interventions. Between 2012 and 2014 the International Institute for Environment and Development (IIED) has worked with research partners and government agencies in several countries across Asia and Africa to pilot a new approach to evaluating the effectiveness of adaptation interventions, Tracking Adaptation and Measuring Development.

TAMD is a twin-track framework that evaluates adaptation success as a combination of how widely and how well countries or institutions manage climate risks (Track 1) and how successful adaptation interventions are in reducing climate vulnerability and in keeping development on course (Track 2) (see Figure 1). With this twin-track approach, TAMD can be used to assess whether climate change adaptation leads to effective development, and also how development interventions can boost communities' capacity to adapt to climate change. Importantly, TAMD offers a flexible framework that can be used to generate bespoke frameworks for individual countries that can be tailored to specific contexts and used at different scales.

Figure 1. The TAMD framework



1.2 Nepal's climate change context

Nepal is extremely vulnerable to current climate variability and future climate change. Nepal's climate is extremely complex due to its topography – there is a huge variation in elevation from the plains to the Himalayan high mountains, and the influence of the Himalayan mountain range and the South Asian monsoon (see Fisher and Slaney, 2013). The lowland regions of Nepal have a warm and humid sub-tropical climate, while the high mountainous regions are cold and remain well below zero in the winter, all within a span of less than 200 km. This results in considerable macro-, meso- and micro-scale variations in climate (Fisher and Slaney, 2013). A large proportion of Nepal's GDP is associated with climate-sensitive activities such as agriculture, so any changes in climate will have significant impacts on the economy and the livelihoods and wellbeing of the population. The agricultural sector is dominated by smallholder and rain-fed production, and is therefore affected by rainfall variability and extremes such as droughts and floods, landslides, and other weather events such as heat stress, hot winds, cold waves, hailstones and snowfall (Fisher and Slaney, 2013).

The Government of Nepal (GoN) undertakes many programmes in sectors relevant to climate change under the regular annual programme of government expenditure and activities, these are not formally registered as climate change programmes or adaptation. These include integrated water resource management, community forestry programmes and irrigation systems. The main adaptation interventions explicitly addressing future climate risk have been supported in various ways by several development partners and are coordinated by MoSTE. These include the Pilot Programme on Climate Resilience (PPCR), Hariyo Ban (a forestry programme supported by USAID) and the National Climate Change Support Programme (NCCSP).

Nepal's efforts to respond to the challenges posed by climate change are highlighted by the development of policies, action plans and frameworks such as the National Climate Change Policy (2011), the National Adaptation Programme of Action (NAPA) (2010) and the Local Adaptation Plan of Action (LAPA) (2011). Nepal has also developed and established a number of implementation mechanisms, including the Climate Change Council in 2009; the Ministry of Science, Technology and Environment Climate Change Management Division; climate-resilient planning by the National Planning Commission (NPC); and disaster risk reduction (DRR) planning in its 2010 Three-Year Plan (for more details see Fisher and Slaney, 2013).

Overall, Nepal has a number of climate-relevant investments supported by the Government, development partners, and non-governmental organisations. However, although investments in climate change adaptation measures are increasing, there are no national-level frameworks in place to assess climate interventions and track their relative contributions to building resilience. This limits the ability of the Government to make future decisions and investments to support climate resilient planning, based on evidence that highlights the relative merits of different approaches.

1.3 Evaluation context

The Integrated Development Society-Nepal (IDS-Nepal) and the International Institute for Environment and Development (IIED) have undertaken a feasibility study to determine whether the TAMD methodology could be used as an evaluative tool or to strengthen existing local and national-level climate change monitoring and evaluation (M&E) systems. Thereby addressing the gap identified in current government systems.

The TAMD feasibility study began with an appraisal and design phase which took place between October 2012 and February 2013. During the appraisal phase, researchers examined the degree to which climate change adaptation was being mainstreamed into national development planning; examined existing M&E systems in the economic and

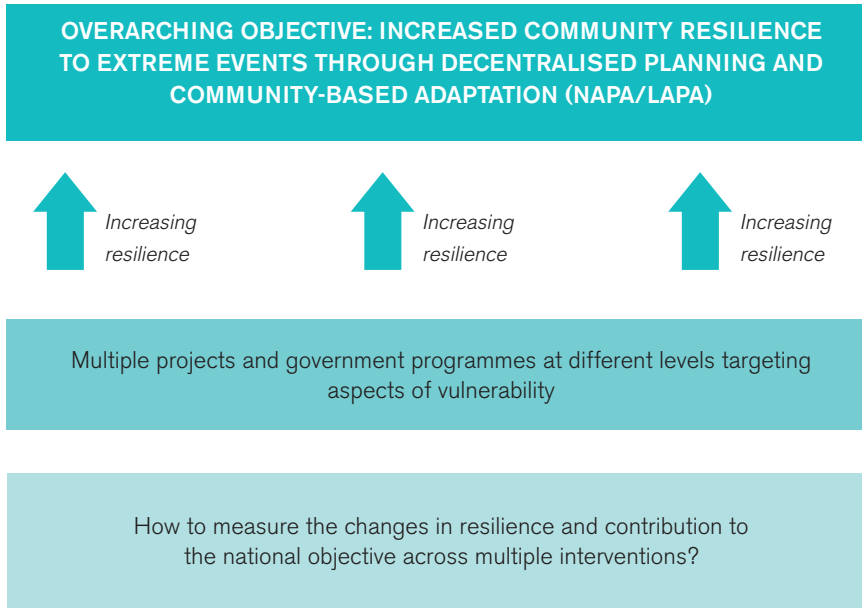
social sectors, as well as the systems currently in place for the M&E of climate change adaptation interventions; and identified possible interventions for testing the application of the TAMD approach. The results of this scoping work indicated that the TAMD framework could be used to monitor and evaluate adaptation in Nepal, and that the methodology should be piloted to analyse the extent to which large climate-related initiatives supported by international development partners had helped promote adaptation and resilience in Nepal (see Fisher et al. 2013; Fisher and Slaney, 2013).

The TAMD study in Nepal sought to assess the resilience benefits of two different interventions working on community-based planning. Two interventions were selected to test the TAMD methodology – the Local Governance and Capacity Development Programme and the Livelihoods and Forestry Project. The first phase of the LGCDP started in 2008 and it is currently in a second phase, implemented by Ministry of Federal Affairs and Local Development (MoFALD). LGCDP aims to bring about improvements in the living standards of the population along with poverty reduction through better local governance with a democratic value system and inclusive development efforts. The programme is in all of Nepal's 75 districts and aims to increase participation of poor and disadvantaged people – particularly women and socially excluded – in local planning to ensure greater inclusion of vulnerability in local development plans and better services for at-risk groups. The LFP, implemented by the Ministry of Forest and Soil Conservation (MoFSC) from 2001 to 2011, sought to build resilience through community forest management in 15 districts by: strengthening policy; building the capacity of forest user groups (FUGs), forest managers and service providers to manage natural resources equitably and sustainably; promoting livelihood diversification through income-generating activities for poor and excluded households; and supporting the development of forest-based enterprises and small-scale infrastructures to build the asset base of rural communities.

For each of these two programmes, the study team applied a retrospective analysis using the TAMD methodology to determine the programme's contribution to building resilience in communities in Nepal. The purpose of approach was two fold:

1. To test the use of the TAMD framework to assess changes in resilience for specific interventions and to see how those results could be used to compare effectiveness.
2. To examine how changes in community and household resilience as a result of project interventions might be measured and aggregated from the local level upwards, to enable the government to track progress and measure effectiveness more systematically (see Figure 2).

Figure 2. Government of Nepal's national adaptation programme



1.4 Theories of change

The broad theory of change underpinning this evaluation is that community-based planning improves local-level resilience by increasing community and household assets. Both interventions seek to improve resilience by increasing assets, whether through improving access to public services (LGCDP), or by managing forests sustainably to boost forest-related livelihoods (LFP).

To better understand the mechanisms by which the programmes sought to build resilience, programme theories of change were derived from the programme documents. Based on a review of documents and reports for each programme, the TAMD study team identified the following programmatic theories of change:

- LGCDP: Increased involvement of disadvantaged and marginalised people in participatory planning at local level ensures increased access to public goods and services, leading to reduced vulnerability.
- LFP: Improved forest management and support for community forestry increase the assets of rural communities living close to forests, making households more resilient to unexpected shocks (both socio-economic or climate) and improving their day-to-day livelihoods.

Local theories of change were then developed with beneficiaries at the community level, to help understand how communities understood the contribution of the interventions to building a particular hazard. Local theories of change are examined in more detail in the methodology and results sections below.

1.5 Methodology and approach

The TAMD feasibility study is a retrospective analysis of changes in resilience across two initiatives – the Local Governance Capacity Building Programme and the Livelihoods Forestry Project. These two programmes have been examined in order to develop an approach for evaluating resilience that was fit for purpose for Nepal, and that could be applied more widely to support national climate M&E systems with locally relevant data and tools.

Based on technical recommendations by the study team,[1] the TAMD Coordination Committee (TCC) decided to examine these two initiatives in greater detail within two districts: Nawalparasi in the Terai region (an area highly vulnerable to flooding) and Rukum in the Mid-Hills region (an area highly vulnerable to landslides). In each of these two districts, the study team organised workshops to share the study objectives, finalise research tools and methods, conduct focus group discussions with key stakeholders, and collect key informant surveys.

The team then selected two VDCs within each district development committee (DDC) that had broadly the same characteristics with the other in the district across several key parameters of development indicators drawn from gateway systems analysis (an approach based on access to key services see *ISET NEPAL, 2013* for more details) and levels of risk to specific hazards.

Communities were purposefully sampled within the VDCs (see below for more details). The team used focus groups and household surveys to understand how resilience to a specific hazard was being built and the contribution of specific interventions to this. A baseline was reconstructed using community recall techniques for five years ago. This allowed results to be compared between then and now for each intervention using simple statistical analysis.

