

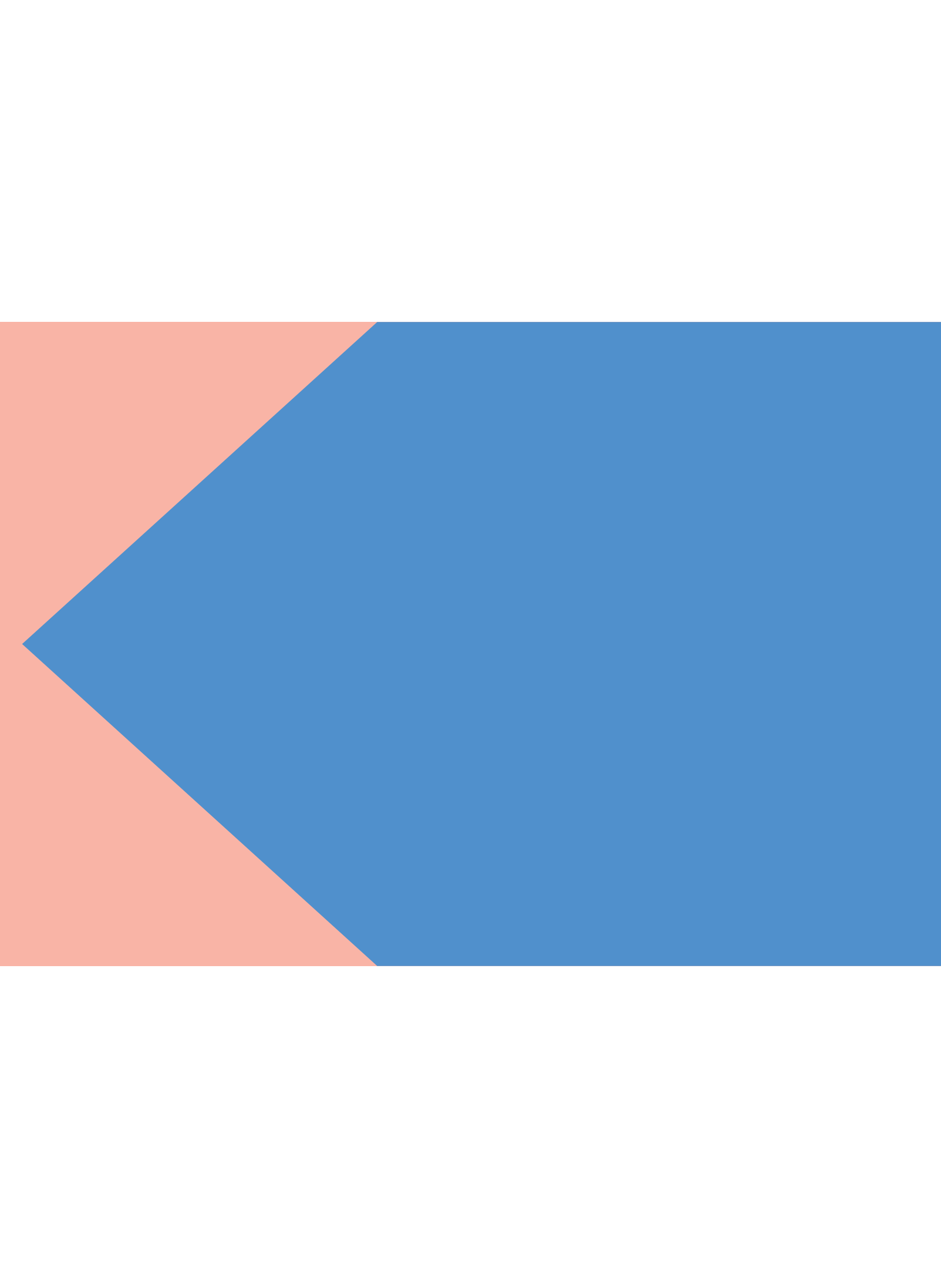
THE NAIROBI WORK PROGRAMME

ON IMPACTS, VULNERABILITY AND ADAPTATION TO CLIMATE CHANGE

Action Pledges:

MAKING A DIFFERENCE ON THE GROUND

A synthesis of outcomes, good practices, lessons learned,
and future challenges and opportunities



UNFCCC

United Nations Framework Convention on Climate Change

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I. INTRODUCTION

1.1. MOTIVATION

The Nairobi work programme on impacts, vulnerability and adaptation to climate change was adopted at the eleventh session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC) in 2005. The objective of this work programme of the Subsidiary Body for Scientific and Technological Advice (SBSTA) is to assist all Parties, in particular developing countries, including the least developed countries and small island developing States, to improve their understanding and assessment of impacts, vulnerability and adaptation, and to make informed decisions on practical adaptation actions and measures to respond to climate change on a sound scientific, technical and socioeconomic basis, taking into account current and future climate change and variability.

The Nairobi work programme was designed as a mechanism for engaging stakeholders and catalysing action, and as a platform for sharing knowledge and learning on adaptation to climate change. Since the launch of the Nairobi work programme at the end of 2005, over 140 organizations (including intergovernmental organizations, United Nations agencies, non-governmental organizations (NGO), community-based organizations and private-sector entities) have formally joined the work programme as partners. The Nairobi work programme has gained broad support from Parties to the UNFCCC and partner organizations, based on its successful implementation to date.

Eight calls for action, identifying priority activities to further advance the work in various areas under the Nairobi work programme have been formulated, based on discussions at mandated technical workshops and expert meetings. 91 action pledges have been made by 40 partner organizations, aligning their ongoing activities with priorities as reflected in calls for action. In recognition of the significance of the Nairobi work programme's catalytic and facilitating role in advancing the work on adaptation in all countries, and its effective implementation, Parties have proposed the expansion of its scope to support the implementation of relevant parts of adaptation actions needed in a future climate regime. Parties and organizations have also expressed a strong desire to see concrete knowledge products from the implementation of the programme. Given the considerable number of outputs generated by implementing pledged actions by partner organizations, the UNFCCC secretariat, under the guidance of the Chair of the SBSTA, undertook consultations with Parties and partner organizations on possible ways to capture and disseminate these outputs, as well as the lessons being learned and opportunities for implementing adaptation action. These consultations revealed that a synthesis publication highlighting the key outputs of pledged actions under the Nairobi work programme and the key lessons learned could be an effective way to both showcase some practical outcomes of the Nairobi work programme through actions it catalyzed, and inform Parties about the resources and actions being offered by Nairobi work programme partners.

