

Scoping Assessment on Climate Change Knowledge Platform in Nepal

Summary
October 2010



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PLATFORM



REGIONAL CLIMATE CHANGE
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Acknowledgements

The Scoping Assessment on Climate Change Knowledge Platform in Nepal - Summary was conducted and written in 2010.

This scoping study of climate change in Nepal draws on work in progress related to the Adaptation Knowledge Platform to disseminate and exchange adaptation knowledge with a wider audience. We thank the countless institutions, organizations, and individuals that have provided key inputs and their insights. The report greatly benefited from comments and suggestions to report the state of climate change adaptation in Nepal.

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October 2010

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ABBREVIATIONS & ACRONYMS

ADB	ASIAN DEVELOPMENT BANK
AIT	ASIAN INSTITUTE OF TECHNOLOGY
AIT-UNEP RRC.AP	ASIAN INSTITUTE OF TECHNOLOGY/UNITED NATIONS ENVIRONMENT PROGRAMME REGIONAL RESOURCE CENTRE FOR ASIA AND THE PACIFIC
AP	ADVISORY PANEL
ASEAN	ASSOCIATION OF SOUTHEAST ASIAN NATIONS
BCAS	BANGLADESH CENTRE FOR ADVANCED STUDIES
BCCSAP	BANGLADESH CLIMATE CHANGE STRATEGY AND ACTION PLAN
BMA	BANGKOK METROPOLITAN ADMINISTRATION
CCA	CLIMATE CHANGE ADAPTATION
CCAI	CLIMATE CHANGE ADAPTATION INITIATIVE
CEGIS	CENTRE FOR ENVIRONMENTAL AND GEOGRAPHICAL INFORMATION SYSTEMS
COP	UNITED NATIONS CLIMATE CHANGE CONFERENCE IN COPENHAGEN
CSR	CORPORATE SOCIAL RESPONSIBILITY
DDPM	DEPARTMENT OF DISASTER PREVENTION AND MITIGATION
DRR	DISASTER RISK REDUCTION
DWR	DEPARTMENT OF WATER RESOURCES
GCCA	GLOBAL CLIMATE CHANGE ALLIANCE
GEF	GLOBAL ENVIRONMENT FACILITY
GOV	GOVERNMENT
GTZ	GERMAN AGENCY FOR TECHNICAL COOPERATION
EKH	ENVIRONMENTAL KNOWLEDGE HUB
EU	EUROPEAN UNION
HMS	HYDRO-METEOROLOGICAL SERVICE
ICCCAD	INTERNATIONAL CENTRE FOR CLIMATE CHANGE AND DEVELOPMENT
ICT	INFORMATION AND COMMUNICATION TECHNOLOGIES
IGES	INSTITUTE FOR GLOBAL ENVIRONMENTAL STRATEGIES
IIED	INTERNATIONAL INSTITUTE FOR ENVIRONMENT AND DEVELOPMENT
INGO	INTERNATIONAL NON-GOVERNMENTAL ORGANIZATION
ISET-N	INSTITUTE FOR SOCIAL AND ENVIRONMENTAL TRANSITIONS–NEPAL
IT	INFORMATION TECHNOLOGY
IUCN	INTERNATIONAL UNION FOR CONSERVATION OF NATURE
IWRM	INTEGRATED WATER RESOURCES MANAGEMENT
KP	KYOTO PROTOCOL
LDC	LEAST DEVELOPED COUNTRIES
MARD	MINISTRY OF AGRICULTURE AND RURAL DEVELOPMENT

MOEF MINISTRY OF ENVIRONMENT AND FOREST

MMF MANGROVES FOR THE FUTURE

MONRE MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT

MOST MINISTRY OF SCIENCE AND TECHNOLOGY

MPI MINISTRY OF PLANNING AND INVESTMENT

MRC MEKONG RIVER COMMISSION

NAPA NATIONAL ADAPTATION PLAN OF ACTION

NCS NATIONAL COMMUNICATIONS

NDWC NATIONAL DISASTER WARNING CENTRE

NEA NATIONAL ENVIRONMENT AGENCY

NGO NON-GOVERNMENTAL ORGANIZATION

NISTPASS NATIONAL INSTITUTE FOR SCIENCE AND TECHNOLOGY POLICY AND STRATEGY STUDIES

NOCCOP NATIONAL OFFICE FOR CLIMATE CHANGE AND OZONE PROTECTION

NSEP NATIONAL STRATEGY FOR ENVIRONMENTAL PROTECTION

NTP NATIONAL TARGET PROGRAM

NWP NAIROBI WORK PROGRAMME

ONEP OFFICE OF NATURAL RESOURCES AND ENVIRONMENTAL POLICY AND PLANNING

OVI OBJECTIVELY VERIFIABLE INDICATOR

PPCR PILOT PROGRAMME FOR CLIMATE RESILIENCE

SAARC SOUTH ASIAN ASSOCIATION FOR REGIONAL COOPERATION

SEA START SOUTHEAST ASIA SYSTEM FOR ANALYSIS, RESEARCH AND TRAINING

SEI STOCKHOLM ENVIRONMENT INSTITUTE

SENSA SWEDISH ENVIRONMENTAL SECRETARIAT FOR ASIA

SIDA SWEDISH INTERNATIONAL DEVELOPMENT COOPERATION AGENCY

TEI THAILAND ENVIRONMENT INSTITUTE

TOR TERMS OF REFERENCE

UK UNITED KINGDOM

UKCDS UK COLLABORATIVE ON DEVELOPMENT SCIENCES

UN UNITED NATIONS

UNDP UNITED NATIONS DEVELOPMENT PROGRAMME

UNEP ROAP UNITED NATIONS ENVIRONMENT PROGRAMME
REGIONAL OFFICE FOR THE ASIA AND PACIFIC

UNFCC UN FRAMEWORK CONVENTION ON CLIMATE CHANGE

UNISDR UNITED NATIONS INTERNATIONAL STRATEGY FOR DISASTER REDUCTION

USA UNITED STATES OF AMERICA

WWF WORLD WILDLIFE FUND

EXECUTIVE SUMMARY

The Regional Climate Change Adaptation Knowledge Platform for Asia (hereinafter, referred to as the Adaptation Knowledge Platform) has been developed to respond to demand for effective mechanisms for sharing information on climate change adaptation and developing adaptive capacities in Asian countries, many of whom are the most vulnerable to the effects of climate change. The Adaptation Knowledge Platform supports research and capacity building, policy making and information sharing to help countries in Asia adapt to the challenges of climate change. The Adaptation Knowledge Platform will facilitate climate change adaptation at local, national and regional levels to strengthen adaptive capacity of countries in the region – while working with existing and emerging networks and initiatives.

Through its work the Adaptation Knowledge Platform is working towards building bridges between current knowledge on adaptation to climate change and the governments, agencies and communities that need this knowledge to inform their responses to the challenges that climate change presents to them. This is reflected in the **Platform Goal**, which is to facilitate climate change adaptation in Asia at local, national and regional levels and strengthen adaptive capacity [see Annex 1 for Phase One - Logical Framework (2009-2011)].

The specific **Purpose** of the Adaptation Knowledge Platform is to establish a regionally and nationally owned mechanism that facilitates the integration of climate change adaptation into national and regional economic and development policies, processes and plans, strengthens linkages between adaptation and the sustainable development agenda in the region and enhances institutional and research capacity.

In order to achieve this purpose, the Adaptation Knowledge Platform will bring together policy-makers, adaptation researchers, practitioners, and business leaders and will work through a range of activities to achieve three components:

- a. **Regional knowledge sharing system:** a regionally and nationally owned mechanism to promote dialogue and improve the exchange of knowledge, information and methods within and between countries on climate change adaptation and to link existing and emerging networks and initiatives.
- b. **Generation of new knowledge:** to facilitate the generation of new climate change adaptation knowledge promoting understanding and providing guidance relevant to the development and implementation of national and regional climate change adaptation policy, plans and processes focused on climate change adaptation.
- c. **Application of existing and new knowledge:** synthesis of existing and new climate change adaptation knowledge to facilitate its application in sustainable development practices at the local, national and regional levels.

In collaboration with a wide range of national and regional partners, the Adaptation Knowledge Platform will aim at establishing a regionally and nationally owned information exchange mechanism that facilitates the integration of climate change adaptation into national and regional economic and development policies, processes and plans, strengthening linkages with the development agenda and enhancing research and institutional capacity.

The need for such an initiative is clear: the form it should take, less so. The initial partners in the Adaptation Knowledge Platform (Stockholm Environment Institute (SEI), Asian Institute for Technology/United Nations Environment Programme Regional Resource Centre for Asia and the Pacific (AIT-UNEP RRC.AP) and UNEP Regional Office for Asia and the Pacific (UNEP ROAP), supported by the Swedish Environmental Secretariat for Asia (SENSA) consequently agreed that the initial stages of the Platform's development, during 2009, should be an inception phase during which the management and implementation modalities were established, contacts with and the ownership of stakeholders at both national and regional levels were developed, needs for knowledge generation and sharing and capacity building were assessed and plans for the implementation of the Adaptation Knowledge Platform in 2010-2011 were prepared.

Overall, the activities implemented in 2009 achieved these aims. Activities have been initiated in the five pilot countries, Bangladesh, Cambodia, Nepal, Thailand and Viet Nam, with local partner's mobilized and key knowledge and capacity gaps identified. The management arrangements for the long-term development of the Platform are in place and the structure of the regional knowledge sharing mechanism has been defined. Effective communications are initiated, leading to awareness of the Adaptation Knowledge Platform's development that culminated in its successful, high profile launch on October 3rd 2009 together with the Asia Pacific Climate Change Adaptation Network (hereinafter, referred to as the Adaptation Network). Capacity development activities include training for officials and researchers from across the region and substantial progress has been made in the inventorying of existing and generation of new knowledge products. Sharing of knowledge on climate change adaptation has been initiated, focusing on the impacts of climate change on high altitude ecosystems. Linkages and collaboration with other relevant initiatives has been initiated, with the agreement reached with the Asia Pacific Adaptation Network and the Southeast Asia Network of Climate Change Focal Points for delivery of country needs on climate change adaptation in South and South-East Asia.

