

Climate and Development Outlook

Stories of change from CDKN

Nepal Special Edition

SCALING UP CLIMATE-SMART AGRICULTURE IN NEPAL

By **Dr Bikash Poudel**, LI-BIRD

A CDKN-supported study, 'Economic Impact Assessments of Climate Change in Nepal' (completed in 2014), identified agriculture as a sector highly vulnerable to the impacts of climate change. It was therefore important to identify climate-resilient agricultural technologies and practices, and to develop scaling-up mechanisms in the Nepalese context to support the livelihoods of two thirds of the population, ensure national food security and contribute to the economic development process. A new project was born, on climate-smart agriculture, following discussions with stakeholders. This CDKN-funded project was managed by Local Initiatives for Biodiversity, Research, and Development (LI-BIRD) and Climate Change, Agriculture and Food Security (a CGIAR research programme).

The project operates in three districts, one in each of Nepal's major agro-ecological

zones (high mountains, mid-hills and Terai plains), and aims to enhance the resilience of the farming communities in the project areas that have different agro-ecological systems. Through a desk review, extensive consultation with local stakeholders and communities field pilots and on-farm evaluation, the project recommended a set of potential climate-smart agricultural interventions in the areas.

This inclusive approach, which took into account the local contexts and climate risks faced by the farming communities, facilitated a sense of ownership of the project among local people. As it nears completion, the project has successfully identified a range of context-appropriate practices that have high potential for scaling up within Nepal's various agro-ecological systems and, as they are championed by local authorities, they will be incorporated into local development plans.

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March 2017

Climate and Development Knowledge Network

Helping developing countries to design and deliver climate compatible development

Nepal's climate and development

Around three quarters of Nepal's population is dependent on agriculture, which is highly climate sensitive and increasingly at risk from climate change impacts. This directly affects the economic growth and development of the country. CDKN Nepal has been responsive to government priorities in integrating climate change impacts into the development process, by improving policy frameworks and investment decision systems in the changing context. In 2015, CDKN supported three projects on the basis of a recommendation of the Government of Nepal: a climate change impact study geared towards making agriculture climate smart; making irrigation systems climate resilient; and making hydroelectricity projects climate adaptive. Considering the ever-increasing role of climate finance in responding to climate impacts, CDKN has also undertaken an initiative to strengthen the capacity of the government and other key stakeholders in accessing international climate change funds. This *Outlook: Nepal Special Edition* provides some important glimpses of CDKN initiatives in Nepal.

INSIDE >>

- Building the resilience of Nepal's irrigation and hydropower sectors
- A future for climate-smart agriculture
- Strengthening Nepal's access to climate finance



“The project has developed good understanding of the climate-smart agriculture and left a very positive change in the mindset of the policy-makers regarding need for scaling up. It has sensitised and convinced the senior-level officials on implementation and mainstreaming of climate-smart agriculture in Nepal. This has also contributed to identify the barriers for scaling up ... There is still greater need for research, creating database and documentation of climate-smart agriculture in Nepal.”

LEKHA NATH ACHARYA,
JOINT SECRETARY, MINISTRY OF
AGRICULTURAL DEVELOPMENT,
NEPAL

“Adaptation to climate change in the agriculture sector is a top government priority. The on-farm validation of climate-smart agriculture is timely and very relevant for Nepal. The learnings of this project will be useful for implementing climate change adaptation actions in Nepal.”

MR BALKRISHNA GHIMIRE,
JOINT SECRETARY, NATIONAL
PLANNING COMMISSION



“The climate-smart agriculture project has generated learnings which will be important for the Government of Nepal to implement the climate-smart village programme, which the Government has announced in 2016. There is greater need for creating synergies and coordination among various agencies to leverage the learnings for the greater good.”

BIJAYA KUNWAR,
FORMERLY HON. MEMBER, NATIONAL PLANNING COMMISSION

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The project also identified statistically similar agro-ecological zones – now and for the future – where the tested technologies and practices can be scaled up. In the course of these trials, we have learned valuable lessons about how a facilitating agency such as LI-BIRD can help strengthen the link between service providers and vulnerable communities. The climate-smart agriculture team also carried out separate vulnerability assessments for women and marginalised *Dalit* and *Janajati* communities that helped further refine community-specific climatic vulnerabilities and appropriate adaptation interventions.