It is the intention of all the contributing partners that the practical outcomes, emerging good practices and lessons learned, challenges and opportunities reported in this publication would assist all Parties, particularly developing country Parties, within the context of planning for and implementing enhanced adaptation actions as part of a future adaptation regime arising from the Bali Action Plan process.

1.2. PURPOSE AND SCOPE

In response to the mandates by the SBSTA for the Nairobi work programme during its second phase,¹ this publication aims to provide a succinct and user-friendly synthesis of the major outputs and their practical impacts of those actions pledged and implemented by Nairobi work programme partner organizations to date, as well as key emerging good practices, lessons learned, challenges and opportunities.

The wide range of activities included in the action pledges and reported by partner organizations have been grouped into the following seven themes in this synthesis, reflecting the nature of the activities in delivering adaptation actions:

- Improving the provision of climate data and information;
- Developing and disseminating methods and tools;
- Assessing the impacts of, vulnerability and adaptation to, climate change;
- Communicating climate risks;
- Scaling up community-based adaptation actions;
- Reducing risks of extreme events and climate-related disasters; and
- Promoting knowledge sharing and learning.

In this synthesis, these seven themes are considered in relation to each of the nine work areas of the Nairobi work programme.

For more detailed information on the contributions made by partner organizations for this publication and the underlying action pledges, readers are invited to visit the Nairobi work programme website at <http://unfccc.int/nwp>.

1.3. PROCESS OF DEVELOPING THIS PUBLICATION

Under the guidance of the Chair of the SBSTA, a concept note outlining the key aspects of the publication was developed, and all Nairobi work programme partner organizations that made action pledges by June 2009 were invited to contribute, on a voluntary basis, a short summary of the implementation of their pledged actions. Out of 37 invited organizations, 24 committed themselves to contributing to this publication while the rest of the invited organizations informed the UNFCCC secretariat that their implementation of pledged actions was still at an early stage. However, these partners indicated their interest in contributing to similar exercises in the future.

Partners made contributions under the seven themes, depending on the scope of their action pledges. In addition to reporting on their own action pledges, seven partners contributed further to this publication by compiling contributions from collaborating organizations into thematic chapters. The list of contributing organizations is given in the [TABLE I-1](#). Using the thematic chapters developed by partner organizations, the UNFCCC secretariat, in close consultation with relevant partner organizations, carried out an editorial revision to ensure consistency and coherence across the thematic chapters.

As described above, this synthesis is a truly voluntary contribution from the Nairobi work programme partner organizations, undertaken in the spirit of their commitment towards the achievement of the objectives of the Nairobi work programme. The UNFCCC secretariat, under the guidance of the Chair of the SBSTA and in consultation with Parties and partner organizations, played a purely catalytic and facilitating role in this exercise.

1.4. OUTLINE

This publication consists of this introductory section, and seven thematic chapters, each containing a synthesis of activities included in the synthesis exercise, case studies and examples highlighting: key outputs from the adaptation actions undertaken by Nairobi work programme partners, their practical impacts, emerging good practices and lessons learned, and challenges and opportunities. A final concluding chapter provides the overall key messages from the lessons learned to date and possible ways in which the Nairobi work programme can enhance its roles as a catalyst for action and as a central learning platform on adaptation, both currently and in the context of a future climate regime.

¹ FCCC/SBSTA/2008/6, paragraphs 30 and 34.

Table I-1. Nairobi work programme partners that contributed to this synthesis publication

Thematic chapter	Compiled by	With contributions from
Improving the provision of climate data and information	World Meteorological Organization (WMO)	– Ibero-American Network of Climate Change Offices (RIOCC) – Office of Agricultural Risk (Argentina) (ORA) – United Nations Development Programme (UNDP) – Water Center for the Humid Tropics of Latin America and the Caribbean (CATHALAC) – WMO
Developing and disseminating methods and tools	Food and Agriculture Organization of the United Nations (FAO)	– Asian Development Bank (ADB) – Christian Aid – FAO – International Union for Conservation of Nature (IUCN)
Assessing impacts of, vulnerability and adaptation to climate change	Global Change System for Analysis, Research and Training (START)	– Center for International Forestry Research (CIFOR) – Christian Aid – Food and Agriculture Organization of the United Nations (FAO) – International Union of Forest Research Organizations (IUFRO) – START – World Federation of Engineering Organizations (WFEO) – World Food Programme (WFP)
Communicating climate risks	Environmental Development Action (ENDA)	– ENDA – Global Change System for Analysis, Research and Training (START) – Practical Action
Scaling up community-based adaptation actions	Practical Action	– Christian Aid – Environmental Development Action (ENDA) – Institute for Social and Environmental Transition (ISET) – Kyoto University Graduate School of Global Environmental Studies – Practical Action – Satkhira Unnayan Sangstha (SUS) – United Nations Development Programme (UNDP) – World Food Programme (WFP)
Reducing risks of extreme events and climate-related disasters	United Nations International Strategy for Disaster Reduction (UNISDR)	– Christian Aid – Ibero-American Network of Climate Change Offices (RIOCC) – Institute for Social and Environmental Transition (ISET) – Kyoto University Graduate School of Global Environmental Studies – Munich Climate Insurance Initiative (MCII) – United Nations Development Programme (UNDP) – UNISDR – World Food Programme (WFP)
Promoting knowledge sharing and learning	United Nations Environment Programme (UNEP)	– Environmental Development Action (ENDA) – Ibero-American Network of Climate Change Offices (RIOCC) – Institute of Development Studies (IDS) – Kyoto University Graduate School of Global Environmental Studies – Stockholm Environment Institute (SEI) – United Nations Development Programme (UNDP) – UNEP







II. IMPROVING THE PROVISION OF CLIMATE DATA AND INFORMATION

CHAPTER COMPILED BY

World Meteorological Organization (WMO)

WITH CONTRIBUTIONS FROM

Ibero-American Network of Climate Change Offices (RIOCC), the Office of Agricultural Risk (ORA), United Nations Development Programme (UNDP), the Water Center for the Humid Tropics of Latin America and the Caribbean (CATHALAC), WMO including its Global Climate Observing System (GCOS)

Climate observation and prediction is an ongoing challenge, particularly at the regional and local level, and for developing countries. Scarcity of adequate and reliable climate data is a major constraint in developing an accurate understanding of current and future climate variability and change. Improving the observation and management of climate data will improve projections of future climate and help develop effective adaptation strategies.

Activities carried out by Nairobi work programme partners on this theme aim to:

- Improve the collection, management, exchange, access to and use of observational data and other relevant information on current and historical climate and its impacts;
- Promote the improvement of observations, including the monitoring of climate variability.