Within each district there was a VDC with the LFP and LGCDP, and one with just the LGCDP. Therefore, results were also compared between these two VDCs to understand if any greater increases in resilience had been seen in the communities with the LFP as well as the LGCDP. A difference-in-difference analysis was used here.

1 See the appraisal and design report (Fisher *et al.* 2013) for a discussion of the selection criteria.

The difference-in-difference approach involves measuring indicators before and after an intervention for a sample of individuals, households or other entities such as villages in a target/beneficiary population or area, and also for a sample in a comparison population or area that has not been targeted by an intervention. The differences in the indicators between the pre- and post-intervention periods are compared between the two populations. If the intervention has been successful, there should be a larger difference/improvement for the target population than the comparison population (see Brooks and Fisher, 2014).

Figure 3. Selected VDCs in Rukum and Nawalparasi, with selection criteria

RUKUM DISTRICT

Shyalapakha VDC

- very high landslide vulnerability
- presence of LGCDP and LFP interventions

Nuwakot VDC

- high landslide vulnerability
- presence of LGCDP intervention only

NAWALPARASI DISTRICT

Rampur Khadauna VDC

- very high flood vulnerability
- presence of LGCDP and LFP interventions

Kolhuwa VDC

- very high flood vulnerability
- presence of LGCDP intervention only

Two levels of data were collected during the course of the TAMD feasibility study.

Track 1 data collection

Firstly, data on climate risk management (Track 1) was collected at the VDC level to assess the effectiveness of the institutional response to climate change within VDCs and the context within which the interventions were operating. To collect this data, institutional scorecards were administered by TAMD researchers to key individuals and local government officials, including VDC secretaries and/or technical officers, local development officers, and DDC planning or funding officers. Supporting evidence and narratives also played an important part, with respondents providing DDC/VDC Annual Plans, DRR Management Plans, DDC/VDC profiles, Budget Plans, and audit reports to corroborate their answers.

Track 2 data collection

Secondly, data on development performance was collected at the community and household level using a combination of methods that included local theories of change, participatory indicator development, and household surveys.

To begin, local theories of change were developed with the communities to understand how they thought resilience was being built at the local level. Based on these theories of change, local indicators were developed that could be used to assess change over time in community resilience to specific hazards. These indicators were incorporated into household surveys that were developed by the research team and adapted to the vulnerability context for Rukum and Nawalparasi.

Sampling for the household survey within the selected VDCs was done purposefully by selecting wards that were highly affected by the hazard in question (identified through district and VDC consultation). In Rukum, ward numbers 2, 4 and 7 of Nuwakot VDC and Ward numbers 3, 6 and 8 & 9 (combined) of Shyalapakha VDC were considered for sampling and conducting HH survey. In Nawalparasi during the focus groups, it was found that Rampur Khadauna VDC's Ward number 7 was the most affected, the second highest impact was in ward 1 and 2 equally, and the third most adversely impacted wards were 8 & 9 (combined). In this VDC all five wards were considered for sampling. Four wards were selected for sampling in Kolhuwa VDC, the most affected was in ward 4 and 7, followed by 6 and 9. Therefore, in each district two VDCs from which at least 3 most vulnerable wards were identified which were the target sample selection area.

The sample size required for household survey was calculated with a 95% confidence/ significance. While knowledge on variability of key variables is necessary to determine the sample size, no information on variability (mean and variance) is available. Therefore, the survey used a methodology for selecting the sample size with maximum variability taking into consideration level of precision, level of confidence and degree of variability in the attributes being measured.

The total households of the projects VDCs under this study is 5671. The computed value from an indefinite population is 360. However, the final household survey questionnaire was completed with 414 HHs in the selected VDCs of both piloted districts because some of the questionnaires may not be usable due to incompleteness etc.

The household survey collected data to reconstruct a baseline as no secondary data was available at this scale. Results were then analysed for each programme over time (i.e. results from the reconstructed baseline compared to the present day). In a further step of analysis, a difference in difference analysis was done to see if those VDCs with the LFP as well as the LGCDP had seen further increases in resilience.

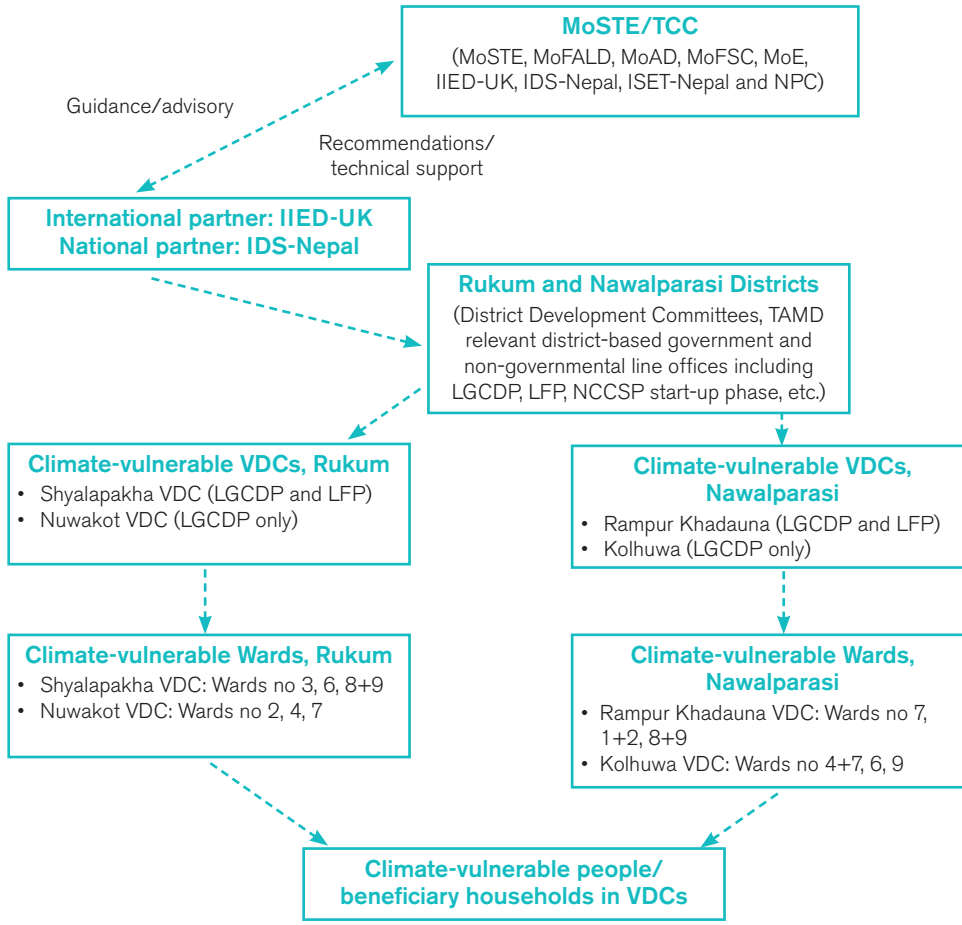
The team then considered the results in the context of existing climate data to understand them over time in the context of the climate challenge. This was done using the information to construct a qualitative narrative that might contribute to explaining changes over time rather than through statistical analysis (see Brooks and Fisher 2014 for discussion of this method).

1.6 Stakeholder engagement

The TAMD feasibility study was supported by the active engagement of staholders at a variety of levels. At the central level, MoSTE chaired the TAMD Coordination Committee, whose key members comprise: MoFALD; Ministry of Agricultural Development (MoAD); MoFSC; Ministry of Education (MoE); NPC, ISET-Nepal, IIED and IDS-Nepal. Representatives of these ministries and stakeholder organisations participated in formal and informal meetings and regularly interacted with the TAMD study team to provide advice and guidance.

At the local level, the TAMD study team carried out the fieldwork in both of the project's pilot districts – Nawalparasi and Rukum. These activities helped collect relevant data and information at district, VDC, community, and household levels. Figure 4 shows the stakeholders involved at various scales during the feasibility study.

Figure 4. Stakeholder map for the TAMD feasibility study in Nepal



1.7 Indicator development

The TAMD study team developed Track 1 and Track 2 indicators based on background work and consultations with stakeholders at different levels within each of the selected districts.

The team developed indicators in two main areas: institutional indicators (Track 1) and resilience indicators (Track 2).

Track 1 indicators: institutional CRM

The VDC is the most decentralised layer of government in Nepal, where local development interventions are planned, budgeted, coordinated and implemented. It is the logical entry point for assessing climate risk management using the TAMD methodology, since decisions taken at the VDC level will have a direct impact on the climate-vulnerable poor.

The study used institutional scorecards to measure CRM capability within the district development committees and the VDCs. The categorical/qualitative indicators related to CRM are a useful tool to assess and match DDC and VDC ability and stages of performance in responding to climate change through local development planning. Although these indicators aim to track changes in CRM performance over time, the team used them in the feasibility study to establish a baseline.

The aim was to produce a list of relevant institutional CRM indicators to capture how local institutions are better integrating CRM decision making into development planning in Nepal. The scorecards (see Annex 1) on these Track 1 indicators were also discussed and tested at DDC and VDC level. Some of the TAMD areas were too complex and far removed from the current VDC situation – for example, they may have been dealing with too much climatic uncertainty. In such cases, the team incorporated indicators on business-as-usual functioning, learning and flexibility as precursors to dealing with uncertainty before introducing specific CRM indicators. Developing indicators at this level will provide some tools for the government to track progress and identify DDCs and VDCs in need of further support.

Each CRM indicator is comprised of a scorecard containing three questions for DDCs and two questions for VDCs, the answers to which are scored at incremental ranges between 0 and 100%. On a sliding scale, 0% equals no performance, 1–25% is low, 26–50% moderate, 51–75% satisfactory and 76–100% high performance. The results of this can be found in Chapter 4.

The study also sought to combine the scorecards with the standards set out in MoFALD's Minimum Conditions and Performance Measurement (MCPM) system. It is proposed that the next phase of the TAMD project in Nepal will consider incorporating a small subset

of Track 1 indicators into the MCPM system or the LGCDP-II's Environmentally Friendly Local Governance Framework (EFLG).