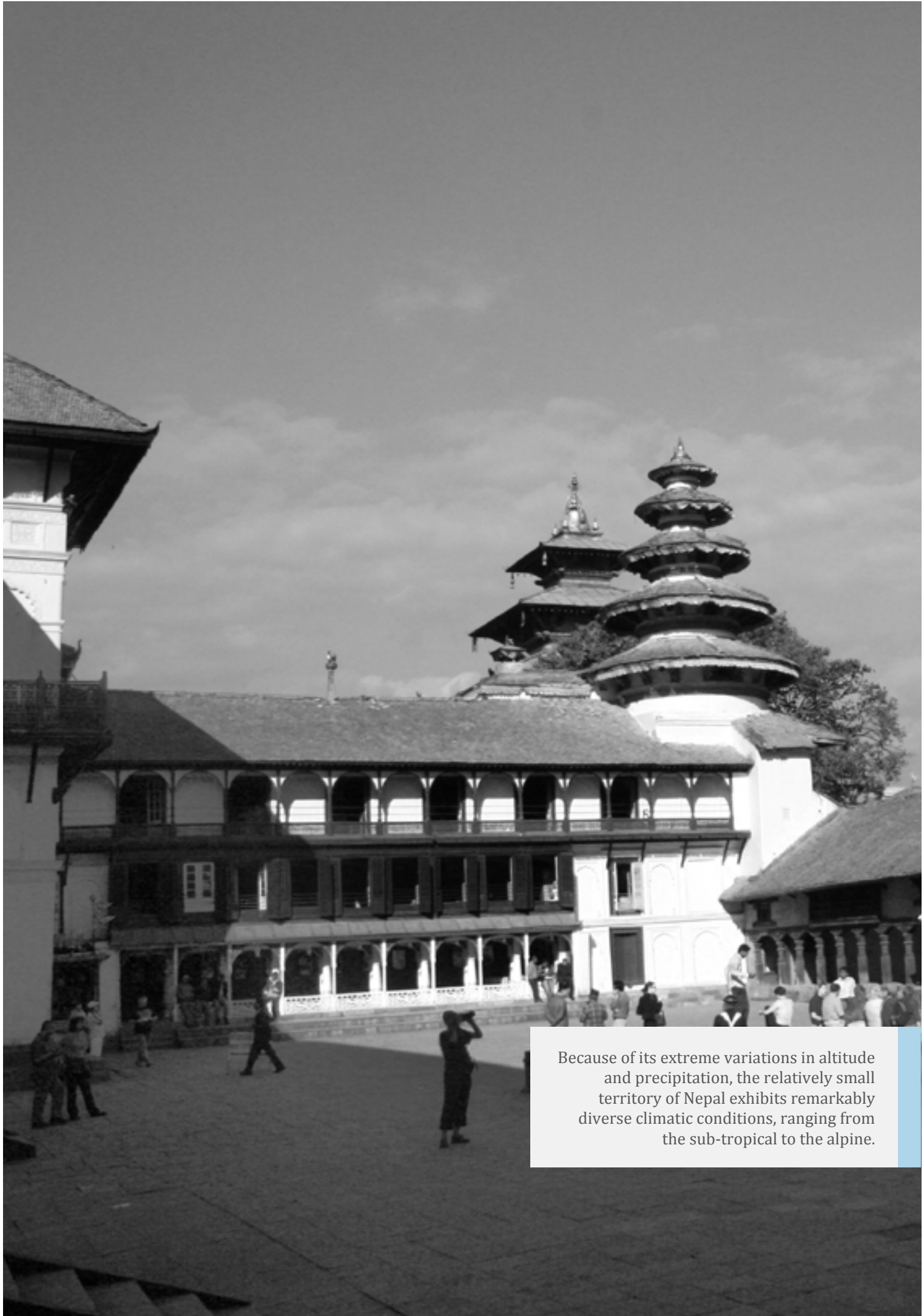
The most significant outcome of the inception year is the strategy for the future development of the Adaptation Knowledge Platform, presented in this report. The strategy details the activities that will be undertaken for each of the three components identified in the programme framework, along with a number of specific communications activities. These three components, along with the main focus of planned activities, are:

Regional knowledge sharing system: a regionally and nationally owned mechanism to promote dialogue and improve the exchange of knowledge, information and methods within and between countries on climate change adaptation and to link existing and emerging networks and initiatives. This will include the development of a Platform website and communications products to reach stakeholders across the region, an annual Asian Climate Change Adaptation Forum, a number of training and capacity development activities, the synthesis and dissemination of information and global experiences on adaptation actions and the development of national-level knowledge sharing and capacity development activities.

Generation of new knowledge: to facilitate the generation of new climate change adaptation knowledge promoting understanding and providing guidance relevant to the development and implementation of national and regional climate change adaptation policy, plans and processes focused on climate change adaptation. This will include the development of generic knowledge products, focused on the analysis of resilience and vulnerability, understanding the links between disaster risk reduction and climate change adaptation and downscaling of climate change and impact assessment data. It will also include four new studies that address key gaps in knowledge and understanding for the mainstreaming of adaptation into development planning. These four studies are: (i) Understanding Planning; (ii) Perceived and Actual Knowledge Gaps; (iii) Comparing Adaptation and Development; and (iv) How 'Autonomous' are Autonomous Responses?

Application of existing and new knowledge: synthesis of existing and new climate change adaptation knowledge to facilitate its application in sustainable development practices at the local, national and regional levels. The focus here is where knowledge is applied: within the countries of the region through mainstreaming adaptation into development planning. Follow-up activities are planned for the five pilot countries listed above and, in addition, in 2010 and 2011 the Adaptation Knowledge Platform activities will be initiated in the remaining eight focal countries: Bhutan, Sri Lanka, China, the Philippines, Myanmar, Indonesia, Lao PDR and Malaysia. In all of these countries, the Adaptation Knowledge Platform will work through partnerships with local institutions and 30% of the budget for 2010-2011 will be dedicated to these partners. There will also be activities to develop generic knowledge-to-practice products at the regional level.

Together with the dedicated **communications** activities, these components will achieve the objectives of this phase of the Regional Climate Change Adaptation Knowledge Platform for Asia. They will also build a base for the long-term development of the Platform as a knowledge-based, demand-driven structure through which planning for and capacities to address climate change adaptation as a core challenge for the future development of Asia. It is anticipated that this legacy will be carried forward through new phases of the Adaptation Knowledge Platform if and when there is demand for the services the Platform provides from the countries of Asia.



Because of its extreme variations in altitude and precipitation, the relatively small territory of Nepal exhibits remarkably diverse climatic conditions, ranging from the sub-tropical to the alpine.

CLIMATE CHANGE KNOWLEDGE PLATFORM IN NEPAL



INTRODUCTION

As is true elsewhere, Nepal's approach to development is based on gathering historical data within disciplinary boundaries to design solutions, an approach that assumes that everything else remains the same. In a world facing the perils of climate change such an approach will not be admissible. The current education system defines and imparts knowledge within disciplinary silos, but the impact of climate change, with its complex physical and social inter-linkages, demands much more. Nowhere is this interconnectedness unique than Nepal. The interconnectedness of Nepal's physical and social environments presents unique challenges to the country's development goals which the impacts of climate change will only serve to exacerbate. The punctuated rainfall of the region means that the hydrological science developed in temperate climes of the world will not be applicable here.

Because of its extreme variations in altitude and precipitation, the relatively small territory of Nepal exhibits remarkably diverse climatic conditions, ranging from the sub-tropical to the alpine. In fact, in just 200 km from north

to south, the country covers six distinct geological and climatic belts varying in altitude from above 8,000 m to just 95 m: the Trans-Himalaya, the High Himalaya, the High Mountains, the Middle Mountains (Mahabharat Range), the Chure Hills (the Siwaliks) and the Tarai. During the monsoon, rainfall is often sharp and intense, but and its magnitude, duration and intensity vary dramatically at the macro-, meso- and micro-scales. Difference in altitude can cause large variations even within a single valley of a large catchment. Cloudbursts, which can generate 500 mm of rainfall in just 24 hours, are common. Precipitation

in the winter months is minimal though more in the west than the east; what does come is brought by the westerlies. Higher elevations witness snowfall.

Nepal's six physiogeographical regions give rise to three types of river systems classified on the basis of their dry-season discharge and origin. Without regular and predictable precipitation, two of Nepal's primary sources of water--glaciers and groundwater—cannot be adequately recharged and the seasonal discharges of the river systems are severely compromised. The much-debated issue of glacier melt in the Himalaya is a key concern as many of Nepal's rivers right across the country get their dry-season flow from the melt-water of its over three thousand glaciers. The Koshi basin alone has eight peaks over 8,000 m in height including Sagarmatha the highest peak

Nepal's economy is heavily dependent on agriculture though only 27 percent of the country's land is cultivable and only one-third of that land is irrigated.

on earth, 36 glaciers and 296 glacier lakes (Bajracharya et al. 2007). East of the Koshi river, the Chure range is absent.

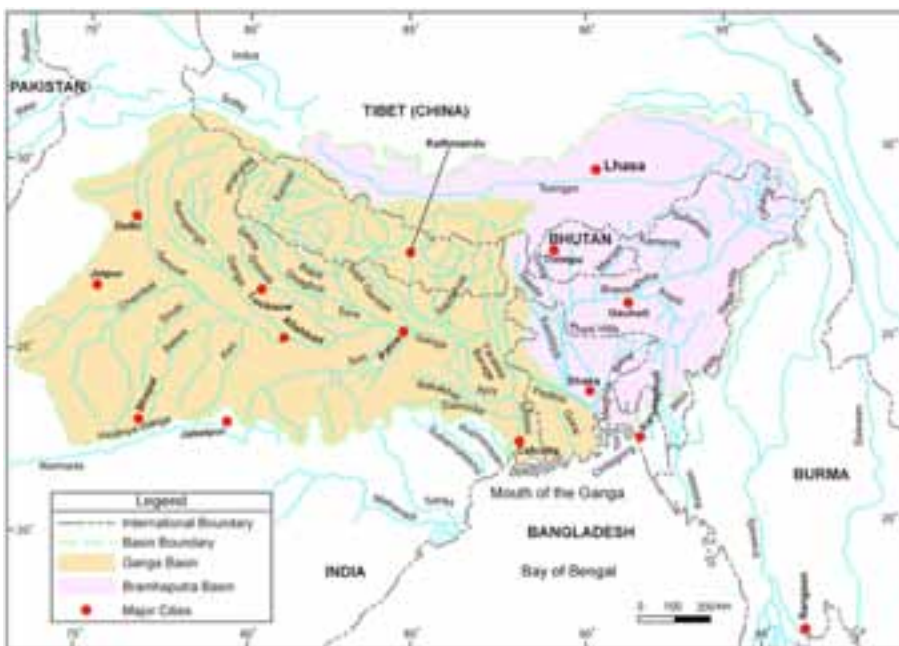
Nepal has four perennial snow- and glacier-fed Himalayan also called first grade rivers: the Sapta Koshi, the Narayani, the Karnali and the Mahakali, which forms Nepal's western border. The Mahabharat rivers (or the third grade rivers) are also perennial but they are rain-fed and originate in the Mahabharat Range. They include the Mechi, which forms the eastern border, the Kankai, the Trijuga, the Kamala, the Bagmati, the East Rapti, the Tinau, the West Rapti and the Babai. The Chure rivers (Or the third grade rivers), as the name implies, originate in the Chure range and have low or, in some cases, no dry-season flow. Because Chure rivers are fed primarily by monsoon rains, their flows are flashy and highly variable. Needless to say, the hydrology of these rivers exhibits great spatial and temporal variation. Together the rivers in Nepal have an average annual runoff of 1,500 m³ and support the irrigation systems and the hydroelectricity plants the nation depends on. In addition, the thousands of villages depend on small springs and rivulets for meeting their drinking water and other domestic water needs.