This chapter highlights the work undertaken by Nairobi work programme partners, including that completed through their action pledges on improving the availability of climate data and information. It includes lessons learned, and the challenges and opportunities identified from implementing actions.

2.1. ACTIONS TAKEN AND RESULTS ACHIEVED

The activities carried out by partners are aimed at overcoming the difficulties of data and information provision and application by improving:

- monitoring and forecasting (including the recovery of historical data and the recording of traditional knowledge);
- climate prediction for Impacts, Vulnerability and Adaptation (IVA) assessment (including scenario development and modelling).

Of particular importance is how partners are promoting data sharing and data management, disseminating climate data and building capacity to assist decision-making at all levels.

Some of the main actions and results are highlighted in [TABLE II-2](#) and described in more detail in [BOXES II-1](#) to [II-5](#).

Table II-2. Summary of activities undertaken and results achieved to date

Type/Name of action	Activities	Countries/regions covered
MONITORING		
GCOS Regional Action Plans	Identifying regional needs and priorities for climate observing systems	Developing countries
GCOS Cooperation Mechanism	Implementing Regional GCOS Action Plans	Ibero-America
DARE	Reviewing worldwide data rescue projects; identifying gaps and actions for advancing data rescue and digitisation of climate records	Worldwide
Climate Watches	Providing technical advice to end-users of climate data	Global
Climate observations and regional climate modeling in support of climate risk management and sustainable development	Three interlinked workshops to address the issues of accessing and using good quality climate observations with sufficient spatial and temporal coverage. Capacity building to utilise observations and to employ appropriate downscaling strategies to analyse, evaluate, interpret, and apply data for adaptation planning	Countries of the Greater Horn of Africa (GHA)
PROVIDING CLIMATE DATA FOR VULNERABILITY ASSESSMENT AND ADAPTATION DECISION MAKING		
Country climate profiles	Producing country-level climate profiles	Developing countries
Ibero-American Programme on Adaptation to Climate Change (PIACC)	Strengthening decision-making, including through the development of adaptation projects; the strengthening of climate data and observation systems; the development of on-line and field training courses; and the elaboration of outreach materials	Ibero-America
Improved monitoring, analysis and dissemination	Assisting decision-making through improved monitoring, analysis and dissemination	Argentina
The Mesoamerican Regional Visualisation and Monitoring System (SERVIR)	Providing information on climate data, tools, access to information products in a variety of formats and tailored to the range of decision-makers, from scientists to the general public	Mesoamerica and the Dominican Republic

	Focus area(s)/Sector(s)	Results to date	Organization(s)
	Multiple sectors	Assistance to a number of developing country to implement GCOS Regional Action Plans	GCOS
	Multiple sectors	Different projects in the Global Upper Air Network and in the Global Surface Network in Perú, Uruguay, Ecuador, México, El Salvador, Colombia, etc. developed; financial support provided	RIOCC
	Data review and rescue	A comprehensive report on data rescue worldwide prepared, along with several proposed actions to improve data availability	WMO
	Early warning	Two workshops organized since 2008, with more planned	WMO
	Multiple sectors	A preparatory meeting organized in June 2009 to officially start the programme	WMO, GCOS, the World Climate Research Programme (WCRP) and the Intergovernmental Authority on Development (IGAD) Climate Prediction and Application Centre (ICPAC)
	Multiple sectors	52 country-level climate profiles produced and disseminated	UNDP
	Multiple sectors	Coordination between countries in the region improved; adaptation projects started or planned; capacities among experts in the region enhanced	RIOCC
	Multiple sectors	A range of weekly monitoring data made available; a method developed to calculate water balances for some crops grown in the region; and the results of these calculations as weekly charts to inform producers in the region and assist decision-making produced	ORA
	Multiple sectors	Facilities for data and information generation and exchange and for North-South and South-South knowledge transfer improved; a suite of tools, providing access to information products in a variety of formats and tailored to the range of decision-makers developed; capacity enhanced through nearly 30 technical training workshops held across the region with participation of over 500 professionals trained	CATHALAC

Box II-1. Systematic observation and monitoring

Continued accumulation of basic climate data and observations is essential to understand past and current climate variability and change and to test, verify and improve global and regional models. Scarcity of adequate and reliable climate data in many parts of the world is considered to be a major constraint in developing an accurate understanding of current and future climate variability and change, particularly in the developing and least-developed countries.

Under the auspices of the World Meteorological Organizations (WMO), the global network of National Meteorological and Hydrological Services (NMHS) has the specific responsibility for the collection, processing and archiving of systematic climate data. NMHS collectively operate a world-wide system which combines the instrument facilities of a Global Observing System^a on land, at sea, in the air and in outer space that measure weather and essential climate variables. WMO's Global Telecommunication System facilities provide for nearly instantaneous collection, exchange and distribution of observations on a real-time basis, and its Global Data-Processing and Forecasting System's centres carry out numerical computations and analysis, and prepare and distribute weather and climate records, warnings, forecasts, predictions, and outlooks.

The NMHS network contributes significantly through the development and use of modern climate data management systems and through the 'rescue' of historical records that are at risk of deterioration, in order to secure complete and safe long-term climate records. The NMHS data archive has been used in the publication of world climatological statistics and a wide variety of climate diagnostics. In addition, the NMHS and WMO maintain permanent relations with key economic sectors, such as marine, aviation, agriculture, health and water, and are committed to understanding their needs and maintaining a regular dialogue with them.

The NMHS network also contributes to the Global Climate Observing System (GCOS), a global system of climate systems facilitating climate observations for terrestrial, oceanic, and atmospheric domains. GCOS facilitates improvements in observing climate systems in both developed and developing countries, in part through its interaction with the Conference of the Parties (COP) to the UNFCCC. GCOS has recently completed a *Progress Report on the Implementation of the Global Observing System for Climate in Support of the UNFCCC 2004 – 2008* (GCOS 2009). This report assesses progress in actions called for in a 2004 report, *Implementation Plan for the Global Observing System for Climate in Support of the UNFCCC* (GCOS 2004). Among other things, the Progress Report notes that developing countries have made only limited progress in filling gaps in their observing networks, with some evidence of decline in some regions. Capacity building support and funding remain small in relation to needs. The GCOS Secretariat is currently preparing an update of the 2004 Implementation Plan, taking into account the progress made since that time, as well as new and emerging needs, such as climate data and information support for adaptation to climate variability and change.