The project has developed knowledge products, including a learning report, a policy brief, a compendium of case studies, and scaling-up mechanisms for the climate-smart technologies and practices for the benefit of national, regional and international stakeholders. LI-BIRD's climate initiatives are receiving strong support from the Ministry of Agricultural Development (MoAD) and other government officials. LI-BIRD has forged strong connections with

government, and senior officials have been active participants in planning and implementing many climate-smart agriculture approaches.

The consensus among high-level government officials is that Nepal has sufficient policies and strategies through which climate-smart agriculture can be scaled up. While earlier policies and strategies had given priority to sustainable agriculture and reducing the environmental footprint of agriculture, recent policies (e.g. Agriculture Development Strategy, 2015) are more explicit about the need for promoting climate-smart agriculture in Nepal. Despite incremental, favourable policy changes, translating those policies into tangible actions supported by budget and human resources remains a challenge. From now on, concerned parties in all sectors agree on the need to emphasise:

- making usable knowledge readily accessible to farming communities
- policies that are more sensitive to the needs of smallholder farmers and women, who are the most

vulnerable to the effects of climate change

- conducting research on both the negative and positive impacts of climate change
- creating incentives for private sector actors to run sustainable business models for promoting climate-smart agriculture in Nepal.

There is every reason to believe that scaling up climate-smart agriculture will be an integral part of the implementation of Nepal's Agriculture Development Strategy and the 14th Development Plan. Integrating climate-smart agriculture into the Government's local planning processes and reflecting it in local development plans will help leverage and amplify the Government's resources and services at the local level.

“This initiative was timely for facilitating the sharing of the learnings and knowledge build-up regarding climate-smart agriculture and climate change adaptation in Nepal. We should continue such learning and sharing in future, with greater emphasis on linkage to other initiatives such as local adaptation plans of actions (LAPA).”

DR SUROJ POKHAREL,

JOINT SECRETARY, MINISTRY OF AGRICULTURAL DEVELOPMENT, NEPAL (NOW THE SECRETARY OF THE MINISTRY OF AGRICULTURE)

ADAPTATION TO CLIMATE CHANGE IN THE HYDROELECTRICITY SECTOR IN NEPAL

By **Dr Divas Basnyat**, NDRI

Hydropower provides approximately 90% of total electricity generation in Nepal. The power projects are severely affected by the huge seasonal variations in river flows, with abundant flow during the monsoon period (June to September) and low flows during the remainder of the year, particularly from January to April, compounded by inter-annual variations. Hydropower plants are also affected by water-induced natural disasters, notably floods and landslides associated with the summer monsoon, severe erosion and sedimentation problems, and the risks of glacial lake outburst floods. The state electricity utility, the Nepal Electricity Authority (NEA), reported a peak supply deficit of almost 555 MW on 11 November 2015, the day of peak load recorded in that year.

Current climate variability and extreme events already cause major impacts and economic costs in Nepal. A recent study of the economic impacts of climate