Nepal encompasses a good plurality of not only the natural systems but also of social systems incorporating hundreds of ethnic and caste groups, scores of languages, half a dozen nation-states and virtually all the religions of the world.¹ Despite its natural and social diversity, Nepal's economy is heavily

dependent on agriculture though only 27 percent of the country's land is cultivable and only one-third of that land is irrigated. Approximately 66% of the population depends on agriculture, whether as farm owners or agricultural wage earners. Agriculture, particularly in the hills, is subsistence level, but the average landholding—just 0.8 ha—often does not produce enough to feed a family throughout the year. In fact, over three-quarters of households produce only for their own consumption and less than 1% produce exclusively for sale (CBS, WB, DfID and ADB, 2006). In addition, studies (MOAC, 2007/8) suggest that 45 of Nepal's 75 districts

experience regular food deficits and that the country as a whole is forced to import over 485 thousand tonnes of food every year. In terms of volume, the total food shortage in the hilly region is more than thrice that in the mountains and the Tarai, which are about at par.

FIGURE_1 River basins of Nepal



Source: xxx

1 The total population of Nepal was estimated at 28.6 million (World Bank, 2009)
 2 The total food deficits for the mountains, hills and the Tarai are 127, 483 and 125 thousand tonnes respectively (MOAC cf. NAPA Synthesis Report, 2009).

The vagaries of climate change increase the vulnerability of the population whose primary occupation is agriculture. In response to the inquiries of a recent study (NCVST, 2009), farmers generally identified decreases in production of paddy and wheat and recurrent droughts as the hydro-geophysical consequences of the changing climate. Since rice is the staple food for most Nepalis, any significant decline in paddy yields can have a devastating impact on household-level food security. Climate change-induced impacts such as extreme weather events, including drought and flooding; delays in the arrival of and erratic rainfall during the monsoon; and pest and weed infestation have greatly affected agriculture, often negatively. Traditional farming practices are threatened due to increased temperatures and changes in the frequency and volume of precipitation subsequently resulting in either extended periods of drought and flash floods. Poor households with small landholdings face the greatest hardship because they grow a limited variety of crops and have no other sources of income. To cope with these adversities, many families are abandoning agriculture and migrating to Nepal's already overpopulated cities.³

These numbers are likely to increase as the climate grows increasingly volatile and unpredictable and traditional management practice can no longer respond to them. In fact, the country as a whole can expect to see a shift away from agriculture. In fact, in 2008 agriculture accounts for just 36% of GDP, a considerable decline from 1987-1988, when it constituted almost half of the total (NCVST, 2009:74). This indicates that Nepal economic structure is undergoing transformations.

Because of the regular and frequent occurrence of different natural hazards and the vulnerability of the population, Nepal is a disaster hot spot. The country's social context—its low level of development and institutional dysfunctions—intensifies the impacts of disasters. In fact, Nepal ranked 23rd in the world in terms of the total of natural hazard-related deaths from 1988 to 2007, with more than 7,000 deaths reported (IFRC, 2007). It has the seventh highest number of deaths attributable to floods, landslides and avalanches combined and the eighth highest number for flood-related deaths alone. Except for windstorms, which only one district is prone to, the incidence of disasters is extensive: a UN Report (2008) identifies that 49 are susceptible to floods and/or landslides and 23 to wildfires. Given how much smaller and less populated Nepal is in comparison to the other countries featuring in the top slots, these rankings are particularly high. They underscore the high human toll of disasters in Nepal even during 'normal' years.

Climatic hazards in particular, including hailstorms, snow avalanches, and cold and heat waves, also result in considerable losses of life⁴ and property. Localised thunderstorms, for instance, are a common killer, annually taking the lives of about 27 and injuring another 33 (MoHA, 2004). Existing records

Because of the regular and frequent occurrence of different natural hazards and the vulnerability of the population, Nepal is a disaster hot spot

³ The CBS shows that the rate of rural migration is increasing. In 1996 the rural to urban migration was 25.5 per cent whereas in 2001 it was 31.2 per cent (CBS, 2003).

⁴ In 1984, Dig Tsho was breached when a large avalanche slid into it. Two hours afterward, the flood reached a peak of discharge of 1500 m³/s. it destroyed a hydroelectricity project, 14 bridges, 30 houses and farmland worth four million US dollars. In 1985, a large avalanche triggered GOLF at Dig Tsho. A third devastating Golf was that of the Tam Pokhari in 1998. Two were killed, six bridges were destroyed and arable land was washed away. Losses were estimated at 150 million rupees (Source: 2009, Nepal Disaster Report, The Hazardscape and Vulnerability, Government of Nepal, Ministry of Home Affairs)

show lightning strikes are most frequent during the pre-monsoon months of April, May and June, but that they occur in other months as well. Avalanches, heavy snowfall and floods due to glacial lake outburst also cause losses of human life. Hailstones, in contrast, rarely kill, but they do occasionally destroy cereal crops and thereby exacerbate food deficits. As the intensity and frequency of weather hazards induced by anthropogenic climate change increase, Nepal's vulnerability to climate-related disasters is also likely to increase (IPCC, 2007). How does Nepal and Nepali deal with the new stress layers, what kinds of strategies will be needed and how one decided what one decides to do? These are important questions as one begins to answer some these questions.

This report brings together various domains of climate-related knowledge activities by looking at

- The institutional landscape
- Policies, laws and regulations
- Knowledge generation and capacity, and
- Ways forward



THE INSTITUTIONAL LANDSCAPE⁵

Institutional landscape in Nepal involves several organizations representing government and non-government player each involved in both production and use of knowledge. These organisations (see Appendix 1 for a list) directly address or make recommendations about environmental, climate-related, poverty alleviation and development issues. They work on drinking water, irrigation, hydropower and energy system development, community empowerment, capacity-building in disaster preparedness and response, and natural resource management. Such organisations can be broadly classified as governmental and semi-governmental organisations, multilateral and bilateral donor agencies, educational institutions, international and local NGOs, and federations of user groups, which in turn can be grouped into three solidarities: the state, market and civil society. Each of these solidarities is a social carrier of a different type of knowledge, one that reflects the needs of its particular world view and filters out other points of view. In this sense, no solidarity looks at its assumptions critically and challenges to accepted understandings rarely emerge. The members of each solidarity are identified in Table 1.

Considering the institutional landscape, donors and I/NGOs in Nepal consider climate change to be an important issue for development. However, only a few specific actions have been taken so far. The priorities of the donors reflect the priorities of the GoN, where the emphasis is on the peace-building process and where climate change features as a less urgent and immediate priority. A number of donor-supported programmes are explicitly or inadvertently addressing issues relevant to adaptation to climate change risks and reduction of vulnerability. The support to mitigation and CDM-related activities has been the main response to climate change in Nepal but there has been an emerging emphasis on adaptation and the mainstreaming of climate change impacts in the project portfolio of donors and NGOs.

5 Most of the references in this section is directly adapted from DANIDA's report on Climate change screening of Danish development cooperation with Nepal (2008)

Table 1 Three dominant worldviews

The state (managerial organisations)	The market (market-based organisations)	Civil society (social movements)
Government and semi-government institutions such as Ministries (Ministry of Environment; Ministry of Agriculture, Ministry of Forests and Soil Conservation; Ministry of Health and Population; Ministry of Science and Technology; Ministry of Information and Communications; Ministry of Physical Planning and Works); Departments (Department of Hydrology and Meteorology; Department of Water Supply and Sanitation; Department of Irrigation; Department of Water Induced Disaster Prevention; WEC)	Farmers and other primary sector producers Industries Service-sector agencies Domestic households	International NGOs Local NGOs Civil societies Community-based organisations User groups Federations of user groups Courts
Administrative units such as District Development Committees, (DDCs); Municipalities, Village Development Committees (VDC)		Academics and educational institutions
Bilateral and multilateral donors		Media

Since 2008 donor harmonization in climate change was initiated by Department for International Development (DFID). However, donor harmonization for adaptation projects still remains an area for improvement. There are a number of multilateral and bilateral donor supported adaptation programmes in Nepal including LAPA (DFID), Energy Sector Assistance Project (DANIDA), Tsho Rolpa Glacier Risk Reduction Project, Climate change impact on snow glacier cover using Remote Sensing and Climate change scenario and impact.

The work of INGOs has also been significant in climate change sector. WWF-Nepal has been actively involved in climate change activities for five years and supported the development of a climate change policy for Nepal. It has two adaptation specific projects - pilot adaptation in Langtang National Park and Buffer Zone (LNPBZ) and Indrawati sub-basin project. At the wider scale, WWF network has initiated Eastern Himalayas eco-region wide initiative called the Living Himalayas Initiative, which is geared towards addressing regional issues including climate change and transboundary connectivity of habitats in Nepal, India and Bhutan. IUCN and CARE-Nepal do not have specific climate change projects, but they have climate change on the agenda and are planning to mainstream climate change as a 'crosscutting issue'. In the past few years, NGOs also have shown need to collaborate on climate adaptation work. For example, a consortium of 5 organizations (Practical Action, IUCN, NAVIN, CECI and WWF) recently signed an MoU with ADB to prepare a standard vulnerability assessment tool for local level planning. Similarly, WWF and IDE are collaboratively implementing an IWRM project in which adaptation is a strong component. Practical Action has engaged in developing early warning systems for flood affected communities and community based approaches to disaster mitigation. The British Council is engaging through the Climate Generation project under its Global International Climate Champions Programme, which is a project with young people to act on climate change. Local NGOs (including community forest user groups) are also indirectly addressing climate change issues concerning adaptation measures by carrying out awareness, research and studies. Since climate change is an emerging topic, only some NGOs like

NTNC (National Trust for Nature Conservation), Environment and Public Health Organization (ENPHO), Clean Energy Nepal (CEN), and FECOFUN (Federation of Community Forestry User Groups in Nepal) have so far been engaged in raising awareness among decision makers and the population.