In addition, in response to an invitation from the COP (Decision 5/CP.5), the GCOS Secretariat has been responsible for facilitating the development of ten Regional Action Plans^b intended to strengthen observations in developing countries. Much more dedicated support from both national and international sources is needed to implement the projects identified in these Action Plans, and, more broadly, to improve and sustain observing systems in developing countries.

^a The backbone of the Global Observing System is 11,000 stations on land and 900 stations making observations of the upper air using radiosondes while aircraft automatically provide observations en-route. Over the oceans around 6,000 ships and 2,000 buoys and other platforms are instrumented to provide meteorological and oceanographic observations. In space, five polar-orbiting and six geostationary satellites provide global coverage.

^b The regional plans were for the Pacific Islands, Eastern and Southern Africa, Central America and the Caribbean, East and Southeast Asia, Western and Central Africa, South America, Central Asia, South and Southwest Asia, Eastern and Central Europe, and the Mediterranean Basin.

Box II-2. Providing country-level climate profiles for assessments and adaptation planning

Information on future climate conditions, or scenarios, are an essential element in assessing future vulnerability and adaptation. Constraints in technical capacity, data and information availability, and financing often obstruct the ability of developing countries to generate climate scenarios of satisfactory quality. A United Nations Development Programme (UNDP) project, financed by the Global Environment Facility/UNDP/United Nations Environment Programme (GEF/UNDP/UNEP) National Communications Support Programme (NCSP) and the UK Department for International Development, aims to address these constraints through the preparation of country-level climate profiles.

Under the project, climate profiles for 52 developing countries were created to provide an 'off-the-shelf' analysis of climate data, including historic trends and projected future changes, using up-to-date Global Climate Model (GCM) experiments and robust analytical tools. Each

country profile contains a set of maps and diagrams illustrating the observed and projected national climates as well as maps depicting changes on a 2.5° grid, with summary tables of the data. The files are user-friendly, manageable and in text format which can easily be downloaded, reviewed and further analyzed.

Based on surveys carried out by the NCSP, the profiles have helped country teams working on vulnerability and adaptation assessments to refine and strengthen local studies. The successful conclusion of the first phase of the project has resulted in many more countries signing up for the second phase, which may involve country teams more directly to further develop capacity and facilitate replication at the local level. Data on extreme events may also be included in future country profiles. The profiles can serve as an invaluable basis to communicate climate risk to policy makers.

Figure II-1. UNDP country-level climate profiles



Source: United Nations Development Programme.

Box II-3. Assisting decision-making through regional capacity building

A large range of partners are fostering capacity to understand and use climate data more effectively, so as to enable decision-making on adaptation on a regional and national basis.

The decision to create Ibero-American Network of Climate Change Offices (RIOCC) was taken at the IVth Forum Meeting of the Ibero-American Ministers of the Environment in October 2004. The network serves as an engagement tool between the Ibero-American countries to integrate climate change considerations into the highest political dialogue; promote strategies focused on sustainable development and low-carbon economies; and identify common problems and solutions in the context of impacts, vulnerability and adaptation to climate change.

RIOCC's activities include keeping track of the international climate negotiations under the UNFCCC and its Kyoto Protocol; systematic observation and climate change research (including support for the

GCOS Regional Action Plans and the identification and execution of regional research projects); capacity building; and exchange of knowledge and experiences. In 2005, the Ibero-American Programme on Adaptation to Climate Change (PIACC) was launched.

The aim of PIACC is to strengthen the development and application of adaptation strategies in the region, within the context of the UNFCCC, by making the most of the countries' strengths and interests, and to facilitate assistance to all the members of the RIOCC in the evaluation of climate change impacts, vulnerability and adaptation options. PIACC enables the different groups of countries in the Latin American region to work together on adaptation priorities. It is an instrument for exchanging knowledge and experiences within the RIOCC framework, facilitating North-South and South-South cooperation.^a

^a <http://unfccc.int/files/adaptation/sbsta_agenda_item_adaptation/application/pdf/action_pledge_riocc.pdf>.

Box II-4. Assisting decision-making through tracking climate impacts on natural resources

In addition to a lack of detailed information on climate impacts, an overall lack of harmonised information on the region's environment is a stumbling block in Mesoamerica. The Water Center for the Humid Tropics of Latin America and the Caribbean (CATHALAC) – with the support of international partners – implements a Regional Visualization & Monitoring System (SERVIR, in Spanish).

Established in 2005, SERVIR is a bilingual virtual information platform for the nine countries of Mesoamerica and the Dominican Republic <<http://www.servir.net>>, with an operational facility at CATHALAC, and a supporting prototyping facility at the NASA's Marshall Space Flight Center in Alabama. SERVIR supports decision-making in the areas of climate change adaptation, environmental management and early warning for disasters, among others, through the provision of historic data, information on current environmental and weather conditions, forecasts and future scenarios.