Figure 5. Track 1 indicators at VDC/DDC level

1. Climate change mainstreaming/integration into VDC/DDC planning
2. Institutional coordination
3. Budgeting and finance
4. Institutional knowledge or capacity (VDC/district staff and *ilaka* representatives)[1]
5. Use of climate information
6. Participation
7. Awareness among stakeholders from district councils, ward citizen forums (WCFs), FUGs and other civil society groups
8. Learning and flexibility
9. Business-as-usual functions

Track 2 indicators: resilience

The aim of the study is to gather empirical evidence on changes in resilience at the community level indicators, which can be aggregated to inform national priorities and indicators. We hope that some of these bottom-up indicators will provide support for nationally aggregated data points, such as the PPCR indicators to be tracked by MoSTE. We also hope to use this bottom-up process to identify already tracked national indicators that can be proxies for local resilience.

Track 2 indicators were partly derived through detailed review of expert literature on mountain livelihoods. The team also used community-level participatory techniques to develop a set of location- and hazard-specific contextual indicators. Focus group members discussed the community's perception of vulnerability, which was consequently incorporated into Track 2 indicator development. For example, communities in Rukum district identified ox ownership as an indicator, because households with an ox could choose when to plant, and were therefore able to respond quicker to slow onset changes such as rainfall variability; households who had to hire an ox could be less responsive to changing conditions. Similarly, in Nawalparasi district, which has better access to road networks and market centres than Rukum, owning or having access to agricultural operation machines – such as a power tiller, tractor, water lifting pump or threshing machine – could help people enhance their adaptive capacity in times of changing climatic conditions.

1 *Ilakas* are an administrative division in Nepal, made up of four or five VDCs. There are 927 *ilakas* in Nepal.

Figure 6 shows the indicators that were developed to assess changes in resilience and wellbeing over time.

Figure 6. Track 2 indicators: Rukum and Nawalparasi

1.	House type
2.	Food self-sufficiency from own production
3.	Annual household income
4.	Number of sources of income
5.	Livelihood diversification
6.	Livestock holdings
7.	Exposure to local hazards over the last five years
8.	Benefit from seasonal migration income or remittances
9.	Majority of agricultural land on steep slopes **OR** majority of agricultural land on flood-safe plains, affected flood plains or river and stream banks
10.	Majority of houses located on steep slopes **OR** majority of houses located on flood-safe plains, affected flood plains or river and stream banks
11.	Reliance on cash crops, seasonal and off-seasonal vegetables and/or fruits
12.	Knowledge of climate change and risks
13.	Has experienced changes in agricultural productivity over the last five years
14.	Exposed to socio-economic shock in the last five years
15.	Ownership of an ox or male buffalo (Rukum)
16.	Ownership of or access to agricultural operation machines (Nawalparasi)

1.8 Challenges and lessons

During the course of the TAMD feasibility study, the research team experienced a number of constraints that hindered the collection of grassroots data. These included difficulties in accessing villages, geographically scattered settlements and poor monitoring mechanisms. They also faced difficulties in obtaining data sets for the selected interventions and accessing government database systems. For example, although reports were available that covered baselines and targets achieved for interventions at the national or programmatic level, there was no corresponding data available at the VDC/DDC level. This made it difficult to establish relevancy and reliability through such data and information extracted from reports at ground level. There was also a lack of robust and up-to-date spatial and temporal data from concerned government line ministries and departments.

Following consultations during the study period in Nepal, the team drew two important lessons which could be useful in further developing and applying TAMD in Nepal and elsewhere:

- In order to make the scorecards relevant to the context of Nepal where local governance is still relatively weak, the study team incorporated learning and flexibility indicators as precursors to dealing with uncertainty before introducing specific CRM indicators. This would allow researchers to measure local adaptation and the willingness to address climate risk in the future.
- In Nepal, different geographical and ecological zones are characterised by particular climate vulnerabilities. The feasibility study only covers two of Nepal's 75 districts – which faced vulnerabilities relating to flooding and landslides. The study team and stakeholders believe that another key climate vulnerability – glacial lake outburst floods – should be considered for further study in Nepal's high mountain districts, as this could strengthen the evidence base for TAMD by covering wider ecological zones and climate vulnerability prevailing in Nepal.

2

Addressing the challenges of adaptation M&E

Climate change adaptation poses challenges of unprecedented scale and scope, which cut across normal programming sectors, levels of intervention, and timeframes (Bours *et al.* 2013). The fact that adaptation interventions are conducted across sectors, scales, and long timeframes means that evaluating adaptation is an equally challenging process.

TAMD Working Paper No. 1 (Brooks et al. 2011) identifies four common challenges in conducting M&E of adaptation, which need to be understood and incorporated into evaluation frameworks in order to ensure that evaluations of adaptation are robust. These four challenges are:

- the long timescales associated with climate change and adaptation
- attributing outcomes of adaptation to specific actions, interventions or policies
- shifting baseline conditions of climate change over time, which can make it difficult to interpret adaptation results
- contextualisation of adaptation outcomes within the wider socio-economic and political processes that may impact adaptation interventions and thereby alter the results.

It is vital these challenges are understood and incorporated into evaluation frameworks to ensure these are robust. In this chapter, we outline each of these challenges in greater detail, and explain how the TAMD initiative addressed them within the Nepalese context.

2.1 Long timescales

The first core challenge is the long timescales associated with climate change and adaptation. Measuring the success of adaptation is difficult because the pathway to resilience may take many years before an individual, household, community, business, etc. can be considered resilient. This is particularly true of adaptation initiatives intended to address longer-term changes in climate that will take years or decades to unfold. The long timescales required to measure resilience are complicated by the shorter timescales imposed by the cyclical nature of project and programmatic funding (usually 1 – 5 years). These initiatives – whether funded through the national planning process or by external donors – often require measurable results over short timescales that do not complement the incremental nature of building adaptation in the longer term.

In Nepal, the application of TAMD has been retrospective, looking back at results over a five-year period. This has been done primarily using shorter-term, asset-based resilience indicators that assess the inherent capacity of households to respond to any shocks and stresses. Although it was not within the scope of this feasibility study to undertake further work on long timescales, the next steps would be to link these resilience indicators with outcome indicators related to the hazard in question – for example, loss and damage from landslide or floods – and/or to statistically link the resilience indicators with broader wellbeing indicators. The government could then track these wellbeing indicators in areas that face that particular hazard where they have been empirically proven.

2.2 Attribution

The second challenge in monitoring and evaluating adaptation is the issue of attribution. Adaptation policies, programmes and projects do not occur in a vacuum, but within a broader context of socio-economic, political and environmental change that can influence development and adaptation outcomes. As such, it can be difficult to attribute the impacts and outcomes of a given adaptation intervention. This is an important challenge for evaluations, because policymakers need a strong understanding of attribution to judge the effectiveness of their intervention and to learn lessons on how to improve interventions in the future.

The TAMD feasibility study in Nepal has sought to address issues of contribution to resilience rather than direct attribution. This recognises the very complex nature of any changes in resilience at the community level and also the many different projects and underlying factors that support any changes over time.

First, the team used local theories of change to explore the mechanisms by which an intervention might lead to changes in resilience and the community understanding of the contribution of the intervention. By comparing each intervention's theory of change with local understandings, the team was able to gain a better idea of whether or not the intervention's actions supported a community's resilience to a particular hazard (in this case, landslides and flooding).

Contribution was also addressed in the research design. Within each district, two VDCs were matched for development parameters, socio-economic status and the hazards they faced. Although this was only a rough matching process, including contextual indicators in the household survey allowed for a more in-depth analysis of similarities and differences between the matched communities.

Changes in resilience were compared both over time using a reconstructed baseline, and then between the VDCs that had the LFP compared to those without (just the LGCDP) using a difference-in-difference analysis. Using this analysis of with and without a specific intervention allowed the team to estimate which changes could and could not be attributed to an intervention. However, this is a very complex environment, and even with the matching it is difficult to make any assertions on the contribution of any given intervention to broader community resilience.

2.3 Shifting baselines and contextualisation

Adaptation interventions will take place within a shifting climatic and environmental context that will expose vulnerable communities to greater climate-related hazards and risks. This poses a challenge for evaluation, as it has the potential to act as a confounding factor in the assessment of development and adaptation interventions. For instance, an adaptation intervention aiming to improve the productivity of smallholder farmers (thereby improving their asset base and contributing to resilience) may yield no overall increases in crop yields, which would appear to show that adaptation efforts are not succeeding. However, if the project was implemented during a period that coincided with an increase in intensity of droughts, then the fact that productivity has not declined would actually indicate success in building resilient food systems. This example shows that if the adaptation intervention is not contextualised within changes in baseline environmental conditions and events, M&E assessments could misinterpret the effectiveness of these interventions. Shifting baselines therefore need to be incorporated into evaluations, both in the design of forward-looking evaluative tools and the retrospective analysis of data from specific interventions.

As highlighted above, researchers in Nepal faced challenges in accessing community and district-level data sets during the TAMD feasibility study. This made it difficult to establish initial baselines from which to evaluate progress in building resilience, as well as to establish a baseline climate context backed with meterological data, from which the team could measure changes over time. To address these data gaps, the study team reconstructed a baseline from primary sources using household surveys, key informant surveys and community recall techniques. The team also used data from the nearest meteorological station to interpret the results for resilience indicators and wellbeing to provide an explanatory narrative for any changes over time.

This approach is the resource-light approach suggested in Brooks and Fisher (2014) to provide potential explanations for changes in resilience and wellbeing. In this approach, quantitative climate data provides contextual information that helps us explain whether adaptation has taken place, even where the relationships between climate indices and wellbeing indicators are not analysed quantitatively. Alternatively, stakeholder perceptions of changes in climate hazards can also be used (and were in this case collected through KIS and focus groups) and of how these changes are related to changes in wellbeing indicators.