POLICIES, LAWS AND REGULATIONS⁶

The policies that Nepal currently espouses do not directly address the issue of adaptation to climate change because this idea of adaptive policies in general had not yet emerged as an issue of discourse when they were framed. Laws and regulations which have a bearing on adaptation to climate change can be broadly categorised as governing three systems: the natural resource management, the social and economic, and the financial systems.

I. Natural resources management system

a. *Drinking water and sanitation policies*

- Water Management Plan 2005
- The Rural Water Supply and Sanitation Strategy 2004
- The Rural Water Supply and Sanitation Sectoral Strategic Action Plan (RWSSSSAP) 2004
- Water Resources strategy 2002
- The National Water Supply and Sanitation Policy (1998)
- Water Resource Act 1992

b. *Irrigation policies*

- Irrigation Policy 2003
- Irrigation Regulation 2000
- Muluki Ain 1963

c. *Forest policies*

- Nepal Biodiversity Strategy 2002
- Forest Regulations 1995
- Forest Act 1993
- Forest Preservation Act 1967
- Forest Act of 1961

d. *Agriculture policies*

- National Agriculture Policy 2006
- National Fertilizer Policy 2002
- Consumer Protection Act 1996
- Food Act 1967

e. *Ecosystem policies*

- National Wetland Policy 2003
- Nepal Biodiversity Strategy 2002
- Forest Act 1993
- Nepal Environmental Policy and Action Plan 1993

- National Conservation Strategy (NCS) 1988

- Soil and Watershed Conservation Act (SWCA) 1982

f. *Energy policies*

- Community Electricity By-Laws 2003
- Hydropower Development Policy 2001
- Development Committee Act 1996 (which established the Alternative Energy Promotion Centre)
- Electricity Regulations 1993
- Electricity Act 1992

g. *Disaster policies*

- National Strategy for Disaster Risk Management 2009
- Natural Calamity Act 1982

II. Social and Economic Systems

a. *Communication*

- The Right to Information Act 2007
- Telecommunication Policy 2004

b. *Education*

- Technical Education and Vocational Training Skill Development Policy 2007
- Open and Distance Learning (ODL) Policy 2006
- Non-formal Education Policy 2006
- Technical Education Policy 2006
- Foreign Education Directives 2002

⁶ Most of the references in this section is directly adapted from DANIDA's report on Climate change screening of Danish development cooperation with Nepal (2008).

c. *Health*

- Abortion law 2002
- Mothers' Milk Substitutes (Control of Sale and Distribution) Act, 1992
- National Health Policy 1991
- The Protection and Welfare of the Disabled Persons Act 1982
- The Drugs Registration Regulation 1981
- Cosmetics and Drugs Act 1980
- Drug Act 1978

d. *Gender*

- Nepal's Interim Constitution 2007
- Irrigation policy 2003

III. *Financial system**Banking*

- Bank and Financial Institution Act 2006
- Nepal Rastra Bank Act 2002
- Debt Recovery Act 2002
- Development Bank Act 1996
- Insurance Regulation 1993
- Insurance Act 1992
- Industrial Policy 1992
- Trade Policy 1992
- Cooperative Act 1991

Because almost all of the above-mentioned acts and policies were framed when Nepal was still a constitutional monarchy and before discourse on the impact of climate change in the country, it is unfair to expect that they explicitly address the issue of climate change adaptation. Even so, it is possible that they can provide a foundation to enable adaptation anyway.

Nepal signed the UN Framework Convention for Climate Change (UNFCCC) in June 1992. UNFCCC entered into force in Nepal in July 1994. The Kyoto Protocol entered into force in Nepal in December 2005. The Ministry of Environment, Science and Technology (MoEST) is responsible for the overall coordination of climate change adaptation and mitigation. The Joint Secretary and Chief of the Environmental Section of MoEST is the national climate change focal point. The climate change focal point also attends the SBSTA (Subsidiary Body for Scientific and Technological Advice) of the UNFCCC.

The constitution of the Kingdom of Nepal (1990) provided for the establishment of a Natural Resources and Environment Committee in the House of Representatives. The main function of the committee is to evaluate policies and programme. However, the committee has been dormant for the most of the time. In 1992 the Environment Protection Council (EPC) was established and chaired by the Prime Minister to serve as the highest decision making body on all matters related to the environment. The initiations of the EPC were the ratification various climate related conventions and development of vehicle emission standards but it has also been mostly dormant. The GoN has formed a coordination forum named the Climate Change Council (CCCN). CCCN is chaired by the Secretary of the MOEST and is mainly activated as an advisory forum before and after having COP meetings of UNFCCC. Two meetings have been held. At the non-governmental level, a network named Climate Change Network-Nepal (CCNN) has been established at the initiative of WWF-Nepal, Winrock and other stakeholders and includes a wide range of members working in the Climate Change. The Government also administered the National Capacity Self Assessment with the support from the GEF-UNDP which identified priorities and needs for capacity building to protect the global environment considering the three 'Rio Conventions and Associated Thematic Areas' of bio-diversity, climate change and desertification.

Under the MoEST, DHM is responsible for meteorological observations, forecast, warning, climate and weather research services. DHM has four divisions (hydrology, climatology, meteorological forecasting, and coordination) and 15 sections including a climatology section for study and investigation of climate change. DHM is a focal point to IPCC, WMO, and meteorological activities of SAARC. The Department has set up weather stations (337 precipitation, 154 hydrometric, 20 sediment, 68 climatic, 22 agro-meteorological, 9 synoptic, and 6 Aero-synoptic) across Nepal. Media broadcasts the department's weather forecast through news bulletins and daily newspapers. The GoN in December 2005 nominated MoEST as the Designated National Authority (DNA) of the Kyoto Protocol and a Steering Committee was established in April 2006 with the Secretary of MoEST as chairperson.

MoEST with support from WWF is prepared a climate change policy for Nepal in 2009. A number of sector policies and strategies indirectly address climate change risks and adaptation, particularly National Wetland Policy (2003), Nepal Biodiversity Strategy (2002), Water Induced Disaster Policy (2006), Water Resource Strategy (2002), Rural Energy Policy (2006), Non-Timber Forest Products Policy (2004), Agriculture Policy (2004), Sacred Himalayan Landscape Strategy (2006), Agro-Biodiversity Policy (2007), and Bio-Safety Policy (2007). Several Acts and Regulations have been formulated to regulate the policies and strategies, for example the Forest Act (1993) and Forest Regulation (1995), Environment Protection Act (1996), Environmental Regulation (1997), and Water Resource Act (1992). The GoN has made the Environment Impact Assessment (EIA) and Initial Environment Assessment (IEA) mandatory before carrying out any major activities.

The GoN has formulated several national-level development and sector plans (e.g. Master Plan for Forestry Sector, National Water Plan and Agriculture Perspective Plan), relevant to adaptation to climate change, although the climate change risks are not directly addressed. In the 9th and 10th Plans, climate-relevant issues were indirectly mentioned, e.g. energy switching has been emphasized with several alternative energy sources to reduce the domestic use of wood and fossil fuels and encourage greater use of hydropower and biogas. The Interim Plan (2008 -2010) is more explicit on climate change risks and adaptation, in addition to a section on disaster management.

The Government of Nepal: Interim Plan (2008-2010)

The Government of Nepal, after people's movement in 2006, brought an interim constitution providing that constitution election will be held to prepare a democratic and republican constitution. The interim constitution constituted an interim government. The interim government has introduced a three year Interim Plan for 2008 to 2010. The plan has mentioned priorities, policies and strategies related to climate change in the development agenda, e.g.:

- A national policy on climate change will be formulated.
- Carbon trade will be promoted to achieve benefit from CDM under the Kyoto Protocol. In addition, carbon financing is taken as a sustainable financing source for the promotion of renewable energy technologies in Nepal
- By integrating environmental aspects in social and economic development programs through EIA system, improvements will be made in the quality of environment by means of environment-friendly development.
- Conventions on environment to which Nepal has endorsed will be publicized and implemented.



The focus of disaster management in Nepal is changing from reactive (relief and response) to proactive (preparedness and mitigation) risk reduction

The Ministry of Home Affairs (MoHA) is the national agency responsible for coordination of various aspects of disaster management, including preparedness, response, recovery and mitigation of disasters. The focus of disaster management in Nepal is changing from reactive (relief and response) to proactive (preparedness and mitigation) risk reduction, as can be seen in the draft national strategy for disaster management prepared by the ministry. The measures taken under disaster risk reduction (DRR) to meet with disasters in the short-term also contribute towards longer-term climate change adaptation, which is positive, if well coordinated with other stakeholders working on climate change.

A Central Disaster Relief Committee under the chairmanship of the Minister for Home Affairs (MoHA) and district-level disaster committees under chairmanship of the Chief District Officers in each district have been formed to coordinate and execute the activities relating to disaster preparedness, mitigation and reconstruction as well as rehabilitation as per the 'Natural Calamity Relief Act'. Regional and local-level committees may also be formed under the Act. A Central Calamity Relief Fund established under the Act is also being used to promote preparedness and mitigation, in addition to the main tasks of response and relief.

MoHA has prepared a National Strategy for Disaster Risk Management (NSDRM) which has now been approved by GoN. Draft legislation is also being drafted to enable the shift from disaster response to DRR. The three-year Interim Plan has also lays emphasis on programmes like disaster management teams in coordination with the concerned ministries, for emergencies due to natural hazards or outbreak of epidemics, providing training in disaster management, reducing earthquake risks, medicine supply chain improvement among others.