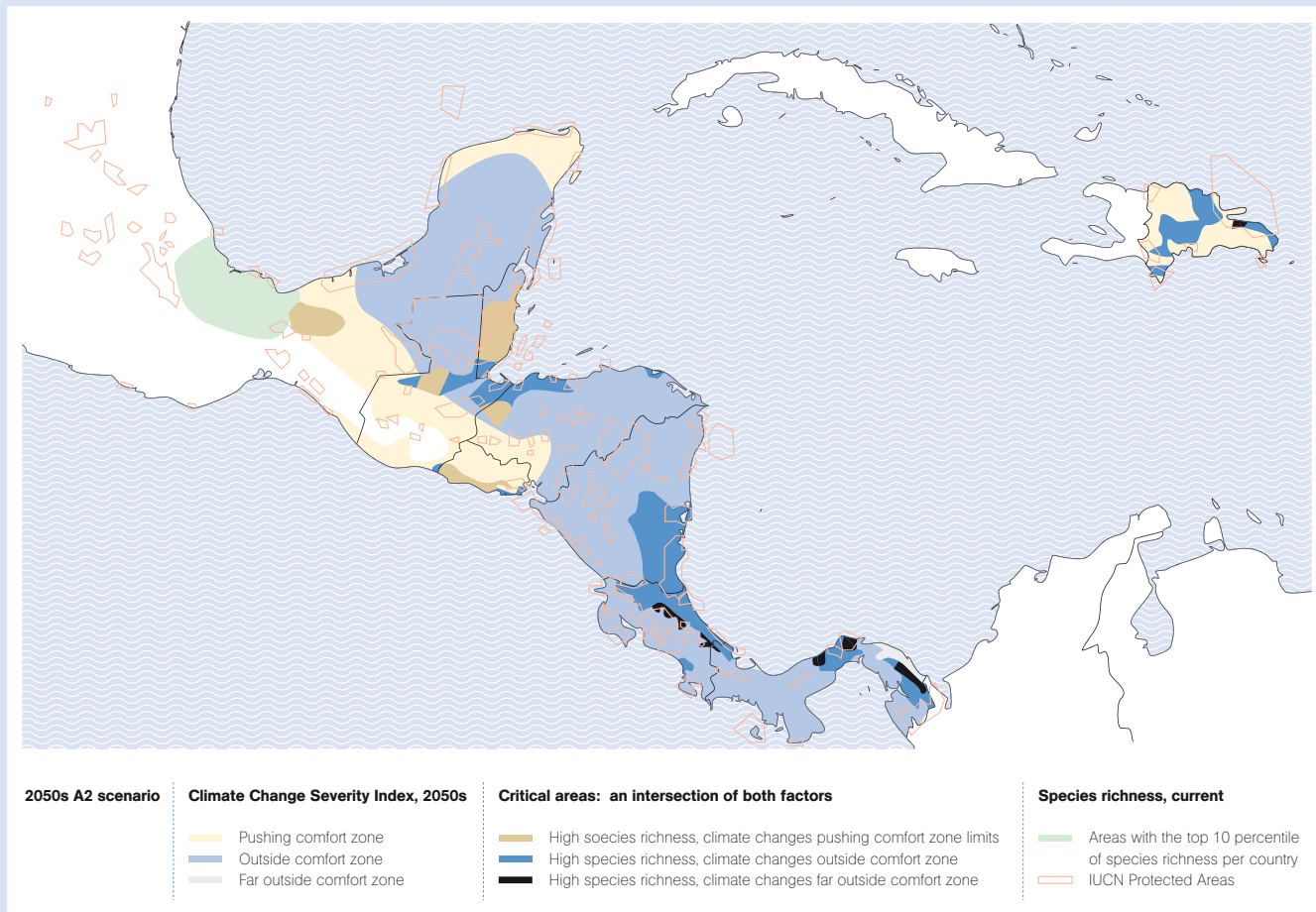
The platform has effectively improved facilities for data and information on climate change through an ongoing process of North-South and South-South knowledge transfer. Satellite data supplied by developed nations is combined with in-situ data from the Mesoamerican countries. SERVIR possesses a suite of tools, providing access to information products in a variety of formats and tailored to the

range of decision-makers, from scientists to the general public. Capacity development is a key component of SERVIR's strategy – nearly 30 technical training workshops have been held across the region from mid-2004 through mid-2009 and have trained over 500 professionals. In early 2010, CATHALAC will roll out the region's first master's degree in climate change adaptation.

SERVIR is focused substantially on identification of areas at risk of climate change, and identification of the potential impacts of climate change on the natural resources on which the region's economies are so dependent on. In 2005, global climate models were downscaled to provide the governments of Central America with the highest resolution climate change scenario data. The study showed that the projected five degree rise in temperature could begin to adversely affect ecosystems on the Caribbean coasts of Honduras, Nicaragua, Costa Rica and Panama by the 2050s. It points to areas where future investments and management activities will need to be targeted to protect the region's rich biological diversity (see Figure II-2).

A SERVIR regional facility for East Africa has recently been established at the Regional Centre for the Mapping of Resources for Development (RCMRD) in Kenya, and a similar facility for Asia is being developed.

Figure II-2. **Critical areas: high levels of species richness and climate change severity**



Source: Water Center for the Humid Tropics of Latin America and the Caribbean (CATHALAC).

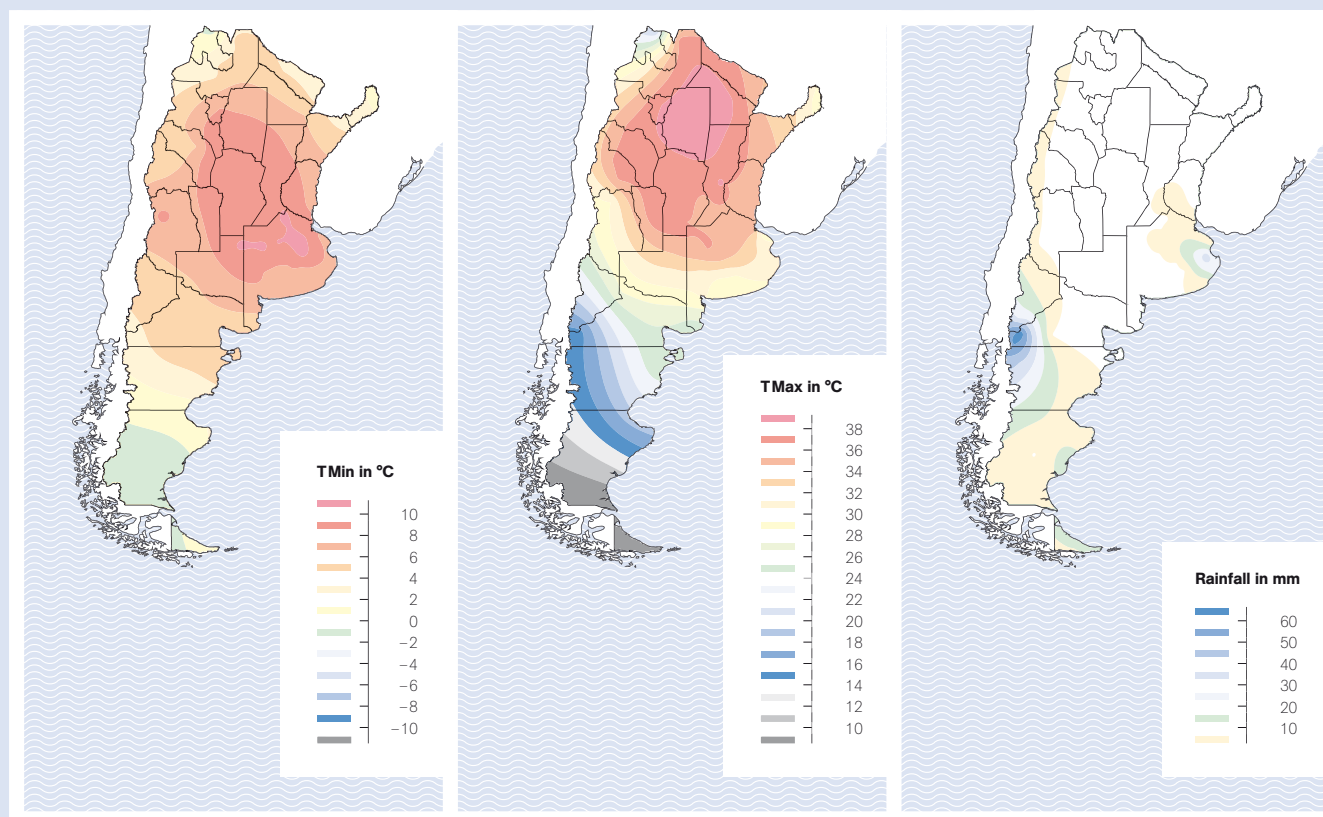
Box II-5. Assisting decision-making through improved monitoring, analysis and dissemination

The Office of Agricultural Risk (ORA) in Buenos Aires, Argentina, together with other countries of the region, is working to improve information for the evaluation of agricultural risk and to develop prevention strategies for extreme events as well as to alert producers in Argentina to extreme events.