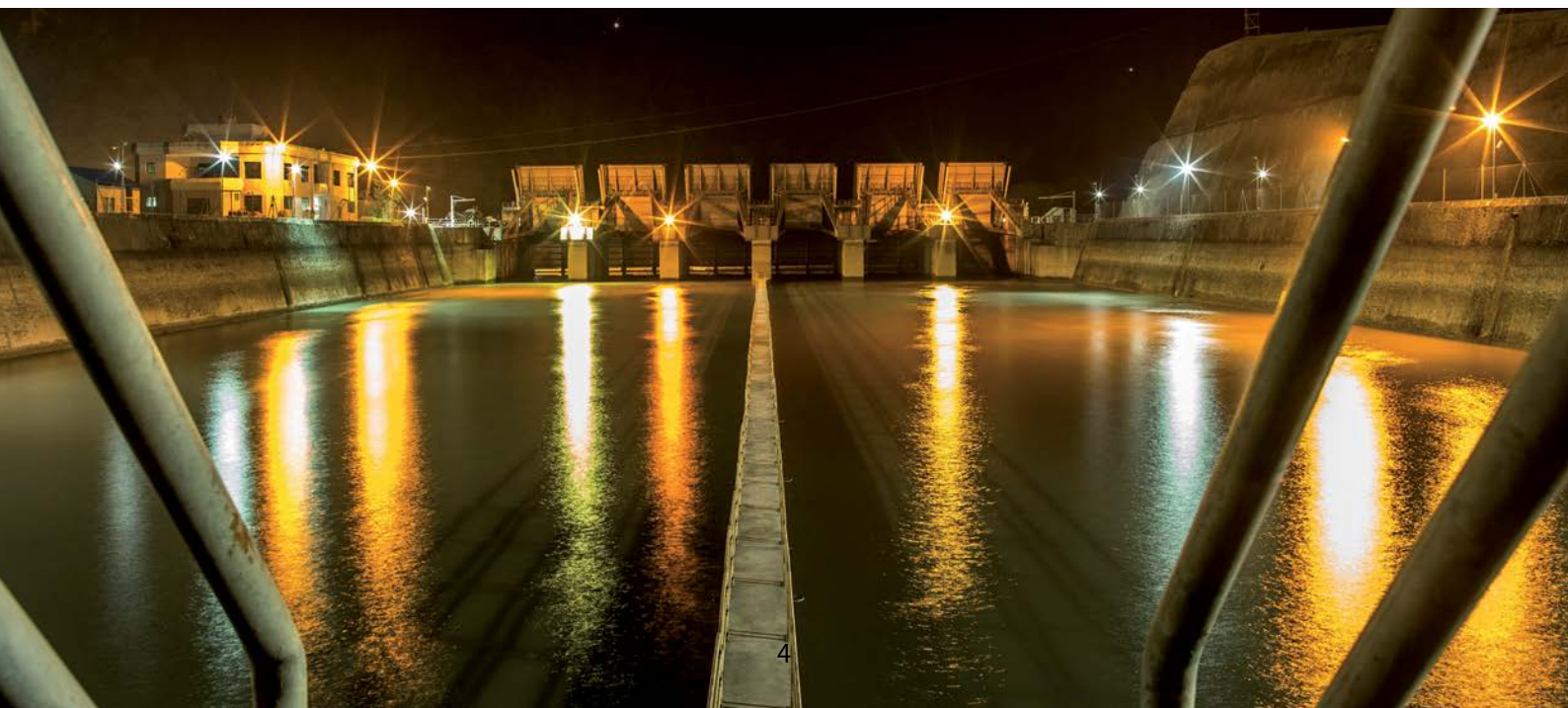
change in Nepal – published in collaboration with the Government of Nepal in 2014 – estimated that the annual costs of the current climate and water resources variability is equivalent to 1.5–2% of current gross domestic product (GDP). A key risk of climate change identified in that study concerned the hydroelectric sector. The risk may increase with climate change, and is thus critically important as Nepal has a very large potential for hydroelectricity. Moreover, the development of the hydroelectric sector is a key part of future development plans and crucial for domestic and export growth, with planned investments of billions of dollars in the near term.

Against this background, and in consultation with the Government of Nepal, CDKN funded a two-year study on ‘Adaptation to Climate Change in the Hydroelectricity Sector in Nepal’ that commenced in February 2015 and was completed in 2016. The study was led by the Nepal Development Research Institute (NDRI), working in collaboration with Practical Action Consulting Limited (PAC), Nepal and the Global Climate Adaptation Partnership (GCAP), UK.

Assessing the future impacts of climate change on the hydroelectric sector in Nepal is challenging due to the complex climate and hydrology, as well as the large changes in elevation that occur across the country. These factors make the computer modelling of future climate change even more difficult than elsewhere. Current climate projections show large differences in projected future rainfall changes – even in terms of the sign of change – highlighting the need to recognise uncertainty in the planning of adaptations.

To address this problem, the study used a climate risk assessment methodology based on a ‘bottom-up’ decision-scaling approach. This starts by assessing the sensitivity of Nepal’s present hydropower systems – and their performance – to the current climate, and then assessing how future climate change could affect this.

A key finding of the climate risk assessment study is that Nepal’s current hydropower system is ill-prepared to address the current variability of climate and hence of water flows. However, there is large variation in this vulnerability, which





“It rains without any pattern. Either it rains or it’s completely dry, which causes drought. Earlier we survived on whatever we grew in our village. Now the children insist on studying in the cities. Men have to migrate to cities and other countries.”