The Department of Water Induced Disaster Prevention (DWIDP) under the Ministry of Water Resources is involved in mitigating impacts of floods, debris flow and carries out river training, hazard and risk mapping, community awareness and strengthening institutions involved in managing such disasters. DWIDP works in close collaboration with MoHA on rehabilitation and reconstruction of river protection infrastructure and has its staff in most flood-prone districts in the plains. Joint Secretaries from some key line ministries have been appointed as Disaster Management focal points for MoHA, which is well aware of its coordination role to bring together relevant sectoral ministries for implementation of DRR activities. Bilateral and international organisations such as EU, UNDP, and other I/NGOs are complementing government efforts, e.g., the Community-Based Disaster Management Programme funded by the UNDP.

Civil society is also involved in these efforts. For example, Disaster Preparedness Network (DPNet), initiated in 1998, is an informal network of individuals and organisations involved in the disaster management from a development perspective. The network has 35 members from 24 Government and NGOs including International and Nepal Red Cross Societies, media, donor communities, community based organizations, and municipalities. The main reason for initiating DPNet is to enhance the capacity and improve the performance of its members/partners to share, design, implement and sustain disaster preparedness activities in Nepal. In addition, DPNet aims to promote sustainable disaster preparedness and management activities, link disaster to development, strengthen the disaster management capacity of partners and share knowledge.

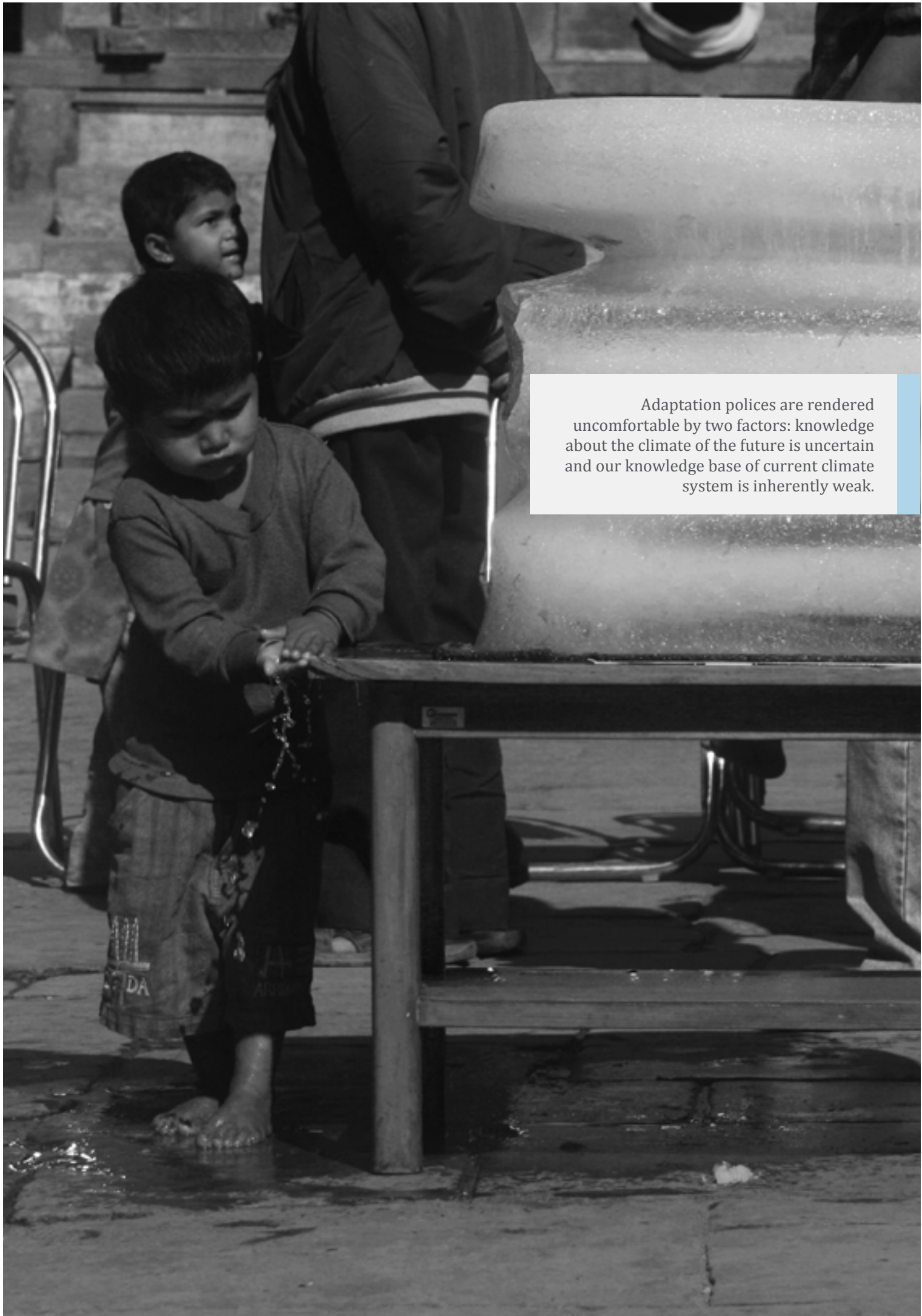


EXPLORING THE KNOWLEDGE-POLICY INTERFACE IN THE CONTEXT OF CLIMATE CHANGE ADAPTATION

Adaptation is widely recognised as a central component of any policy response to climate change despite the many challenges adaptive policymaking faces in the course of minimising the vulnerability of the populations to climate-shocks. Adaptation policies are rendered uncomfortable by two factors: knowledge about the climate of the future is uncertain and our knowledge base of current climate system is inherently weak. These two realities share a common interface in the knowledge-policy domain. Adaptation presupposes the existence of knowledge about how to adapt to and survive the challenges of climate change. To generate such knowledge involves engaging in problem-solving at all levels of governance—local, national and global--and to make it useful requires integrating it into existing knowledge systems so that it is available when needed. While high science and modern information is critical for responding to the impacts of climate change, it is also important to consider the wisdom of ages contained in traditional forms of knowledge. The knowledge required for adaptation must blend both.

Table 2 Adaptation options and their processes (OECD, 2009)

Adaptation options	Process
Bear losses	A “do-nothing” response in which the individual simply endures and accepts the losses he or she incurs.
Share losses	This type of adaptation response involves sharing the losses among a wider community. Such actions take place in traditional societies and in the most complex, high-tech societies. In traditional societies, many mechanisms exist to share losses among a wider community, such as extended families and village-level or similar small-scale communities. At the other end of the spectrum, large-scale societies share losses through public relief, rehabilitation, and reconstruction paid for from public funds. Sharing losses can also be achieved through insurance.
Modify the threat	It is possible to exercise a degree of control over some environmental threats. For example, the threat of a flood can be mitigated by constructing dams or dykes, and the threat of drought by building irrigation systems.
Prevent effects	A frequently used set of adaptation measures involves steps to prevent the effects of climate change and variability. For example, in agriculture such measures include: changes in crop management practices, such as increased irrigation water, additional fertiliser use, and pest and disease control.
Change uses	Where the threat of climate change makes the continuation of an economic activity in traditional ways impossible or extremely risky, a vulnerable individual may change how he approaches that activity. For example, a farmer may choose to plant a more drought-tolerant crop or switch to more drought-resistant varieties of the same crop.
Change location	A more extreme response is to change the location of economic activity such as the feasibility of relocating major crops and farming regions away from areas of increased aridity to areas that are currently on the cooler side for productive agriculture. Such areas may become more attractive for some crops in the future.
Income diversification	An individual or community may adopt to more than a single earning option; in case if one fails due to climate change impact, livelihood is sustained by the others.
Research	The process of adaptation can also be advanced by research into new technologies and new methods of adaptation.
Encourage behavioural change through education, information and regulation	Another type of adaptation is the dissemination of knowledge through education and public information campaigns which actually leads to behavioural change.



Adaptation policies are rendered uncomfortable by two factors: knowledge about the climate of the future is uncertain and our knowledge base of current climate system is inherently weak.

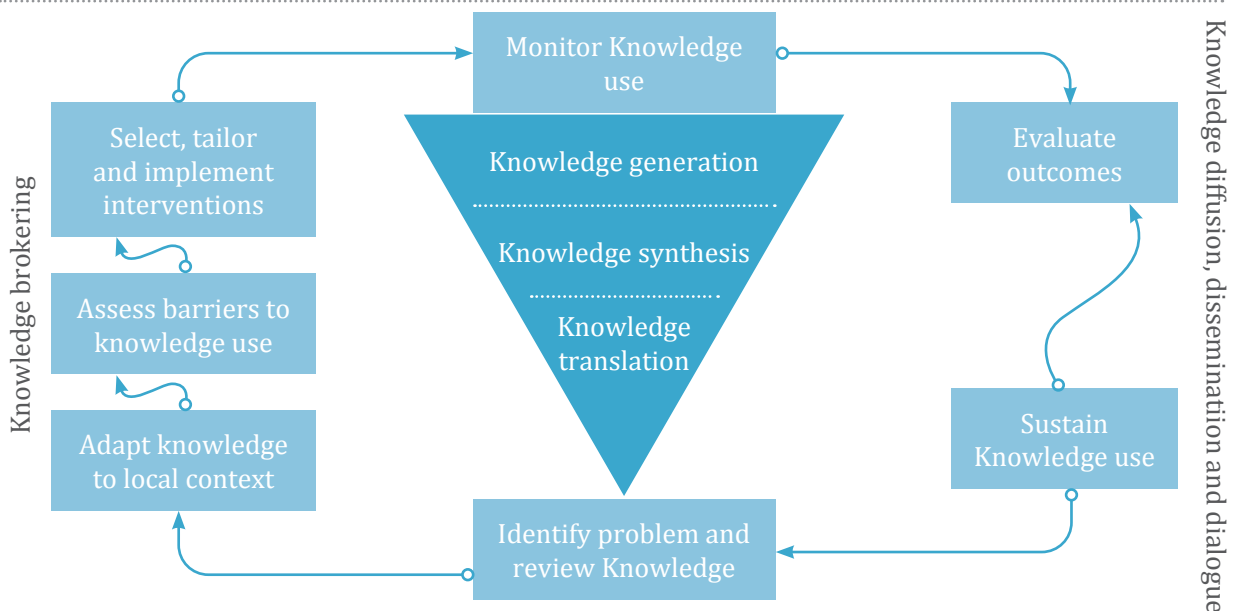
As the table makes clear, a broad range of adaptation measures can be implemented in response to both observed and anticipated climate change. Hence no one single measure can ensure the success of an adaptation policy instead multiple approaches should be adopted simultaneously. Scheraga and Grambsch (1998) have suggested several principles that can help formulate effective adaptation policy. They also indicate the complexity associated with the development of adaptation policy (See figure 2). This sort of taking account of various significant factors in policymaking is by no means a new practice. Indeed, Crabbé and Leroy (2008) refer to a wide range of literatures on policy which demonstrates its complexity.