ORA offers a range of weekly monitoring data, including maps of weekly highs and lows in temperature, average temperature anomalies and precipitation, as well as state and El Niño/Southern Oscillation (ENSO) forecasting.

ORA have also developed a method to calculate water balances for the crops of wheat, corn, sunflower, soybean and pasture in the Humid Pampa region and produce the results of these calculations as weekly charts to inform producers in the region and to assist decision-making. The reports will be available for crops in the Gran Chaco region soon. All forecasts are available on the ORA website <http://www.ora.gov.ar>.

Figure II-3. Examples of weekly forecasts of temperature and rainfall



Source: Secretariat of Agriculture, Livestock, Fisheries and Food (ORA)

2.2. PRACTICAL OUTCOMES, GOOD PRACTICES AND LESSONS LEARNED

Good quality data and information is the basis for decision-making and planning at all levels: regional, national and local. Although activities are ongoing at each of these levels, more efforts are needed towards this end. Sufficient and sustained monitoring is vital, as is the need to translate this data to meet the specific needs of stakeholders, including decision-makers in all sectors.

The involvement of relevant stakeholders, particularly at the national and local level, in the process of generating data is crucial for identifying needs, utilizing existing knowledge on local or national contexts, and developing capacity and expertise. The work of UNDP has shown the value of user-oriented data for supporting communication with policy-makers and the general public, to facilitate policy dialogues and awareness raising, and to provide inputs for climate change impact, adaptation and vulnerability assessments.

WMO's foundation of standardised procedures (in timing, quality control, installation, operations, maintenance, calibration, and archiving) allows users to obtain the same product, i.e. the *data*, from disparate networks anywhere on the earth's surface or from outer space. These data standards have shown the importance of ensuring consistency and quality of data and enable different data to be used together. This good practice will be built on in the future as WMO's comprehensive observation systems across a number of observing domains (e.g. surface, atmosphere, ocean, atmospheric chemistry composition, etc.) will be further integrated and coordinated, and made more cost-effective and sustainable, in part through improved network design and flexibility to incorporate new observing systems. A special effort is being launched that would allow building of historical Climate Data Records from all the earth-observing satellites that have operated since the beginning of WMO's Space programme in the 1960s. It includes satellite inter-calibration activities.

GCOS learned much about best practices during the course of assisting developing countries to develop their Action Plans, although implementation of the Plans was beyond the scope of the Regional Workshop Programme itself. For implementation of Action Plans to proceed successfully, best practices need to include:

- Engagement of a focused regional organization and full-time regional program officer to take responsibility for implementation actions;
- Development of a solid planning mechanism to advance projects;
- Identification of partners and donors to participate in projects and/or contribute resources;
- The ability to build leverage from existing bi- and multi-lateral agreements;
- Establishment of a regional steering or leadership group and regular communication with the GCOS Secretariat for better monitoring, fundraising, and advocacy;
- Involvement of motivated people with *interest* in making improvements;
- Involvement of a broad base of stakeholders – not just the meteorological community.

2.3. CHALLENGES AND OPPORTUNITIES

Better observations are needed, particularly in developing countries, to improve forecasting and climate services at all levels and in different sectors to enhance countries' ability to adapt. This need was expressed yet again at the World Climate Conference-3 (WCC-3) in Geneva in September 2009, where participants called for strengthening of the essential elements of a global framework for climate services, including:

- GCOS and all its components and associated activities, and provision of free and unrestricted exchange and access to climate data;
- The World Climate Research Programme, underpinned by adequate computing resources and enhancing interaction with other relevant global climate research initiatives;
- Climate services information systems taking advantage of enhanced existing national and international climate service arrangements in the delivery of products, including sector-oriented information to support adaptation activities;
- Climate user interface mechanisms focused on building linkages and integrating information, at all levels, between the providers and users of climate services, aimed at developing and using climate information products efficiently, including the support of adaptation activities;
- Efficient and enduring capacity building through education, training, and strengthened outreach and communication.

At WCC-3, the participants agreed to set up a global body to supply on-demand climate predictions to users ranging from national governments to businesses and individual farmers. This Global Framework for Climate Services (GFCS) will provide an effective interface between the providers and users, in addition to building and strengthening existing initiatives on observation and monitoring, and research, modeling and prediction.

In addition, existing programmes and projects at all levels, including the GCOS Regional Action Plans and the activities of regional and national bodies such as RIOCC, CATHALAC and ORA, will continue to need support.

A key challenge in developing countries has been and still remains the lack of knowledge related to climate change's potential impacts. Policymakers need to be made aware of the importance of strengthening the information base for adaptation, particularly data and observations, not only for global purposes, but also to assist them in their country's own development and adaptation objectives. UNDP's country profiles and PIACC's regional activities are important in this regard. With the success of the UNDP country climate profiles project, additional countries have requested to be included in a second phase of the project, which may be carried out pending additional financial resources. This phase would involve the country teams more directly in the process to further develop capacity. This active involvement would provide the opportunity for these data-gathering exercises to be replicated at the local level. Developing this capacity through training on the application of data is important for the adaptation decision-making processes. Further, the inclusion of data on extreme events is another future potential addition to the country profiles.

Access to appropriate finance is vital to increase the exchange of climate data. The WMO requests countries to establish a trust fund in order to fill gaps in the global climate monitoring network, and support capacity-building of ground-based atmospheric observing systems recognised by GCOS.