INDIRA KUMARI GURUNG,
NEPALI FARMER

is influenced by catchment elevation, size of catchment and location, as well as the type of plant. The impacts of future climate change on hydroelectric plants and the sector are even more uncertain. The study approach was specifically designed to incorporate and adjust for this uncertainty. It is also clear that future climate will have most impact by increasing climate-induced hazards (e.g. sediment, floods and glacial lake outburst floods), rather than average energy generation. Last but not least, while important, the impact of climate change is additional to other factors (which are more influenced by existing political uncertainties and weak institutional base), at least for the current and immediately planned plants. The climate risk assessment has been linked to an iterative adaptation pathways approach to use this risk information to build up possible adaptation responses under uncertainty.

The method has identified three types of adaptation where decisions (or policy) will be important over the next five to ten years, and provides information to help address both current climate variability and long-term climate change. These are:

1. Immediate actions that address the current risks of weather and climate extremes (the adaptation deficit) and build resilience to future climate change. This includes early low- and no-regret actions, which provide immediate economic benefits as well as future benefits under a changing

climate. These activities are focused on current hydro-power plants.

2. The integration of adaptation into immediate decisions or investments with long life-times (climate smart planning), focusing on the new (planned or candidate) hydro-electric plants that will be built over the next decade or so. These plants will be exposed to future climate change but these changes are in the future and uncertain. This therefore involves a greater emphasis on low cost design or flexible or robust options that perform well under uncertainty.
3. Early monitoring, research and learning to start planning for the future impacts of climate change. This includes the investing in information and learning, to help future decisions (through the value of information and option values and learning).

As the focus of the study was on providing information to enable adaptation action by policy-makers and private sector actors, the study also built up an extensive understanding of the current policy landscape with institutional mapping. This has been complemented with extensive stakeholder engagement, with government, the regulator, developers and the private sector. The study has been guided by a project advisory committee led by the Ministry of Energy with representations from the key government agencies and private sector.

‘Farmers of the future’ film shows women farmers in the lead

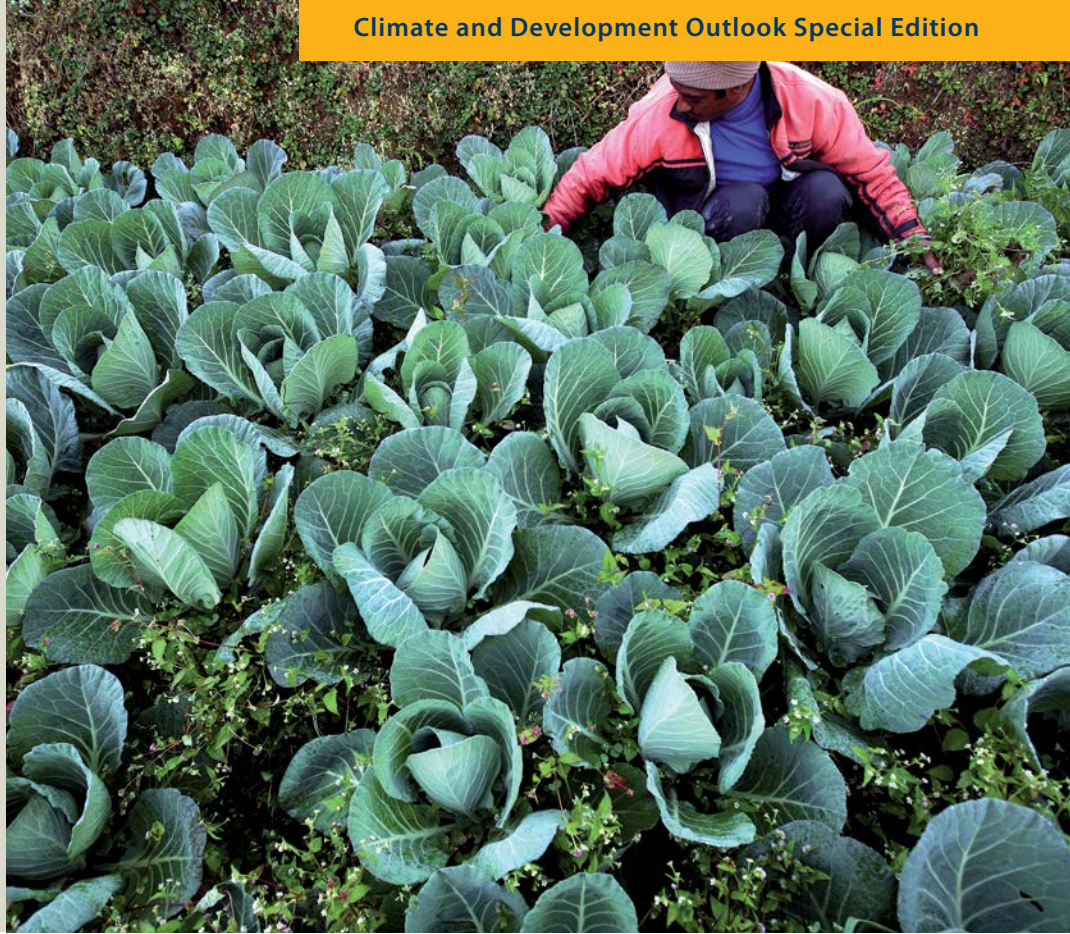
Ms Gurung (above) voices the viewpoint of many women farmers left to toil in the fields and deal with the impacts of climate change, while trying to secure food for the family’s use and for taking to market. According to a new CDKN-commissioned film by TERI, entitled ‘Farmers of the future’, 300 women farmers from the high mountains, mid hills and Terai plains of Nepal are now being mentored in climate-smart agriculture thanks to the CDKN-supported project.