KNOWLEDGE UTILISATION AND POLICY CHANGES

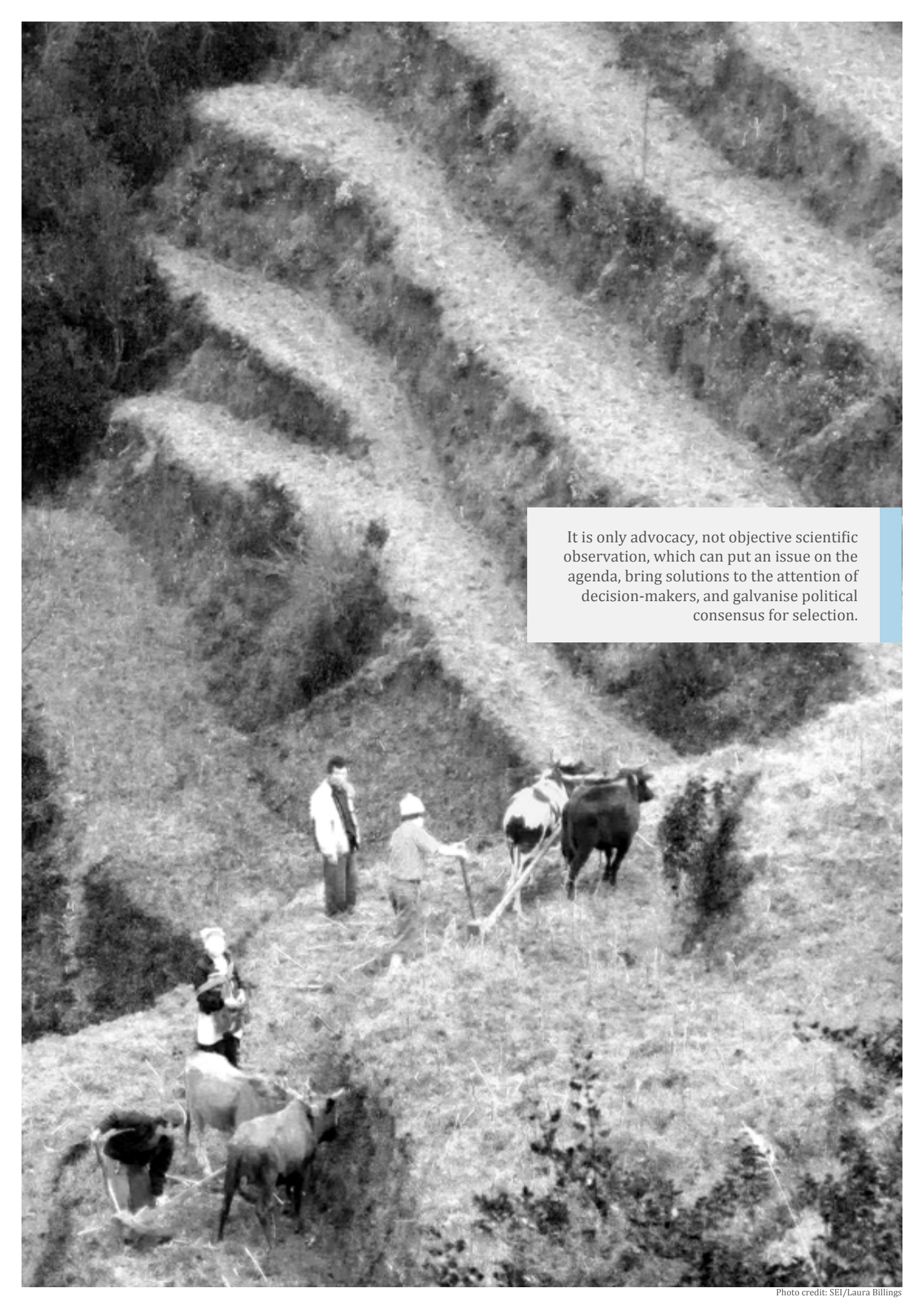
The concept of knowledge utilisation in the context of policymaking is not easy to operationalise because there is little consensus on the meaning of the term “use.” Technical data seldom speak for themselves. As a result, an active process of claim making and persuasion needs to provide argumentation in defence of statements about the knowledge produced. In this way, knowledge tends to creep into policymaking, gradually altering the assumptions and concepts that frame policy discourse. Because these kinds of cognitive and linguistic shifts are subtle and diffuse and often observable only over a span of years, the impact which social scientific research and analysis has on policymaking is often underestimated.

FIGURE_1 Knowledge generation and translation



Source: ODI, 2009

Policy change is not a linear outcome of research; in fact, policy-relevant research seldom provides immediate or direct impact on government decisions. Instead, the influence of research on policy is indirect and incremental. Changes come about through a process of iterative interactions of defining the problem, suggesting solutions, and obtaining political consensus on what constitutes knowledge. Changes take place when these streams of activities converge, presenting a “window of opportunity” that



It is only advocacy, not objective scientific observation, which can put an issue on the agenda, bring solutions to the attention of decision-makers, and galvanise political consensus for selection.

Table 3 Issues pertinent to knowledge system of climate change

Knowledge system	Issues
Climate science	Limited data, climate modeling based on low resolution imagery, complex monsoon dynamics, poorly understood feedback processes in the atmosphere, complex geologic terrains
Social systems	Disappearing indigenous knowledge, poor communication, disorganised migrations, high existing vulnerabilities, increasing poverty, social trade-offs, cultural gaps, illiteracy, gender inequality and social discrimination, poor response mechanisms
Ecosystem	Poorly understood relations among ecological components, increasing deforestation, growing environmental degradation such as pollution and over-fishing, inadequate policies to enhance benefits from ecosystem services
Economy	Lack of valuation of environmental services, lack of insurance mechanisms, poor institutional frameworks, limited market flexibility

can be grasped by individuals engaged in a process of change, including that of adaptation to climate change, and in the making of policy that enables people to adapt.

If researchers and analysts want to have a direct impact on policy—one that goes beyond the diffuse enlightenment function—they may need to abandon the posture of the neutral technician and embrace the actively committed role of an advocate. It is only advocacy, not objective scientific observation, which can put an issue on the agenda, bring solutions to the attention of decision-makers, and galvanise political consensus for selection.

There is widespread agreement on the need for evidence in making informed policies and decisions. But policymaking is a messy process and decision-makers are subject to an enormous range of pressures and constraints. Since policymakers tend to rely on easy-to-understand stories rather than on more abstruse hard evidence, decisions tend to be based more on political expediency than on an objective consideration of what is required. In terms of climate change, the use of evidence runs in to two other problems. First, climate science is not and can never be predictive. Second, the technical nature of the information makes it inaccessible to many.

Knowledge can flow from research to policy in various ways: legislative routes, bureaucratic access, educational avenues, opinions and campaigns, shared learning dialogues, knowledge platforms and networks. Unfortunately, the goal of decision-makers more often seems to be conveying their message than disseminating knowledge. Its transmission is affected by many factors. There may be, for instance, a dearth of policy-relevant research in a country. Another barrier is the lack of access to data, whether to researcher or policymaker or both. Even when there is sufficient data, how thoroughly research apprehend it and how effectively they communicate it will also influence its transmission. In addition, researchers and policymakers are divorced from, or worse, despised by the people or if bureaucrats cannot absorb the findings of research knowledge flow will be limited.

In Nepal, the disjunction between research and policy formulation undermines the role a researcher is able to play in knowledge generation and dissemination. Most researchers are involved in a consultancy type of policy-oriented research, in which knowledge is produced in order to directly assist decision-makers and help them deal with the policy problems they face. Gyawali and Dixit (2000)

term this trend to be a zamindari research culture: in-house or in-country homework is substituted for total reliance on external experts. This reliance has not only weakened the intellectual vigour of Nepali researchers but also made them incapable of providing sound professional advice to the medley of political masters of the day. In general, the culture of a research-oriented system of education has yet to evolve as an integral part of education. As result the kinds of insights necessary for responding to climate change vulnerabilities (whether that response promotes adaptation or mitigation) are not salient in current approaches to knowledge generation, use and transfer. Some of the weaknesses in Nepal's systems of knowledge—area related to climate change adaptation in which insight is lacking—are presented in Table 3.

Many times policymakers and political actors (who are generally not scientists) struggle to understand complex scientific climate models. Connections between the knowledge research makes available and its use in policymaking can be improved by adopting the steps below. It must be re-emphasised that knowledge is one element in the continuum of discrete data, information and wisdom.

BOX_1 Knowledge system for dealing with uncertainty: The case of water resources

Designing future water resource systems, whether institutional or infrastructural, to deal with climate change, presents a unique challenge to knowledge systems because their design is based on probabilistic information. Investments in improving these systems are currently being made and both institutional and infrastructural development has been witnessed. Whether such advances will continue in the future is in doubt though as our capacity to deal with the uncertainty of climate change is limited. First of all, historical data cannot be used in probability data. In addition, since both the modeling process and basic data are limited, it is unlikely that we will be able to provide reliable probabilistic information regarding even the most basic hydrologic parameters. As a result, the viability of the conventional approach to designing water infrastructure, insurance systems and institutions for management (like flood zoning), an approach that requires probabilistic information, is in question. Given the level of investments currently been made in improving climate modeling and data, improving the resolution of local climate projections does not represent a critical gap limiting adaptation. On the contrary, what is the critical gap is the development of knowledge systems for institutional and infrastructure design that do not require probabilistic information about future conditions.

The gap and shortcomings identifies above suggest that future research and action must consider the following specific points:

1. The robustness of methods that project future probabilities must be considered. In particular, can new approaches to water management that do not require knowledge about such probabilities be designed? The identification of such avenues is central.
2. Current practice in the economic analysis of risk reduction focuses on probabilistic techniques. While logical, this approach will be inadequate for justifying or evaluating investment possibilities if the probability of extreme events or other climatic conditions remains difficult to predict. As a result, research into identifying techniques for evaluating the economic viability of investments under conditions of uncertainty is necessary.
3. Currently all decisions related to investment or policy changes in relation to the climate change vulnerabilities of the water sector are made under the assumption of a certain future and impacts on a specific location. The likely improvements in modeling techniques are unlikely to resolve the problem of how to reflect uncertainties. Instead, we need to adopt novel strategies for decision-making that reflect uncertainties.