3 Addressing the potential to scale-up TAMD

3.1 Sustainability

An increasing number of climate change programmes – such as the Pilot Programme on Climate Resilience, Hariyo Ban (a forestry project) and the National Climate Change Support Programme – are joining ongoing development interventions in Nepal. At the same time, a significant amount of global funds/climate finance is entering the country, accompanied by an increase in the share of total government budget allocated to climate change budgets compared to previous years. In the fiscal year 2013/2014, on average 36.39 per cent of the budget allocated to 11 ministries was dedicated to climate change (MoF 2013).

The M&E of climate change adaptation is a new challenge and the government, with support from programmes such as the PPCR, is trying a range of approaches to adaptation and to monitoring and evaluating adaptation (Fisher et al. 2013). Nepal needs to be able to track progress against overall national objectives and ensure development is kept on track despite the stresses of climate change.

MoSTE's Climate Change Management Division is currently authorised to coordinate climate change issues and mandated for overseeing the integration of climate change mainstreaming into national and local development plans and programmes. Adaptation projects funded by development partners tend to have their own baselines and M&E and reporting frameworks, including development partners' global indicators. However they

also generally report through national-level forms and processes to monitor ongoing progress for the government. Reporting between ministries however and co-ordination or sharing of this information is often more challenging.

In this context, both the national government and its development partners are greatly interested in tracking adaptation to climate change and measuring development, so they can evaluate the effectiveness of interventions in Nepal. The TAMD initiative seeks to support this process. It became clear from the pilot work in Nepal and wider consultation during this process that TAMD should not remain an international research project; the useful elements of this work need to be absorbed into national systems as appropriate.

In Nepal, the institutional mechanisms to address climate change issues are already in place, but they need to be better utilised to establish an enabling environment for adaptation M&E. While most of the climate change-related activities are concentrated at local government level, it is not clear how much budget is allocated to this level. Meeting the needs of those who are most vulnerable to climate change will require a strong local delivery mechanism – for example through MoFALD – as well as more comprehensive monitoring of ongoing activities and their outcomes.

3.2 Replicability

Although the current feasibility study covers limited geographical and ecological zones (two out of 75 ecologically diverse districts), it will add value if it is expanded in different zones, as this would provide further support for an evidence base for the framework.

To internalise TAMD into national systems, there must be strong and effective institutional consultation, capacity building and follow-up. Consultations on indicators and further exploration of potential areas for institutional linkages and capacity building are both crucial if government systems are to adopt and apply TAMD – for example, it would be necessary to explore the potential ways to link MoFALD's work with MoSTE's high-level tracking and the NPC's M&E division.

The following activities have potential to further develop the framework in Nepal:

- Conduct current work in a mountain community to cover expanded geographical and ecological zones and address the climatic risks of the high mountains and glacial lakes outburst floods to further support the evidence base. Potential to reconsider sub-sector drought in other districts as well.
- Follow up on the original fieldwork where we have established a baseline, possibly including another intervention (such as the Multi-Stakeholder Forestry Project) that has just started and additional results from the LGCDP-II's Environmentally Friendly Local Governance framework.

3.3 Acceptability among stakeholders

The Government commissioned the TCC, under the leadership of MoSTE, to provide direction in developing a contextual framework for Nepal. With advice and guidance from the TCC, the study team is contextualising different tools, assessing various indicators and M&E frameworks and testing them at local levels in selected districts and villages to establish linkages between the set of selected interventions and identify changes in vulnerability or resilience at the appropriate scale.

Further work needs to increase stakeholders' engagement, particularly focusing on using the TAMD framework to establish a link between MoFALD reporting at DDC level (through DDC profiles, NCCSP, LAPA and LGCDP-II indicators) and higher-level MoSTE indicators developed by PPCR, and the mechanisms to track them. The team will engage with other projects at national level to build consensus among core constituents on M&E for national adaptation initiatives.

3.4 Efficiency

The anticipated focus of the TAMD framework is to establish a link between MoFALD reporting at DDC level and higher-level MoSTE indicators developed by PPCR; and there needs to be a coordinated effort among all actors and stakeholders to track these. It is also anticipated that the results and data from this process would improve governance and ultimately save money. Such an approach has already proven to be cost effective in the cost and values analysis of TAMD in Kenya and Cambodia, once avoided losses are taken into account (Barratt 2014; 2015).

4

Results from the TAMD feasibility study

This chapter provides a brief overview of the empirical findings and results of the feasibility test. As outlined in Chapter 1, the Nepal study, carried out in two districts, used a quasi-experimental design, and matched VDCs and communities to compare changes over time with and without a specific intervention.

4.1 Matching VDCs

Figure 7. Rukum and Nawalparasi fact files

RUKUM DISTRICT

Mid-Western Development Region

Terrain: hilly

Altitude: 754–6,000 metres above sea level

Temperature: 0.4–34.4°C

Annual rainfall: 1,600–2,290mm

NAPA vulnerability ranking: moderate

Number of VDCs: 43

Selected VDCs: Nuwakot, Shyalapakha

Total households: 2,219

Sampled households: 198

NAWALPARASI DISTRICT

Western Development Region

Terrain: marshy grassland, savannah, forest

Total area: 201,616 hectares

Highest altitude: 1,965 metres above sea level

Climate: warm subtropical

Temperature: 5–44°C

Number of VDCs: 73

Selected VDCs: Kolhuwa, Rampur Khadauna

Total households: 2,653

Sampled households: 216

The purpose of matching was to ensure that selected VDCs within each district were similar and therefore in some way comparable. The VDCs were matched for socioeconomic status, climate vulnerability and demographic data. All VDCs had:

- agriculture as the largest primary occupation and principal source of income
- a majority of households owning cultivatable land
- high female illiteracy levels; less high among men
- similar levels of access to drinking water and health services.

The tables below show how the VDCs have been matched for access to key services and also any key differences between the VDCs that need to be taken account of in the analysis.

Table 1. Summary of how VDCs were matched, Rukum district

Indicator	Nuwakot VDC		Shylapakha VDC (LFP)	
Access to health service	82.8% (improved access in 5 year period). Average of 82 mins to access health post		96% have access Average of 131 mins to access health post	
Access to government offices	Average of 210 mins to get access Improved access in 5 year period		Average of 239 mins to get access	
Access to communications services	Average of 19 mins to get access		Average of 64 mins to get access Access improved	
Access to market	Average of 91 mins to get access		Average of 129 mins to get access	
All-weather road	Average distance to highway 12.8km.		Average distance to highway 8km.	
Ethnic profile	Bramin/Chhetri	43.4%	Bramin/Chhetri	59.6%
	Adibasi/ Janajati	21.2%	Adibasi/ Janajati	25.3%
	Dalit	35.4%	Dalit	15.2%
Vulnerability to landslides (% experiencing loss of eqch type in last 5 years)	Land	87.9%	Land	44.4%
	Crops	47.5%	Crops	23.3%
	House & Animal Shed	27.3%	House & Animal Shed	8.1%
	Animal	7.1%	Animal	1%
Population owning irrigated land	100%		87.3%	

Source: HH survey data

Table 2. Summary of how VDCs were matched, Nawalparasi district

Indicator	Kolhuwa	Rampar Khadauna (LFP)
Access to health service	Average of 33 mins to get access	Average of 38 mins to get access
Access to government offices	Average of 32 mins to get access	Average of 78 mins to get access
Access to communications services	Average of 2 mins to get access	Average of 12 mins to get access
Access to market	Average of 40 mins to get access	Average of 58 mins to get access
Population who are wage labourers (%)	4.1%	28.6%
Population owning irrigated land (%)	44	83.7
Access to all-weather road	Average distance to the highway 9.6km	Average distance to the highway 16km
Ethnic profile	Bramin/Chhetri 12.7% Adibasi/ Janajati 87.3% Dalit 0	Bramin/Chhetri 12.3% Adibasi/ Janajati 33.3% Dalit 39.5% Religious minority 11.4%
% population experiencing loss from floods	Land 9.6% Crops 64% House & Animal Shed 14.9% Animal 0.9%	Land 1% Crops 0 House & Animal Shed 0 Animal 0

Source: HH survey data

The comparison table for Nawalparasi shows that households in Rampar Khaduana did not experience significant losses from floods in the past five years , however both VDCs were subject to changing precipitation patterns affecting agricultural production.

4.2 Track 1 results: institutional scorecard

The team used scorecards to measure institutional CRM capacity in DDCs and VDCs in nine key areas:

- mainstreaming or integrating climate change into planning
- institutional coordination
- budgeting and finance
- institutional knowledge and capacity (among district and VDC staff and *ilaka* representatives)
- use of climate information
- participation
- awareness among stakeholders (district council, representatives of WCFs, FUGs and other civil society groups)
- learning and flexibility
- business-as-usual functions: functioning of local systems.

Although these indicators aim to track changes in CRM performance over time, in the feasibility study the team used the scorecards to establish a baseline. We adapted the institutional indicators to fit the Nepalese context, based on the TAMD indicators.

The figures below illustrate that each of the DDCs exhibit strengths and weaknesses against different indicators. There are some clear similarities between both DDCs – for example, in institutional coordination – but also some considerable differences – for example, Nawalparasi scored highly on participation of poor and marginalised groups in DDC planning processes around climate change measures, while Rukum scored very poorly.