“Climate-smart agriculture is really important for Nepal because it helps us to reconcile the two goals: food security and adaptation to climate change,” says Bikash Paudel, the project manager, in the CDKN film.

Please view the film and leave your comment at www.cdkn.org/regions/nepal

“Such study should be a continuous process in order to be alert about the effects of climate change and plan for resilience to the systems of different ecological zones of Nepal.”

MR SAROJ PANDIT,
DEPUTY DIRECTOR GENERAL,
DEPARTMENT OF IRRIGATION,
MINISTRY OF IRRIGATION,
GOVERNMENT OF NEPAL



INCREASING THE RESILIENCE OF SMALL AND MEDIUM-SCALE IRRIGATION SYSTEMS IN NEPAL

By **Dr Prachanda Pradhan,**
Farmer Managed Irrigation Systems
Promotion Trust, Nepal

Agriculture is a mainstay of the economy of Nepal, providing about 33% of GDP and supporting the livelihoods of the majority of the population. The country is highly vulnerable because of its monsoon climate and its topography, and population growth has made landholdings too small to meet the subsistence needs of most people. Off-farm employment and rural–urban migration are increasingly important to supplement agricultural income. Irrigation is an important requirement for agriculture, but – despite the long history of irrigation in the country – it is widely recognised that the sector is still in need of improvement, and that climate change will only make the situation worse.

The research conducted under the project ‘Increasing the Resilience of Small and Medium Scale Irrigation Systems in Nepal’ responds directly to an immediate need from the Ministry of Irrigation, but the work is intended to contribute to wider policy-making processes. The research team has consulted with stakeholders from other ministries, departments and interest groups. The two-year study draws on field studies of representative irrigation systems, as well as analysis of climatic data and future projections to understand how farmers respond to an uncertain climate. Farmers’ perceptions and actions have been correlated with actual climatic data for the recent past, and related to future projections of climate change. Increases in peak flows are expected but, more importantly, small changes in timing, intensity and duration of rainfall coupled with increases in temperature have already influenced cropping, particularly in winter. The ability of communities to adapt to climatic and other changes depends on a wide range of factors.

Climate change does have influences on irrigation systems and their management, but climate change is not the only agent of change. Irrigation systems are also affected by the increasing use of water upstream, in turn affected by population increase, and the changing socioeconomic conditions of the locals.

The key impacts of climate change are:

- Although no change in the annual rainfall amount has been recorded, the pattern has shifted so that it is out of sync with harvest times and thus the usefulness of rainfall for crop cultivation is decreasing.
- Water availability for irrigation is declining.
- There is evidence of increasing peak flood flows.
- River morphology is changing rapidly.
- There is evidence of increased risk of declining crop yields as some farmers face an irrigation deficit due to the declining availability of irrigation water.

“Ten ministries of the Government of Nepal are involved in the National Adaptation Plan (NAP). Hence, it will be useful if this study is integrated with the NAP along with minimising the risk and vulnerability from climate change.”