These issues need to respond to key strategic and tactical considerations, specifically the need to identify measures for adaptation that can be economically.

The link between policy and research can be enhanced by these measures:

- Building relationships, developing a common understanding and sharing knowledge among various groups of people, including groups of politicians and researchers.
- Strengthening the structures of organisations responsible for disseminating information.
- Creating a transparent and trusting environment.
- Working in collaboration to embrace innovations.
- Creating a synergy among communities, the private sector and government actors working at different levels, from the local to the global, rather than focusing on strategies that emerge from one mindset.
- Bridging gaps created by differences between expert and local knowledge and by differing ideologies.

Some essential components of managing knowledge to strengthen climate change policy regime include:

- Documenting management initiatives, particularly ones involving the participation of local populations and organisations as well as the government.
- Building the basis for informed dialogue through broad-based communication strategies that reach key audiences, forums for debate, social networks and partnerships.



KNOWLEDGE AND ACTORS

Because their collective capacities need to be brought to bear in enabling adaptation, it is relevant at this stage to revisit the actors involved in climate change issues in Nepal and to assess their roles in knowledge management. The knowledge platform must include policymaking agencies that operate across and within sectors as well as interdisciplinary scientific and educational organisations, and provisions for cross-regional learning that link knowledge generation to the decision-making processes. Local and regional governments are directly involved in adaptation activities, while NGOs, civil society groups and community-based organisations pilot innovative approaches focusing on vulnerable populations to ensure that such groups

are not excluded or further marginalised as climate impacts increase. The full spectrum of actors and activities must be incorporated. It is also necessary to recognise the roles planned and autonomous adaptation play and to consider how the private sector can be involved in up-scaling successful autonomous efforts. The need of knowledge platform represented by various actors/groups hence is imperative for knowledge management to help policy process. One of such common forums successful in Nepal was that of trail bridge (see box 2) which was able to bring various relevant actors and their interest together for

increasing efficacy of trail bridge sector. In the section below we discuss the specific capacities and roles a variety of groups could play in developing the knowledge platform on adaptation to climate change.

Government departments are major players in climate change negotiations and can play a significant role in facilitating climate change adaptation needs.

BOX_2 Nepal Trail Bridge Forum (NTBF)

In 2001 organisations involved in the Trail Bridge Programme constituted the Nepal Trail Bridge Forum (NTBF). Project planners, educational institutions, manufacturers, policy makers, project management and maintenance specialists were involved. The idea of a forum emerged from discussions among stakeholders, including Association of District Development Committee Nepal (ADDC/N), government departments and educational institutions. The NTBF is an independent forum composing the private sector, donors, the government, I/NGOs, and educational institutions involved in the development of trail bridge.

The formation of the NTBF was guided by the need to initiate a sub-sectoral approach. Its objective is to avoid duplication, generate creative ideas, publicise costs and hold implementing agencies accountable. The forum is not registered (with government membership present), but is instead on informal network. The directing principals of the charter approved in 2004 are as follows:

- a. The Provisions of the charter shall be binding to those who have ratified the charter.
- b. The Forum shall perform the task of enhancing transparency, good governances, practice, decentralisation and community participation with regard to the planning, construction, repair and maintenance, capacity upgrading and management of trail bridges.
- c. The Forum's main function shall be to develop and enhance the mutual exchange of information regarding trail bridges and to promote coordination and contact.
- d. The Forum shall extend all possible assistance in the task of establishing, enforcing, and implementing policies and guidelines regarding trails and trail bridges.

The Forum's major activities are to make public the costs of the components of a trail bridge in a national daily newspaper; organise workshops and seminars for manufacturers and coordinate various building agencies, The Forum is governed by an executive committee with a coordinator, executive secretary, treasurer and members. The Forum holds general meetings twice a year. The forum has three types general of members: institutional, individual and honorary.

The NTBF is an ongoing action terrain which facilitates the collective discussion on issues related to trail bridges. Its major achievements are securing the commitment of trail bridge stakeholders to the Forum; sensitising manufacturers toward quality control issues; increasing awareness; and, by publishing costs in a national daily becoming transparent.

RESEARCH and POLICY STUDY AGENCIES

The many sectors involved in the adaptation process need to have access to knowledge developed by NGOs, academics, the private sector and government departments. Encouraging the formation of a platform could avoid each going their independent ways. The governance of such a platform is key; it must meet the demand for adaptation, communicate "best practices", a replicate the results of such learning. Such agencies must also promote regional and cross capacities in order to identify multiple points of entry.

GOVERNMENT AGENCIES

Government departments are major players in climate change negotiations and can play a significant role in facilitating climate change adaptation needs. In addition to whatever government entities are designated as focal points for activities related to climate change, the National Planning Commission (NPC) and sector agencies are also crucial. NPC can be a key player in enabling adaptation processes and in coordinating across different departments. For their part, sectors can establish systemic measures that promote autonomous adaptation as such shifts in strategies are constrained or enabled by communication, transport, finance, energy systems, water resources and the conditions of ecosystems.

LOCAL GOVERNMENTS

Local governments can influence location-specific factors that constrain or enable autonomous or planned adaptation and thus have an important role. Local government agencies need to be involved in programme delivery, enforcement of laws and policies, poverty reduction and natural resource management. Though local-level consultations identified local governments as being important players, their capacities in promoting adaptation strategies need strengthening. Among all the actors identified, local governments are among those most able to use the results of research and demonstration activities. These agencies can have the greatest capacity to implement planned strategies at scale but in a manner that still reflects regional to local conditions.

EDUCATIONAL INSTITUTIONS

The scientific research community in Nepal has focused its effort on the study of climate change and modeling and now needs to broaden its focus to

1. remain alert to changes in the policy environment; and
2. educate a new core of professionals empowered with interdisciplinary knowledge to work in local governments, sectoral departments, policy organisations, and business entities.

PRIVATE SECTOR

Improving transportation and communications infrastructures are important in enabling adaptation, as is helping vulnerable populations diversify out of climate-dependent livelihoods. The private sector can promote both endeavours. The involvement of the private sector will flow most naturally

from research and development processes that result in courses of action that reflect the business models on which private sector activity is based. Direct business interests are the reason insurance and energy enterprises are involved in climate change-related tasks. Unfortunately, it has been difficult to involve the private sector in other, less obviously profitable issues of adaptation. The most important role private sector organisations can play is in the innovation and incubation of new technologies, services and institutions, itself a significant element in growing local economies and promoting technological flexibility.

NON-GOVERNMENTAL ORGANISATIONS

The work of NGOs in Nepal has focused on development and livelihood-related activities and on disaster risk reduction. NGOs can also play a critical role in the innovation and incubation of technologies, the development of novel strategies and the undertaking of pilot initiatives to support climate adaptation that can later be replicated and up-scaled by private or public sector. NGOs can also play a critical role in the development of climate-related social protection initiatives that are outside the radar screen of governments and are not profitable enough to interest the private sector.

COMMUNITY-BASED ORGANISATIONS

Community-led natural resource management and development programmes abound in Nepal. Although few CBOs are established precisely to carry out climate change adaptation initiatives,

they could nonetheless help implement suitable drought and flood risk reduction approaches. Cooperatives can also play a significant role in strengthening links with markets in order to ensure better returns for small-scale entrepreneurs.

BOX_3 Capacity assessment (Information management)

Information management can be conceived as one element of “adaptation system” that can support ongoing adaptation by communities, businesses, government agencies, and others – much as ecological relationships support the well-being of organisms in an ecosystem. All national systems will need to perform a set of functions if adaptation to climate change is to proceed effectively. These functions include, for example, assessment of vulnerability, coordination of different adaptation actors, and management of climate-relevant information. This is the starting premise of a proposed framework (NAC) (WRI, 2009).

In addition to information management, the other functions considered by NAC are assessment, prioritization, and coordination and risk reduction. The framework provides a set of capacity questions and elements to look for in each capacity category to facilitate assessment. Information management, for example has four capacity questions and supporting elements to look for in each category (See Table 4). The NAC framework was used to assess Nepal’s capacity to manage information vis-à-vis climate change adaptation. A preliminary assessment of strength and gaps are listed in Table 5. NAC aims at strengthening knowledge management related to climate change through collecting, analysing and disseminating knowledge to build adaptive capacities. One of the key aspects of this NAC component is its consideration of targeting stakeholders from local to national level in collating and disseminating knowledge.