More robust and reliable regional climate models and scenarios are required, including the recovery of long-term, high-quality, high-resolution historical climate datasets on a regional scale to generate these scenarios. The improved recovery and dissemination of historical data is a major priority of the WMO Climate Data and Monitoring Programme (WCDMP). In addition, new scenarios for the analysis of emissions, climate change impacts and response strategies are being developed by the scientific community, for the fifth assessment report

of the Intergovernmental Panel on Climate Change (IPCC). These new scenarios are expected to improve the comparability and level of integration of underlying assumptions to ensure the consistent use of scenario information across different research areas. The IPCC is also expected to develop socioeconomic, emission, climate and other environmental scenarios to improve the timeline within which the different climate change research communities (such as climate modelling, impact, vulnerability and adaptation assessment, and mitigation analysis) work and interact.²

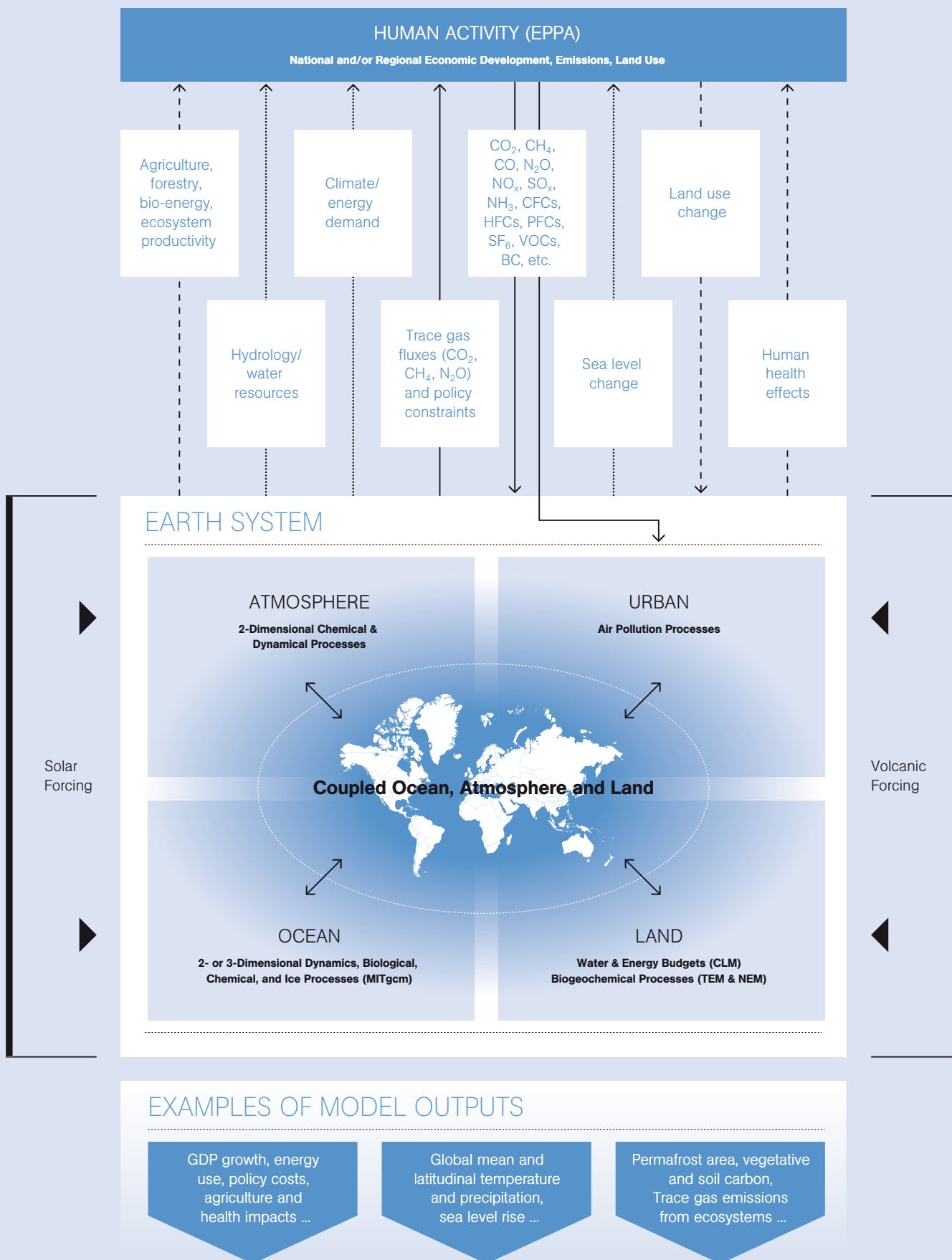
Involving people in improving the availability of data and identifying data needs is vital. Improved links are required between the generators of data and its end-users. Regional centres and knowledge forums are a vital resource to assist at the regional and national level in improving the provision of climate data and information. As mandated by the SBSTA, a technical workshop will be held under the Nairobi work programme by June 2010, to discuss how relevant regional centres and networks could collaborate on, amongst others, effective ways to exchange good practices and lessons learned in developing, disseminating and applying data and information; the promotion of dialogues between the providers and users of data in order for providers to better meet the needs of different users; the provision of information on available climate models, scenarios and downscaled projections, including on their application, limitations and usefulness for different purposes and geographical areas; and the facilitation of feedbacks between users and providers of climate models, scenarios and downscaled projections, in order to enable or enhance the development and to improve the usability of regional climate models and scenarios.³ These discussions and any follow up actions present a good opportunity to improve the availability, accessibility, relevance and applicability of climate data and information in support of climate risk assessment, and adaptation planning and implementation.

² <http://www.ipcc.ch/scoping_meeting_ar5/expert-meeting-report-scenarios.pdf>.

³ FCCC/SBSTA/2008/6, paragraph 32.



Figure III-4. Schematic of the MIT Integrated Global System Model



III. DEVELOPING AND DISSEMINATING METHODS AND TOOLS

CHAPTER COMPILED BY

Food and Agriculture Organization of the United Nations (FAO)

WITH CONTRIBUTIONS FROM

Asian Development Bank (ADB), Christian Aid, FAO,
International Union for Conservation of Nature (IUCN)

Adaptation to climate change is a knowledge-intensive and location-specific process. It entails a series of activities including: projections of climate change, the assessment of impacts and vulnerabilities, capacity-building, policy setting, planning and implementation. Uncertainties associated with climate change and its impact, as well as societal responses, mean that adaptation is necessarily an iterative process. Toolkits for assessment, programming and planning, knowledge-sharing and learning, monitoring and evaluation are critical to guide this iterative process by an enhanced understanding of the scientific, technological and socio-economic aspects of adaptation.