BATUK UPRETY, COORDINATOR, NATIONAL ADAPTATION PLAN,
MINISTRY OF POPULATION AND ENVIRONMENT, GOVERNMENT OF NEPAL

Field studies suggest that several non-climate change aspects are equally responsible for the compounded negative impacts on the irrigation sector. This means that, in addition to the Department of Irrigation (DOI), the roles of various organisations now have a significant impact in building climate-resilient irrigation systems. This can be achieved by strengthening the technical unit in DOI and inter-ministerial and inter-departmental coordination. In addition, the framework for climate-resilient irrigation by the relevant government agencies – especially by the DOI, Department of Water Induced Disaster Prevention, Ministry of Irrigation, Ministry of Agriculture and Department of Local Infrastructure – should be considered for sustained continuity of irrigation benefits for agricultural development. Initial findings also suggest that supporting institutional frameworks for climate-resilient and sustainable irrigation should be a priority: enhancing capacity and knowledge of climate change impacts and adaptation techniques

related to irrigation in planning, implementing and managing irrigation schemes. These would ideally be disseminated among the users and institutionalised in the concerned agencies.

Future initiatives may also include strengthening of community-based organisations, the condition of infrastructure and the importance of agriculture in the local economy. Improvement of agricultural support services is needed to enable diversification into higher-value crops, for which the growth of new markets resulting from rapid urbanisation and improved road access provides an opportunity. Catchment-level management is increasingly needed to manage water equitably, particularly as return flows from upstream systems form an important part of the inflow for downstream systems, and both technical and institutional improvements are needed at system level. Resilience needs to be addressed at individual farmer, community and irrigation organisation levels.



“The study has shown clearly that there has been further decreasing irrigation efficiency due to climate change. The recommendations given in the study report will be useful for framing policy promoting resilient irrigation systems in Nepal.”

MR SUSHIL CHANDRA TIWARI,
JOINT SECRETARY,
MINISTRY OF IRRIGATION, GOVERNMENT
OF NEPAL

“There are three take-aways for the government from the study. First, the necessity of preparing ‘design standards’ to address current variability and future changes for new and planned projects. Second, a technical ‘design audit’ for existing projects in the context of new data available and climate change. Third, case studies of existing [hydroelectricity] plants, carried out by the present research and others, can be useful for learning and designing climate-resilient projects considering potential long-term impacts.”

DINESH K GHIMIRE,
JOINT SECRETARY, MINISTRY OF ENERGY,
GOVERNMENT OF NEPAL

STRENGTHENING NEPAL'S ACCESS TO CLIMATE FINANCE

By **Ram Chandra Khanal**, CDKN Nepal

As suggested by the 'Economic Impact Assessment' study (2014), Nepal will have around a US\$2.4 bn adaptation deficit until 2030. The Paris Agreement on climate change indicates that there is a huge opportunity to access international climate finance, but Nepal will need adequate capacity to access such funds. Realising that knowledge on international climate finance and capacity to access it was weak in Nepal, CDKN provided support to the existing initiatives on climate change from the Ministry of Finance. The project is led by Nepal Development Research Institute (NDRI), working in collaboration with Prakriti Resources Centre (PRC) and funded by CDKN.

The overall objective of this project is to support the Government of Nepal, particularly the Ministry of Finance and the Ministry of Population and Environment, in enhancing their understanding of and capabilities to access and utilise climate finance to implement climate actions in the country. Specific objectives of the project are to:

- support and train potential national implementing entities (institutions that may obtain 'direct access' to international climate finance flows, also known as NIEs)
- bridge divergent views and understanding among senior government officials from the Ministry of



Finance, Ministry of Environment and others about the potential sources and application of climate finance

- provide training that will focus on raising awareness of barriers to accessing climate finance both within Nepal (delivery mechanism) and internationally (access) – it is expected that the training will provide a broader understanding of climate finance landscape at global level
- produce knowledge products that enhance the understanding of climate finance and its utilisation in the country.

With enhanced capabilities in terms of accessing climate finance and understanding its dynamics and application, the Government of Nepal and other stakeholders are expected to be able to procure funds with better ease and to spend them in an efficacious manner to address environmental issues.

The Climate and Development Knowledge Network (CDKN) aims to help decision-makers in developing countries design and deliver climate compatible development. We do this by providing demand-led research and technical assistance, and channeling the best available knowledge on climate change and development to support policy processes at the country and international levels. CDKN is managed by an alliance of five organisations that brings together a wide range of expertise and experience.

www.cdkn.org/regions/nepal

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Additional editing, design and layout: Green Ink (www.greenink.co.uk)

Photos: p1, p4, p6: Asian Development Bank; p2: © IOM/Eunjin Jeong 2015; p5, p8: Neil Palmer/CIAT;

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Funded by:



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