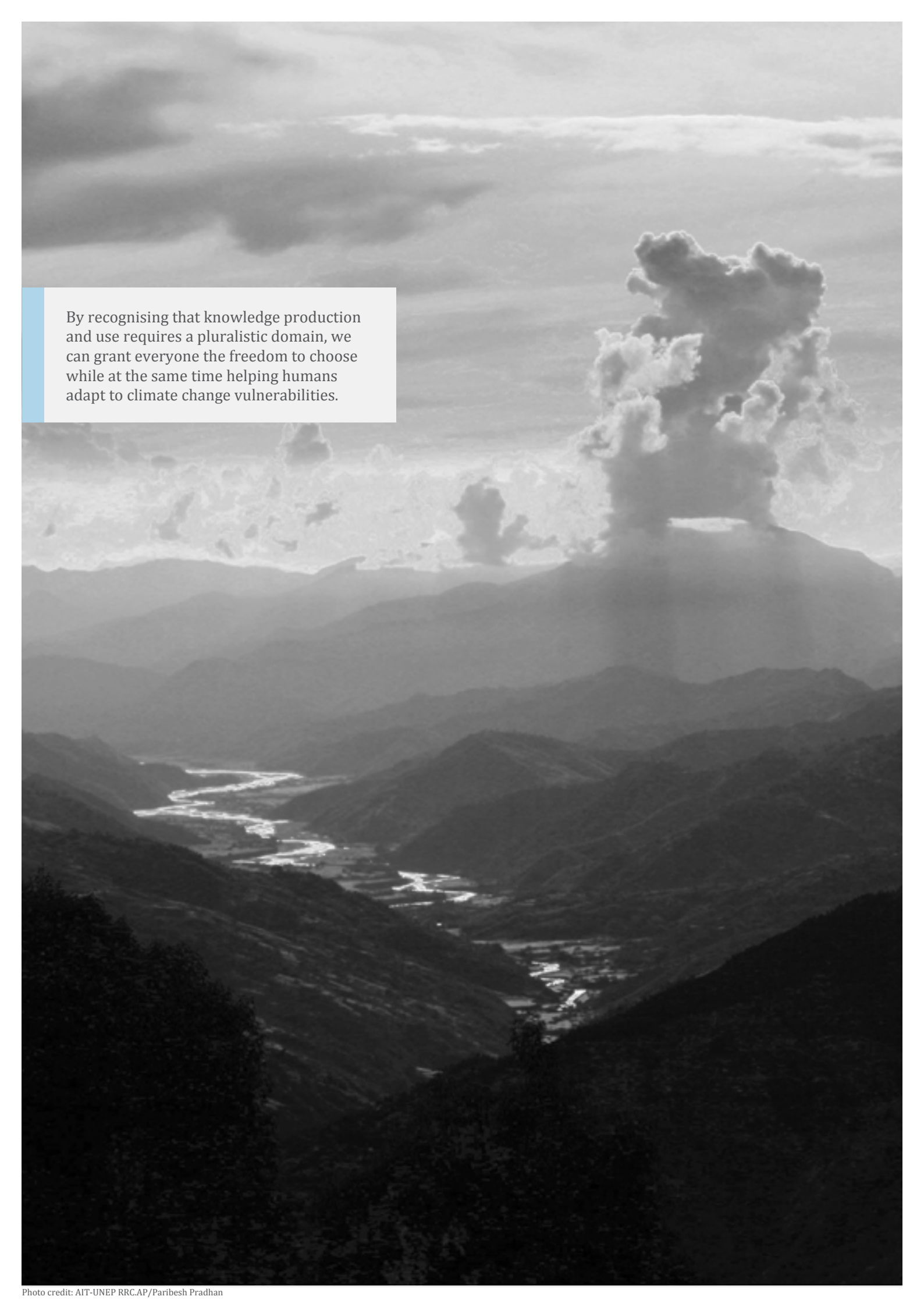
Table 4 capacity questions and element

Capacity questions	Elements to look for
A. To what extent has climate risk been assessed?	<ul style="list-style-type: none"> • A systematic risk assessment has been conducted. • Risk assessment takes into account bio-physical, socio-economic, and policy factors. • Risk assessment considers infrastructure, natural resources management, and social protection programs, as appropriate. • Assessment methodology is made transparent and readily available to public and other agencies. • An institution has a mandate to conduct risk assessment iteratively over time.
B. Have adaptation options for the given priority area been thoroughly considered?	<ul style="list-style-type: none"> • Consideration of options included an appropriate breadth of possible solution: <ul style="list-style-type: none"> • “Soft” and “hard” options. • Infrastructure-based, ecologically-based, and social protection-based options. • Existing adaptation and/or risk reduction projects were reviewed for appropriate replicable options. • Cost analysis, including total costs and cost effectiveness, was conducted. • Environmental implications of options were considered. • Social implications of options were considered, including implications for women and marginalized groups. • Options were evaluated for their short-, medium-, and long-term efficacy. • A broad set of stakeholders were engaged in consideration and selection of options. • Processes exist for reviewing options selected based on new risk assessments over time. • Authorities make publicly available a process description and justification of options selection.
C. To what extent are selected adaptation options implemented on the ground?	<ul style="list-style-type: none"> • Projects/programs/policies are developed to implement selection option(s), as appropriate. • Appropriate authority is tasked with implementation. • Sufficient budget is provided in support of implementation. • A system exists for reviewing effectiveness of implementation. • Projects/programs/policies are achieving stated objectives and timelines. • Mechanisms exist for adjusting non-performing projects/programs/policies. • Mechanisms exist for integrating new risk assessment information into projects/ programs/policies over time.

Source WRI (2009)

Table 5 Strength and gaps in information management

Category	Strengths	Gaps
Information management	Systems for the collection and dissemination of hydrological and meteorological data exist	Stations are inadequate and data collected does not represent the local context. The stations are located are at populated regions
	Analysis of climate trends and climate change scenarios have been done and published. NAPA plus project included some of these learning	Capacity building and resource allocation is necessary for establishing new stations as well as develop ‘software’ and check quality. Limited climate modeling and scientific capacity.
	Plans underway to establish knowledge platform and budget has been set aside.	Lack of resources, capacities and institutional abilities hinder systematic analysis, review and easy availability of information to the public.
	INGOs and NGOs platforms have been established.	Government has made little attempts to make information available to communities that need it the most.
	Information is being collected, used and disseminated via different sources	Few early warning systems have been installed. Those installed do not function or are ineffective. Lack of vertical coordination means that data collected in large number of station



By recognising that knowledge production and use requires a pluralistic domain, we can grant everyone the freedom to choose while at the same time helping humans adapt to climate change vulnerabilities.



CONCLUSIONS

Effective programmes for climate change adaptation require building research capacity at various levels of governance and among public, private and community organisations. Developing countries such as Nepal require basic capacity-building in research skills at all levels of government and within all in-country educational establishments. There is a need to educate the staff of government departments so that they can influence higher-up officials. The process of educating these officials must consider both planned and autonomous adaptation efforts across all sectors and levels to strengthen the capacities of the next generation of policymakers and researchers on climate change. Efforts in research capacity- building should be encouraged to support local government units to use climate change information in adaptation planning. Knowledge hubs across government bodies, universities, NGOs and other civic and business groups can strengthen mechanisms for learning, especially if they are supported and reinforced by research centres and universities using regional collaborative research programmes.

A key issue in knowledge management is providing access to funding and ensuring that research institutions are guaranteed intellectual independence. Such independence can be won if financing is tied to transparent formulae independent of conditions imposed by the donors. If such provisions are made, research funds can support independent institutions which can question, critique and produce ideas that pass the test of intellectual scrutiny. Competition in the production and dissemination of knowledge is necessary to create a generation that can serve the needs of a society facing the perils of human-induced climate change. By recognising that knowledge production and use requires a pluralistic domain, we can grant everyone the freedom to choose while at the same time helping humans adapt to climate change vulnerabilities. Promoting the ability to assess risk and make knowledge-based decisions can help people address whatever constraints the future may toss at them. Our challenge is to craft a dynamic platform the broad, inter-disciplinary understanding of the issues related with climate change discussed. Such understanding must be based on generations of experience, and must be the foundation for the building of adaptive capacity that can respond to various stresses, including those associated with climate change (NCVST, 2009).

The platform should enable different types of knowledge systems to find salience in the public discourse. Referring to the challenge of new knowledge NCVST (2009) has suggested combining high science with the civic science of common, everyday Himalayan experience as an iterative process. What will be demanded in the future is a better understanding of how both natural and social sciences impact each other and how changes in the assumptions of one discipline will have unintended and profound consequences for the assumptions in other. This osmosis and synthesis between the natural and social sciences will require redesigning curricula and teaching methods, and include the writing of textbooks that bring practical insights from the field into the classroom. This process must start at the school level and proceed right up to the tertiary level of education. The curricula should include emerging insights into the changing nature of ecosystem functioning as well as into its services and conservation.

REFERENCES

- Bajracharya, B., Shrestha, A. B. and Rajbhandari, L., 2007, Glacial Lake Outburst Floods in the Sagarmatha Region: Hazard Assessment Using GIS and Hydrodynamic Modelling, Mountain Research and Development, Vol. 27, pp. 336–344, Kathmandu.
- CBS, 2003: Population Monograph of Nepal, Vol. II, His Majesty's Government, National Planning and Commission Secretariat, Central Bureau of Statistics, Kathmandu.
- CBS, WB, DFID and ADB, 2006: Resilience Amidst Conflict An Assessment of Poverty in Nepal, 1995-96 and 2003-04. Kathmandu: The World Bank.
- DANIDA, 2008: Climate change screening of Danish development cooperation with Nepal, Ministry of Foreign Affairs of Denmark Danish International Development Assistance (Danida).
- Crabbé, A., Leroy, P., 2008: The Handbook of Environmental Policy Evaluation, Earthscan, London, UK.
- Gyawali, D., 2001: Water in Nepal, Himal Books, Panos South Asia and Nepal Water Conservation Foundation, Kathmandu Nepal.
- IFRC, 2007: World Disaster Report, Focus on Discrimination, International Federation of Red Cross and Red Crescent Society, Geneva, Switzerland.
- IPCC, 2007: Climate Change 2007: The Physical Science Basis, Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, In Solomon, S., Qin, D., Manning, M., Chen, Z., Marquis, M., Averyt, K. B., Tingnor, M. and Miller, H. L. (eds.), pp. 996, Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
- ISET, 2010: Process Program Digram, Asian Cities Climate Change Resilience Network (ACCCRN), Cities Resilience Planning Workshop, March 9-15 Bankok.
- MoAC, 2006: Agriculture and Environment, Deserts and Desertification: Don't Desert Drylands, Governments of Nepal, Ministry of Agriculture and Cooperatives, Gender Equity and Environment Division, Agri-Environment and Biodiversity Section, Kathmandu.
- MOHA, 2004: Disaster Scenario of Nepal 2000 to 2003, Ministry of Home Affairs, Government of Nepal, Kathmandu
- NCVST, 2009: Vulnerability Through the Eyes of Vulnerable: Climate Change Induced Uncertainties and Nepal's Development Predicaments, Institute for Social and Environmental Transition-Nepal (ISET-N, Kathmandu) and Institute for Social and Environmental Transition (ISET, Boulder, Colorado) for Nepal Climate Vulnerability Study Team (NCVST) Kathmandu.
- Nepal Disaster Report, 2009: Nepal Disaster Report 2009, The Hazardscape and Vulnerability, Ministry of Home Affairs (MoHA), Government of Nepal and Disaster Preparedness, Network-Nepal (DPNet) with support from European Commission through its Humanitarian, Aid Department, United Nations Development Nepal and Oxfam Nepal, Kathmandu.
- ODI, 2009: Knowledge Policy and Power, Six Dimensions of the Knowledge-development Policy Interface, Overseas Development Institute, UK.
- OECD, 2009: Integrating Climate Change Adaptation into Development Co-operation, Policy Guidance, Organisation for Economic Co-operation and Development (OECD).
- Scheraga, J. D., Grambsch, A. E., 1998: Risk, Opportunities, and Adaptation to Climate Change, Climate Research, Vol. 10, pp. 85-95.
- WRI 2009: The National Adaptive Capacity Framework, Key Institutional Functions for a changing Climate



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October 2010
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