Figure 8. Measuring CRM within Rukum DDC

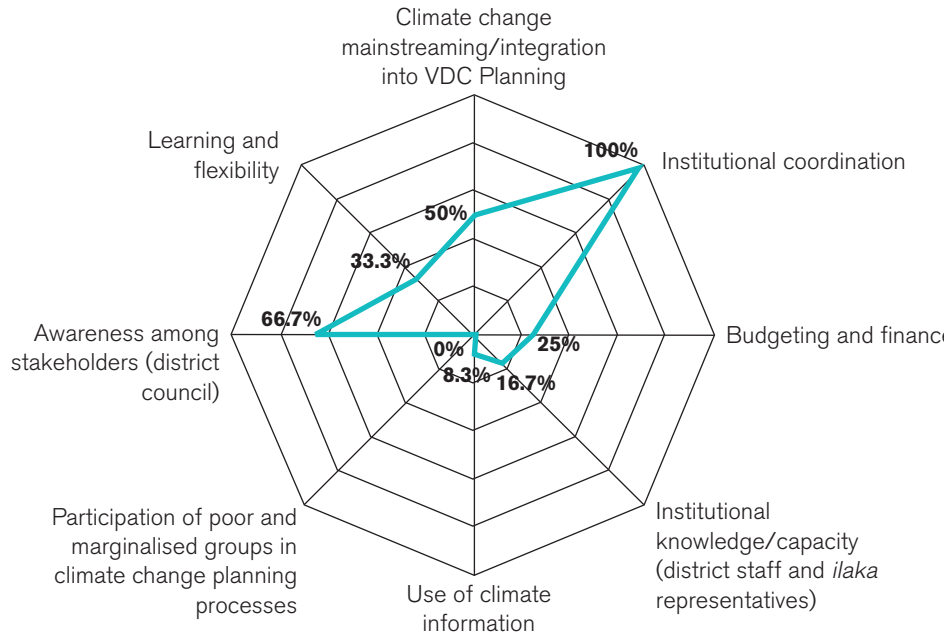
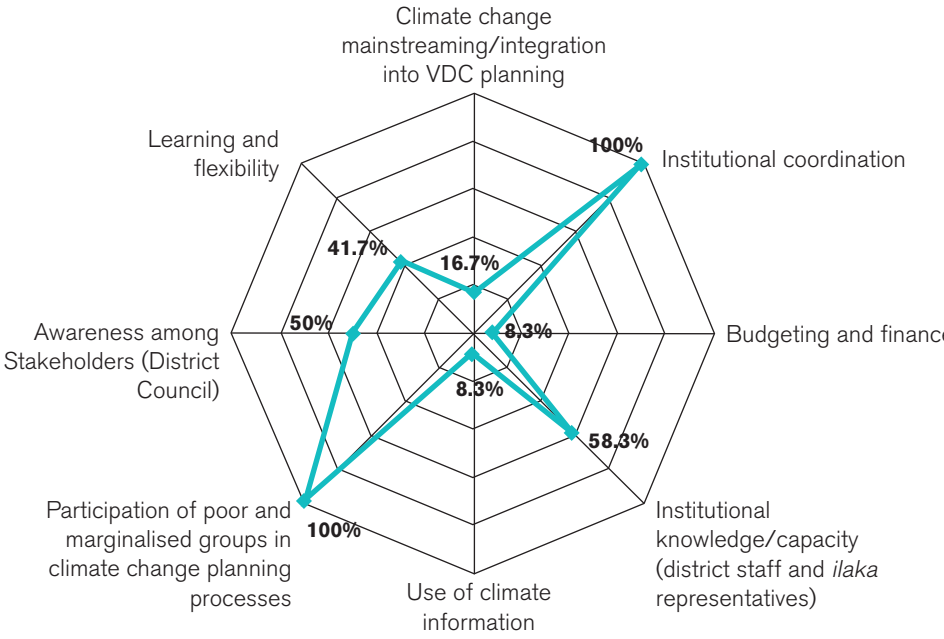
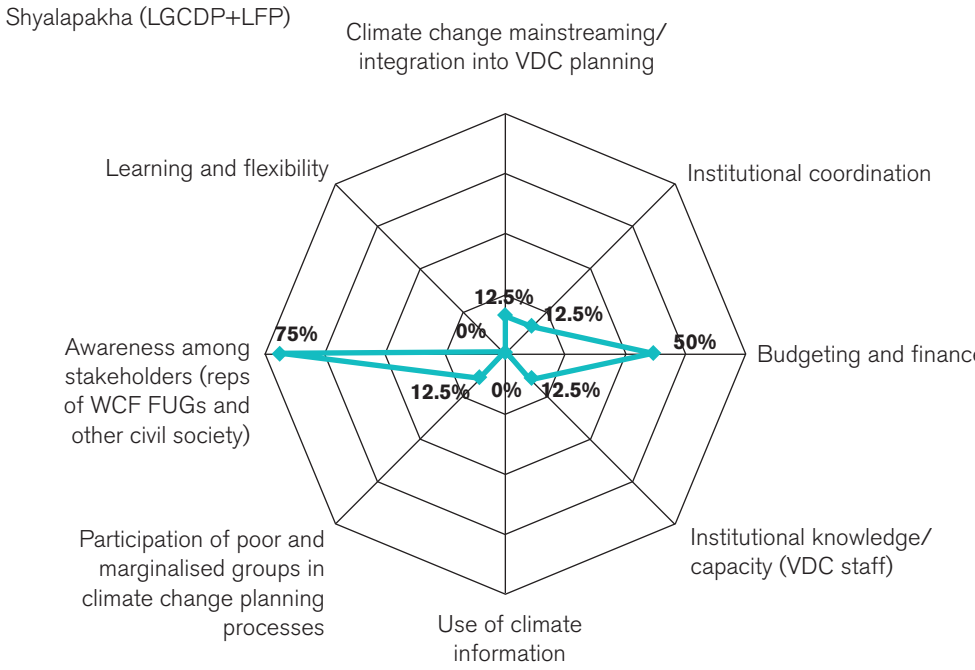


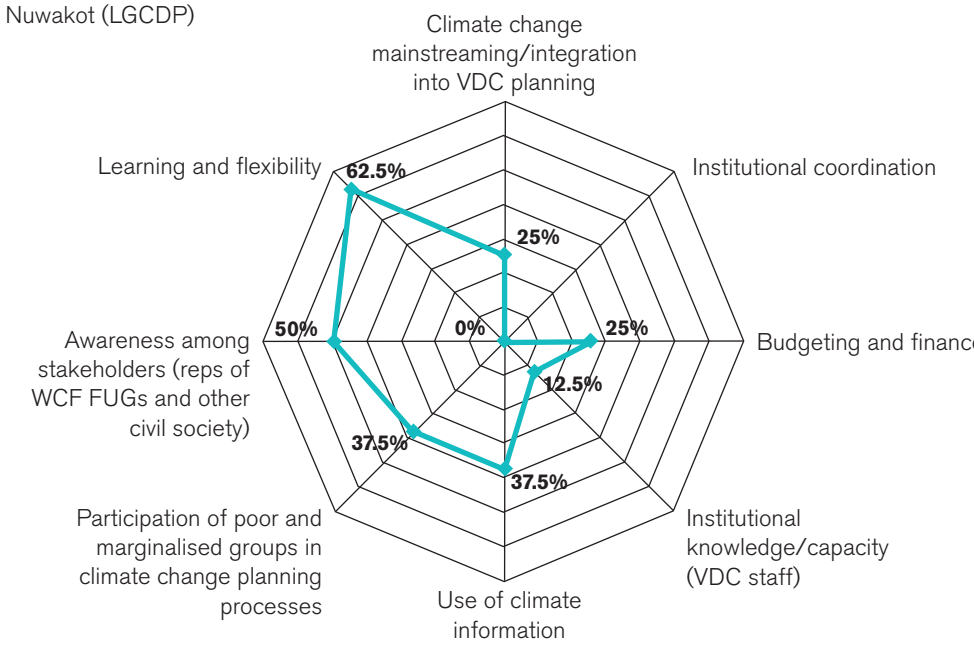
Figure 9. Measuring CRM within Nawalparasi DDC



A similar picture is shown at VDC level – for example, learning and flexibility is high in three of the VDCs, but there are significant difference across the other indicators.

Figure 10. Measuring CRM at VDC level, Rukum district



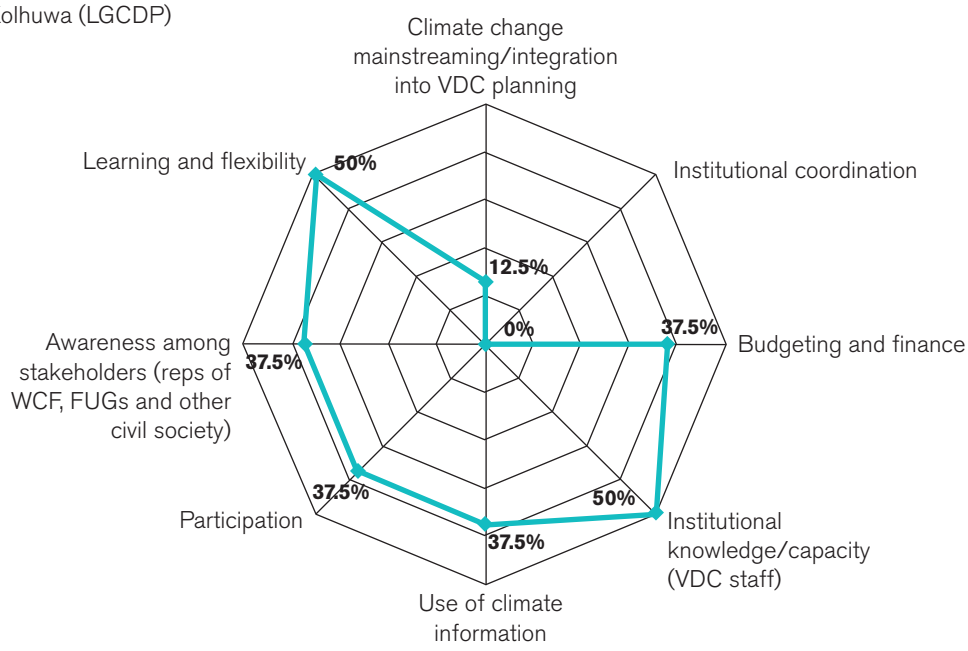


The main observations we draw from Figure 10 are:

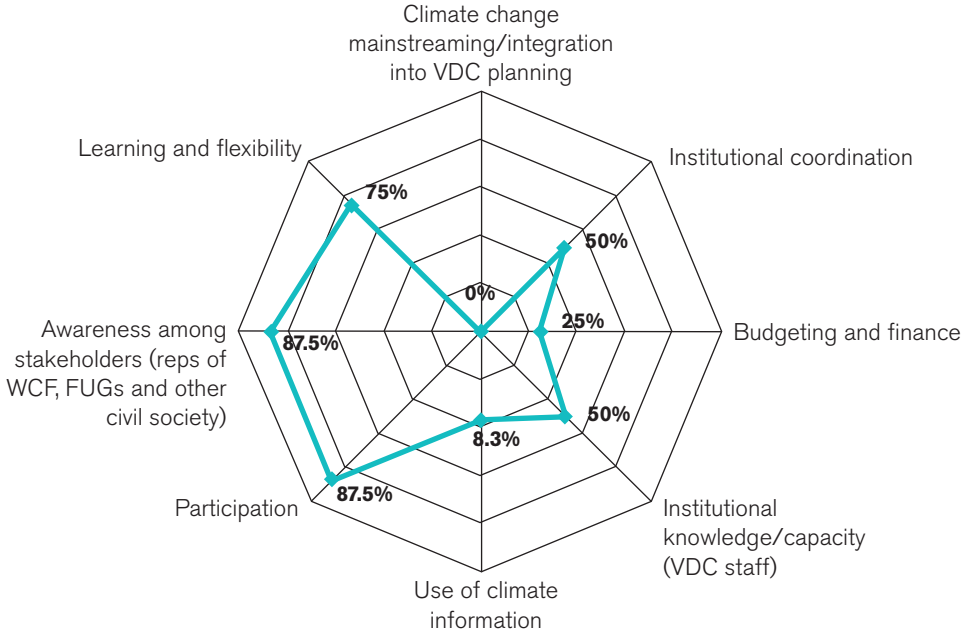
- The indicator on climate change mainstreaming or integration into VDC planning is twice as high in Nuwakot than in Shyalapakha, where only a few measures have been identified and funded to address climate change.
- Institutional coordination scored very low in both VDCs.
- Budget and financial allocation for addressing climate change issues is twice as high in Shyalapakha than in Nuwakot.
- Although trained staff are rarely involved in VDC planning processes, a small number of officials with some level of climate change awareness are involved in both VDCs.
- In Shyalapakha, they do not currently use information on historical or current climate variability trends – from informal observation and experiences, the Department of Hydrology and Meteorology (DHM) or other reliable sources – in VDC planning. There is, however, limited evidence of its use in Nuwakot. A similar situation is seen with regards to participation.
- Nuwakot scored significantly higher than Shyalapakha for stakeholder involvement in planning processes around climate change measures. There are high levels of awareness among village-level stakeholders – WCF, FUG and other civil society group representatives – about potential or available information and responses to village climate change issues in both VDCs.
- Learning and flexibility to incorporate information on past disasters and slow changes to climate into future planning is higher in Nuwakot than in Shyalapakha.

Figure 11. Measuring CRM at VDC level, Nawalparasi district

Kolhuwa (LGCDP)



Rampur Khadauna (LGCDP + LFP)



The main observations we draw from Figure 11 are:

- Integration or mainstreaming of climate change into VDC planning is low in both Nawalparasi VDCs. It is non-existent in Kolhuwa, which scored 0, while Rampur Khadauna scored only 12.5 per cent. This shows that very few measures have been identified and funded to address climate change at the VDC level.
- Institutional coordination is high in Kolhuwa, but there is no coordinating body in Rampur Khadauna.
- Budget and financial allocation for addressing climate change issues is marginally higher in Rampur Khadauna than in Kolhuwa, but both VDCs scored relatively low on this indicator.
- Almost half of the people or staff involved in VDC planning processes are well aware of climate change issues and some have received training in both the VDCs.
- Both VDCs scored the same on use of climate information in VDC planning: the use of historical climate variability trends from informal observations and experiences as well as relevant climate information from the DHM and other reliable sources is increasing in both control and treatment VDCs.

Different interventions adopt different approaches to institutional risk management in Nepal – for example, some do not target local institutions at all, while others work entirely through them. Tracking levels of institutionalisation across the country will help target future interventions and monitor the effectiveness of interventions that seek to build institutional capacity. Keeping a record of DDC and VDC scorecards and asking project interventions to collect and update this data would be a useful contribution towards a national tracking system.

Overall, the Track 1 indicators have revealed that, while the selected DDCs exhibit certain similarities – such as very high institutional coordination – they have different competencies and limits across the other Track 1 indicators. This situation is mirrored at the VDC level.

4.3 Track 2 results: changes in household resilience

Resilience indicators were collected at household level and then compared firstly over a five year period to understand changes in resilience in a particular VDC and potential contributory factors. These changes over time could be due to the improved access and involvement in public services through the work of the LGCDP. This analysis was then taken further with a comparison between matched VDCs that had received an extra intervention on forestry (the LFP), to carry out a with-and-without analysis using difference-in-difference.

The indicators analysed in this section are those associated with household assets. Both interventions seek to improve resilience through increasing assets – either by improving access to public services that will support households to increase their personal assets, or by improving forest management, leading to increased assets from forestry and in general.

The control VDCs – Nuwakot and Kolhuwa – were those where the LGCDP was running while the treatment VDCs – Shyalapakha and Rampur Khadauna – were those with both interventions, LGCDP and LFP. The team analysed the indicators using difference-in-difference, a statistical technique which calculates the *effect* of a treatment – an explanatory or independent variable (in this case the LFP intervention) – on an *outcome* – a response or dependent variable (in this case the household assets). It does this by comparing the average change over time in the outcome variable for the treatment group to the average change over time for the control group.

Results from Rukum district

The results from Rukum show that both VDCs showed improvement over time in all assets apart from food self sufficiency. This suggests that the LGCDP and improved access to public services may have been having some impacts on more general community resilience.

Shyalapakha, the treatment VDC, experienced negative or similar levels of change over the five year period compared to Nuwakot, the control VDC. The exception is in two indicators: income diversification and food self sufficiency. The difference-in-difference comparison shows an increase in the average number of sources of income in Shyalapakha compared to Nuwakot. Both VDCs experienced a decrease in average months of food self sufficiency from own production – but this decrease was less in Shylapakha than in Nuwakot.

Improvements in housing assets here means those houses that have moved from thatched housing to stonewall/corrugated iron roofs, as this is the level most households were at in terms of housing assets. This suggests that the LFP programme in this VDC has not played a significant role in increasing some household assets to build resilience, such as housing, income and livestock holdings. However, two key indicators of resilience (income diversification and food self sufficiency) do show improvement or less significant decreases.

It may be that the focus on forestry assets has enabled households in Shyalapakha to increase their sources of income and food sufficiency but this change has not yet led to an increase in other assets. The LGCDP may have led to improvements in both VDCs over time, it is only in the difference-in-difference that we can assess the additional impact of the LFP.

Table 3. Changes in assets in Rukum district, with difference-in-difference comparison

Indicators (% of households)	Rukum district						
	Nuwakot (control)			Shyalapakha (treatment)			Comparison
	2008/ 09	2013/ 14	Difference	2008/ 09	2013/ 14	Difference	Difference-in-difference
House with stone walls and corrugated iron or stone roof	19.2	53.5	34.3	16.2	46.5	30.3	**–4.3**
Livestock holdings	97	99	2	94.9	94.9	0	**–2**
Average number of sources of income	1.738	1.78	0.042	2.163	2.462	0.299	**0.257**
Average months of food self sufficiency from own production	4.2405	3.045	–1.1955	4.0845	3.564	–0.5205	**0.675**
Rely on cash and off-seasonal vegetables	6	6	0	30	25	–5	**–5**
Own an ox or male buffalo	82	91	11	55	58	3	**–8**
Annual household income (NRs)	34,688.9	48,034	13,345.1	37,962.5	50,933	12,970.5	**–374.6**

Results from Nawalparasi district

The results from Nawalparasi district show improvements in all assets over time, again suggesting that the LGCDP and access to public services may be having an impact on household assets.

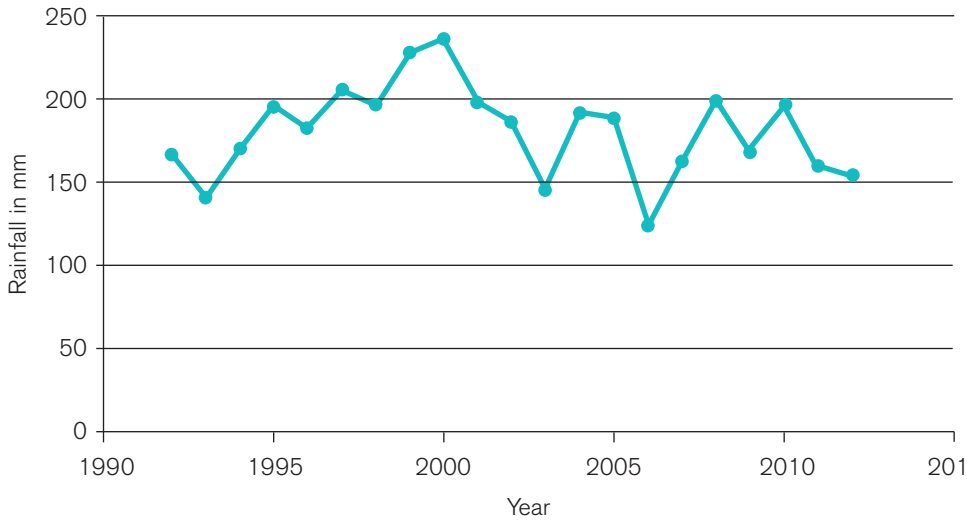
Rampur Khadauna, the treatment VDC, experienced increases in many assets when compared to Kolhuwa. The improvement in housing here is shown in a move to cement buildings, rather than from thatched to stonewall as in Rukum. It is likely that the decrease

in houses with corrugated iron roofs is due to the movement to an improved roofing material – in this case reinforced concrete. In Rampur Khadauna, people have also seen an increase in number of sources of income, availability of cash and seasonal vegetables, although absolute levels of cash crops are higher in the control VDC, Kolhuwa. Food self-sufficiency has also seen a positive increase in Rampur Khadauna when compared to changes in Kolhuwa (difference-in-difference of 0.3975 months). Household incomes in Kolhuwa almost doubled, suggesting that in this VDC there was some other factor that could have led to this change – household survey data on sources of income shows that Kolhuwa had significant income from remittances, wage labouring and services and a much smaller percentage of overall income came from the main food crops. Rampar Khadauna on the other hand relies on the main food crops for about 50% of total income, with other sources playing a smaller role.

Table 4. Changes in assets Nawalparasi district, with difference-in-difference comparison

Indicators (% of households)	Nawalparasi						
	Kolhuwa (control)			Rampur Khadauna (treatment)			Com-parison
	2008/09	2013/14	Difference	2008/09	2013/14	Difference	Difference-in-difference
House with stone walls and corrugated iron or stone roofed	12.7	36.3	23.6	42.1	32.5	–9.6	**–33.2**
Cement building, reinforced concrete roof	2	3.9	1.9	17.5	36.9	19.4	**17.5**
Livestock holdings	63.7	74.5	10.8	54.4.	74.6	20.2	**9.4**
Average number of sources of income	2.745	3.004	0.259	1.341	1.686	0.345	**0.086**
Average months of food self sufficiency from own production	2.871	3.285	0.414	4.3575	5.169	0.8115	**0.3975**
Reliance on cash and off seasonal vegetables	77.5	79.4	1.9	4.4	13.2	8.8	**6.9**
Ownership of agricultural operating machine	22	22	0	18	18	0	**0**
Annual income per household (NRs)	33,048.5	65,368	32,319.5	43,262.3	56,267	13,004.7	**–19,314.8**

Figure 12. Annual rainfall in Rukum district



4.4 Contextualising the results with data on external shocks

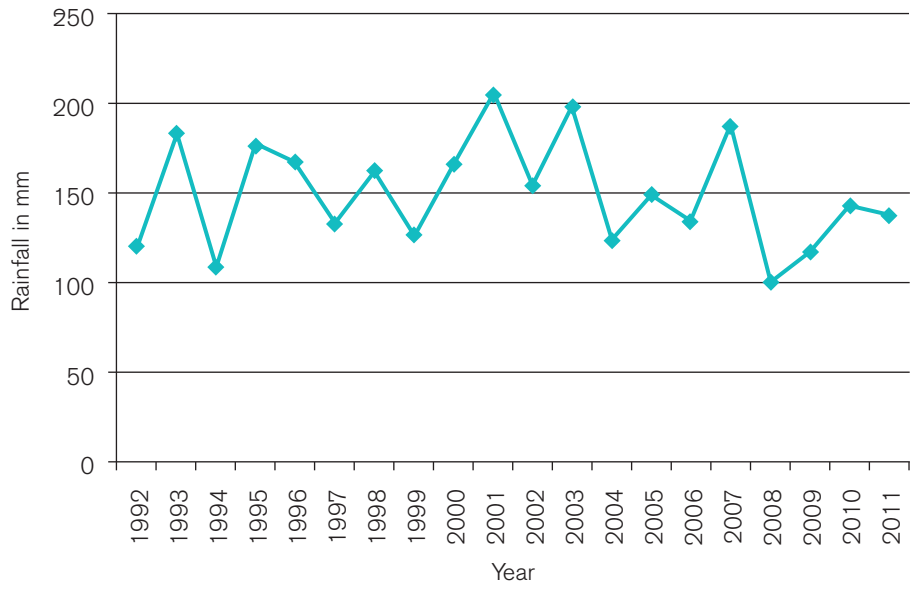
Nepal's climate is complex and varied, driven by contrasting terrain and regional weather systems. To look at climate change trends and impacts in the district context, the study team collected available climatic data – particularly relating to rainfall and temperature – for each selected district from the DHM.

Rainfall

Analysing the past 20 years of rainfall and temperature data, the study found high variability of rainfall in Rukum. The minimum rainfall recorded in the monsoon season was 0mm in August 2003, followed by 77.1mm in June 2006; the maximum recorded in any one month was 819.1mm in August 1995. The minimum annual average rainfall was 124.54mm in 2006; the maximum was 236.94mm in 2000.

Nawalparasi's 20-year average annual rainfall trend is a downward one, with a decreasing trend of 0.802 mm annually. During the monsoon season, the rainfall is not distributed evenly – instead, it is concentrated in the early months. The minimum rainfall recorded in the monsoon season was 0mm in September 2010, followed by 94.3mm in September 1999; the maximum recorded in any month was 917.8mm in June 2000. The minimum annual average rainfall was 100.38mm in 2008; the maximum was 205.25mm in 2001.

Figure 13. Average annual rainfall in Nawalparasi district



(Source: Parasi Station, DHM 2014)

Temperature

The highest average annual maximum temperature in Rukum was 27.425˚C in 2009; the lowest average minimum temperature was 10.57˚C in 2012. The lowest temperature recorded in Rukum was 3.1˚C in January 1997; the highest was 31.9˚C, in June 2010. The average maximum temperatures have been largely constant although in 2009–2010 there has been some increases both in the maximum and minimum temperatures. In Nawalparasi the lowest temperature recorded was 5.9˚C in December 2012; and highest was 44.9˚C in July 1995. There has been some variability over time in the average annual temperatures.

This data is at the district level and is not overly informative for particular VDCs. We therefore also collected local data on experiences of hazards.

Hazards

As well as collecting central government data, the team gathered data from local disaster management offices and communities of their experience of hazards. The main disasters/hazards in both districts are landslides, flood, fire, storms and earthquakes.

Casualties and vulnerability figures from Rukum for the last five years are:

- Landslide: 27 human casualties and 45 very vulnerable households in five areas
- Flood: three casualties and considerable crop loss
- Drought: five communities highly affected

Households reported frequent landslides, floods and drought in last two years. Table 5 shows losses reported in both Rukum VDCs. Households in Nuwakot experienced significantly higher losses – of land, crops and housing by both quantity and value – than households in Shyalapakha.

Table 5. Percentage of households reporting losses from landslides and floods in the last five years, Rukum VDC

Assets lost	Nuwakot	Shyalpakha
Land	88%	44%
House and animal sheds	27%	8%
Crops	48%	23%
Livestock	7%	1%

Respondents attributed a number of changes they have observed in recent years to climate change and the increase in temperature. These include: new diseases and epidemics; spreading of communicable diseases due to an increase in mosquitoes; rapid melting of snow on mountains; drying of water sources; the spread of the invasive *lantana canmara* plant; a decrease in local birds such as sparrows; and the production of tropical fruits such as mango and papaya at high altitudes.

In Nawalaparsi, respondents observed a high level of loss and damage from disasters in 2003, 2007 and 2010. The rainfall trend shows high annual rainfall in 2003 and 2007, which may have triggered floods. Key informants reported that in last two years:

- five households were displaced by flood and fire
- a considerable amount of land has been inundated annually
- four human casualties from landslides
- two human and one ox casualties from flood
- 50 households with increased vulnerability
- seven landslides and cold waves

Households reported frequent landslides (45) and floods (30), and 20 incidents of drought in last two years. Table 6 shows losses reported in both Nawalparasi VDCs. Additionally, respondents attributed new soil erosion, an increase in the number of cold wave and fog days as well as the number of dry spell days, an increase in very hot days and cold nights, an higher yields from off-seasonal vegetables to climate change.

Table 6. Percentage of households reporting losses from floods in the last five years Nawalparasi VDC

Assets lost	Kolhuwa	Rampur Khadauna
Land	1%	9.6%
House and animal sheds	0%	17%
Crops	0%	64%

4.5 Discussion of results

Linking these results to the changes in household assets discussed in Section 4.2, it seems that Nuwakot (control VDC, Rukum) and Rampur Khadauna (treatment VDC, Nawalparasi) have experienced considerably higher levels of stresses and shocks (resulting in losses) over the last five years. Shylapakha, the treatment VDC in Rukum, has not seen significant improvements in all household assets and resilience despite the extra intervention of the LFP. However, there have been improvements in two key resilience indicators (number of sources of income and food self sufficiency) which suggest some benefits from the forestry programme. Rampur Khadauna, on the other hand, shows positive changes in a range of assets when compared to the control VDC, in spite of the increase in identified shocks. This gives some evidence for the role of the LFP in these two districts, as well as evidence-based indicators on resilience in these contexts. The findings for each district are summarised in the tables below and the context of external shocks and changes are also included.

Summary of findings in Rukum district

External context

- Higher level of loss due to landslides in Nuwakot VDC (control).
- Other external factors Nuwakot improved access to health services and fair weather road over 5 year period – Shylapakha remained more constant.

Changes in resilience

- Both VDCs showing improvements over time in key indicators suggesting role of LGCDP and/or other interventions in improving outcomes.
- Average number of sources of income and average months of food self sufficiency from own production show greater improvement in Shylapakha VDC compared to Nuwakot and could be related to work of LFP on building specific assets.
- Nuwakot experienced higher landslide vulnerability in this time and so these indicators may have been affected by this. However, Nuwakot also experienced increased access to healthcare and fair weather road which would have had a more positive impact on some resilience indicators such as income due to access to markets for produce.

Average number of sources of income and months of food self-sufficiency identified as helpful indicators of resilience in Rukum district when understood in the context of any external changes. Suggests LFP had targeted impact on certain indicators but did not build resilience across a broader set of assets.

Summary of findings in Nawalparasi district

External context

- Higher level of loss due to floods in Rampur Khadauna VDC (treatment).
- Access to services in both VDCs remained relatively constant – Rampur Khadauna has higher level of wage labourers.

Changes in resilience

- Both VDCs showing improvements over time in key indicators suggesting role of LGCDP and/or other interventions in improving outcomes.
- Livestock holdings, housing assets, average number of sources of income and average months of food self sufficiency from own production show greater improvement in Rampur Khaduana VDC compared to Kolhuwa and could be related to work of LFP on building specific assets. This is despite greater vulnerability and losses from floods over this period.
- Annual HH income shows a much greater income in Kolhuwa but there could be other factors for this such as remittances. Income in Rampur Khaduana is more reliant on the main food crops.

Range of indicators show improvements in resilience in Rampur Khaduana despite increased climate shocks compared to control VDC. Suggests assets were built more widely including in housing and livestock as well as sources of income and food self sufficiency. Overall household income is not shown to be correlated with other indicators.

5 Conclusions

The TAMD feasibility test in Nepal has tested specific tools for monitoring and evaluating climate change adaptation and made these relevant to the Nepalese context. Using institutional scorecards, community focus groups and household surveys can help policymakers target their interventions and support within the country. These tools will also help demonstrate effectiveness to external audiences.

The results of the study show that climate risk management can easily be tracked in Nepal through some simple tailored scorecards and this information is useful for governments and would help in tracking and monitoring national progress. The results of the resilience assessment show that differences can be identified between matched VDCs and certain key indicators were useful in picking up small changes between VDCs. These were for both VDCs – number of sources of income and months of food self-sufficiency – and for Nawalparasi also livestock holdings, housing assets and income from cash crops/fruit trees. The results showed that the LFP districts did have improved outcomes in certain key resilience indicators although the extent to which this led to broader changes in resilience differed between the two districts. The results also showed that it was important to understand these indicators within the context of the external environment and any climate shocks so as not to misinterpret any trends.

The TAMD study team propose two overall approaches to checking the effectiveness of climate adaptation in Nepal building on this pilot study: using in-depth evaluation and tracking through existing systems. Applying these approaches in government programmes or incorporating them into development partner's initiatives would start to build a more cohesive and integrated national framework for tracking climate change adaptation progress in Nepal.

An evaluative approach for a closer look: A key issue in Nepal is the sheer number of projects and programmes that address climate change. It can be difficult for policymakers to track the cause of district- or national-level changes in resilience. This feasibility study has shown that, if needed, districts can apply a quasi-experimental approach – for example, to assess the effectiveness of its adaptation portfolio or where to direct future investment. This type of evaluative approach requires household- and community-level data specific to the local hazard and context and so is not feasible for national-level tracking. Such an evaluation may be useful for a policymaker wanting to check on progress in a district, consider which approaches are most successful and/or target resources to particular areas or aspects of local livelihoods. This study has identified some key resilience indicators for these two districts that can track changes in resilience in the context of the changing climate. Developing these indicators in other districts will enable them to track broader changes over time as well as conduct more in-depth research when needed.

Monitoring through government systems: Nepal's government ministries already have systems for collecting data on general development. They could now adapt these systems to include indicators for tracking climate risk management, the way in which climate change is integrated into local planning and changes in resilience in villages and districts. This would allow the government to support some of their national indicators with a more grounded understanding of the context at district and village level. It would also help them target institutional initiatives and support.

By combining a few key indicators from Nepal's census and/or National Living Standards Survey with some qualitative explanations of available climate data, government departments can put development changes into context with regards to climate changes. Much of the data needed for this high-level tracking already exists and is collected by different government departments. The key challenge lies in how MoSTE can bring together existing data from across all areas of government to coordinate and collect this information in a useful way and use it to track adaptation planning and resilience at a high level in different districts. One way to do this would be through a simple tracking sheet of four to six indicators at VDC and DDC level (including both institutional indicators as shown here in the scorecards and development performance such as those developed at the district level of food self sufficiency and average sources of income). Different ministries would request and supply the information relating to the indicators relevant to their work, with MoSTE collating and monitoring this information for its relevance to climate change adaptation and resilience.

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Annexes

Annex 1: Scorecards used in Rukum (DDC level) and Nawalparasi (VDC level)

DDC score card Used by: planning officer, funding officer		0 N	1 25%	2 50%	3 75%	4 Y	Supporting evidence/ narrative
I. Climate change mainstreaming/ integration into DDC planning	1. Have specific measures to address climate change (adaptation/ mitigation) been identified and funded?						
	2. Is there a DDC climate change plan?						
	3. Are climate-relevant initiatives in the district screened for climate risks?						
II. Institutional coordination	1. Is there a body (unit, etc) for coordinating climate change actions at the district level?						
	2. Does the coordinating unit have authoritative persons representation the sectoral offices?						
	3. Is there long-term funding for this unit and for coordination?						
III. Budgeting and finance	1. Is there provision of a specific budget allocation for climate change?						
	2. Is there a mechanism for climate risk assessment and costing?						
	3. Are funds available for additional climate risks identified?						

DDC score card Used by: planning officer, funding officer		0 N	1 25%	2 50%	3 75%	4 Y	Supporting evidence/ narrative
IV. Institutional knowledge/ capacity (district staff and ilaka representatives)	1. Are more than 25% of people involved in planning with climate change awareness?						
	2. Are any people with formal climate change training involved in planning?						
	3. Is there a plan to build capacity on climate change among people involved in the planning process?						
V. Use of climate information	1. Is annual planning affected by historical trends of climate variability from informal observation/experience?						
	2. Is relevant climate information available from DHM station or other reliable sources? Is this used in planning?						
	3. Will you consider future climate projections for the next district plan?						
VI. Participation	1. Are those living in landslide, flood or drought-affected areas represented proportionately in DDC planning processes around climate change measures?						
	2. Are the poorest and most marginalised represented proportionately in DDC planning processes around climate change measures?						
	3. Is the participation of these groups sustained throughout the lifecycle of the climate change measures?						

DDC score card Used by: planning officer, funding officer		0 N	1 25%	2 50%	3 75%	4 Y	Supporting evidence/ narrative
VII. Awareness among stakeholders (district council)	1. Are at least 50% of DDC members aware of potential or available responses to climate change?						
	2. DDC members have information on climate-sensitive sectors and district climate issues (e.g. forest, drought, landslide)?						
	3. Does the DDC have an institutional mandate for raising awareness of, and supporting access to, climate change information?						
VIII. Learning and flexibility	1. Has the DDC incorporated information on past disasters into future planning?						
	2. Has the DDC incorporated information on slow changes to the climate into future planning?						
	3. Does the DDC have mechanisms in place to monitor responses and update plans after an unexpected change to the climate?						
IX. Business-as-usual functions: functioning of local systems	A selection of three of the MCPM indicators from the LGCDP on DDC functions						

VDC scorecard: Used by VDC secretary, technical officer		0 No	1 25%	2 50%	3 75%	4 Yes	Supporting evidence/ narrative
I. Climate change mainstreaming/ integration into VDC Planning	1. Have specific measures to address climate change (adaptation/mitigation) been identified and funded?						
	2. Is there a VDC climate change plan? (DRR = 50%)						
II. Institutional coordination	Is there a body (unit etc) for coordinating climate change actions at village level?						
	Is there long-term funding for this unit and coordination?						
III. Budgeting and finance	1. Is there provision of a specific budget allocation for climate change?						
	2. Are funds available for additional climate risks identified (disaster fund – 50%)						
IV. Institutional knowledge/capacity (VDC staff)	1. How many people with climate change awareness are involved in planning (%)?						
	2. How many people with formal climate change training are involved in planning(%)?						
V. Use of climate information	1. Is annual planning affected by historical trends of climate variability from informal observation/ experience?						
	2. Is relevant climate information available from DHM station or other reliable sources? Is this used in planning?						

VDC scorecard: Used by VDC secretary, technical officer		0 No	1 25%	2 50%	3 75%	4 Yes	Supporting evidence/ narrative
VI. Participation	1. Are those living in flood-affected areas represented proportionately in VDC planning processes around climate change measures?						
	2. Is the participation of these groups sustained throughout the lifecycle of the climate change measures?						
VII. Awareness among stakeholders (WCF, CFUG and other civil society group representatives)	1. Are at least 25% of stakeholders aware of potential or available responses to climate change?						
	2. Do stakeholders have specific information on village climate issues (flood)?						
VIII. Learning and flexibility	1. Has the VDC incorporated information/learning from past disasters into future plans?						
	2. Has the VDC incorporated information on slow changes to the climate into future planning?						
IX. Business-as-usual functions: functioning of local systems	A selection of three of the MCPM indicators from the LGCDP on VDC functions						

Knowledge Products

Research Report

March 2015

Climate change

Keywords:
Monitoring and evaluation, planning, adaptation

Tracking adaptation and measuring development (TAMD) is a twin track framework that evaluates adaptation effectiveness. TAMD offers the flexibility to generate bespoke frameworks for individual countries that can be tailored to specific contexts and applied at different scales. Application of TAMD in Nepal focused on assessing the resilience benefits of approaches to community-based planning for adaptation in two districts. This research has included the development of indicators to assess how communities have benefited from different resilience initiatives, using a 'with and without' approach. The TAMD project in Nepal also developed local level scorecards to assess institutional climate risk management in Village and District Development Committees.

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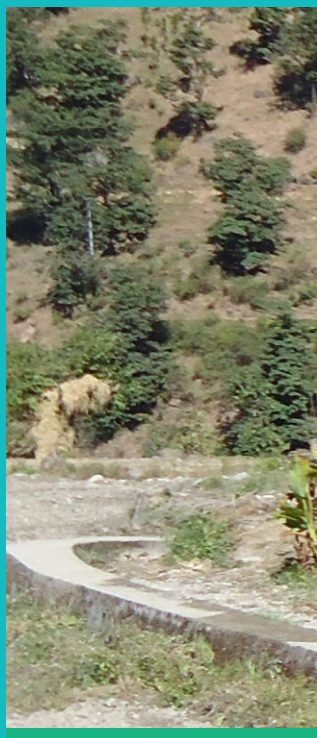

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