Activities carried out by partner organizations under this theme address the following issues as defined in the mandate of the Nairobi work programme:

- Promoting the development and dissemination of methods and tools for impact and vulnerability assessments, such as rapid assessments and bottom-up approaches, as applicable to sustainable development;⁴
- Promoting the development and dissemination of methods and tools for assessment and improvement of adaptation planning, measures and actions, and integration with sustainable development.⁵

Relating to these two issues, there are broadly two categories of methods and tools:

- Methods and tools for impact and vulnerability assessments (Category I);
- Methods and tools to facilitate adaptation planning and implementation (Category II)

This chapter draws on examples from actions pledged and undertaken by Nairobi work programme partner organizations to describe methods and tools in these two categories. It is worth noting that there is no clear boundary between vulnerability and risk assessment on the one hand and adaptation planning on the other, since most adaptation planning starts with vulnerability assessment and risk identification. Therefore, some methods and tools can be used both for assessment and for adaptation planning. This chapter also summarizes the lessons learned in developing, disseminating and applying these methods and tools, and describes gaps, needs, challenges and opportunities to further advance work under this theme.

3.1. ACTIONS TAKEN AND RESULTS ACHIEVED

Under pledged actions, Nairobi work programme partner organizations have carried out a wide range of activities to develop, disseminate and apply methods and tools to facilitate both impact and vulnerability assessment, as well as adaptation planning and implementation. Although most of the pledged actions are still ongoing, some early results have already been achieved. [TABLE III-3](#) below summarizes example actions being undertaken and early results obtained to date by a group of partner organizations. The two sample case studies are provided in [BOXES III-1](#) and [III-2](#) to provide details on how such actions are being carried out. [BOXES III-3](#) to [III-8](#) summarize the key methods and tools being developed and/or applied by partners to support assessments and adaptation planning.

⁴ FCCC/CP/2005/5/Add.1, paragraph 3(a) (i).

⁵ FCCC/CP/2005/5/Add.1, paragraph 3(b) (i).

Table III-3. Summary of activities undertaken and results achieved to date

Category of methods and tools		Name of method or tool	Activities
I	II		
	●	Risk Screening Tool (RST)	Developing and applying the RST for scoping, design and financing adaptation programmes
	●	Livelihoods planning toolkit	Developing and applying a suite of tools for integrating adaptation into secure livelihoods
●		Methodology for assessing climate change impacts on crop yields	Developing a method to assess climate change impacts on crop yields based on FAO crop forecasting tools and methods (AgroMetShell)
●	●	Farm Adaptive Dynamic Optimazation (FADO)	Developing a 3-phased approach to facilitating climate risk assessment and adaptation planning through the strengthening of capacities of national agrometeorological and extension services
●	●	Planning for community-based adaptation in agriculture	Developing a modular e-learning tool to enhance awareness and technical capacity for adaptation planning
	●	Technology for Agriculture (TECA)	Developing a database of available proven adaptation technologies in agriculture, livestock, fisheries and forestry sectors
●	●	CRISTAL	Applying the tool in Zambia, Tanzania and Mozambique to assess impacts of climate change and adaptive capacity of local communities, and to help plan for landscape level interventions that build resilience
	●	CHANGE	Applying the toolkit to develop integrated water resource management adaptation responses through IUCN's Water and Nature Initiative

	Countries/regions covered	Focus area(s)/Sector(s)	Results to date	Organization
	Asia and the Pacific	Multiple sectors	Tool being field tested through projects and improved	ADB
	Global relevance with pilot projects in Africa, Central and South Asia and Central America	Communities, livelihoods	Toolkit developed and being piloted through community-based projects	Christian Aid
	Global	Agriculture	The method developed and first applied to a World Bank-Government of Morocco comprehensive climate change study assessment of crop production	FAO
	Global	Agriculture	Approach developed	FAO
	Global	Agriculture	e-learning course with four modules developed	FAO
	Global	Agriculture fisheries and forestry	Database developed and made available	FAO
	Zambia, Tanzania and Mozambique	Communities	Vulnerability assessments carried out/started; ecosystem-based adaptation measures identified in pilot countries	IUCN
	Guatemala, Tanzania and Nigeria	Water resources	Principles of the CHANGE-toolkit applied to strengthen local capacity to cope with and respond to floods and droughts through integrated water resource management in pilot countries	IUCN

Box III-1. Replacing quick technical fixes with adaptive approach in river basin management

As part of its action pledge to the Nairobi work programme, International Union for Conservation of Nature (IUCN) undertook to apply the CHANGE toolkit for developing adaptation responses and promoting effective resilience building. CHANGE emphasizes a management approach that moves beyond quick technical fixes towards an adaptive approach which is more inclusive and innovative.

In the high-altitude upper watersheds of the Coatán and Suchiate rivers (Guatemala and Mexico respectively), the risk of devastating flash floods has been on the rise due to land degradation and climate change. Environmental degradation has led to the narrowing of livelihood options for densely populated communities in the upper watersheds. These communities are vulnerable to flooding caused by tropical storms and hurricanes. In addition, the intensity of floods is exacerbated by the lost water-storage capacity of the eroded soils.

In the Komadugu-Yobe Basin (Nigeria), the combined effects of water abstraction for large-scale irrigation and regional drying of the climate have eroded the resource-based livelihoods of millions. This has lent urgency to climate adaptation in an impoverished and conflict-prone region. In the Pangani River Basin (Tanzania), flow regimes are changing, with some once-perennial rivers now drying out for part of the year due to over-consumption. As a result of changing climate and weather patterns, many of the features of the natural flow regime that support the river's plant and animal life have been degraded or even lost. Households reliant on rivers and wetlands for water supply and as a safety net during times of hardship are now at risk during the dry season.

Through its Water and Nature Initiative, IUCN has applied the principles of the CHANGE toolkit in the vulnerable watersheds of Guatemala, Nigeria and Tanzania to bring about the transition from quick technical fixes to adaptive management and create resilience in vulnerable communities through ecosystem-based adaptation measures.

Box III-2. Developing forecasting methodology for assessing impact on crop yields

Based on the Food and Agriculture Organization of the United Nations (FAO) crop forecasting methodology (AgroMetShell), a method to assess climate change impacts on crop yields was developed. The method was first applied to a World Bank-Government of Morocco

comprehensive climate change study. The methodology consists of a yield function which empirically links agricultural yields to the soil water balance. The technology trend, future climate projections as well as CO₂ fertilization effects on the crops were incorporated in the yield functions.

Box III-3. Developing a practical methodology to build technical capacity for adaptation

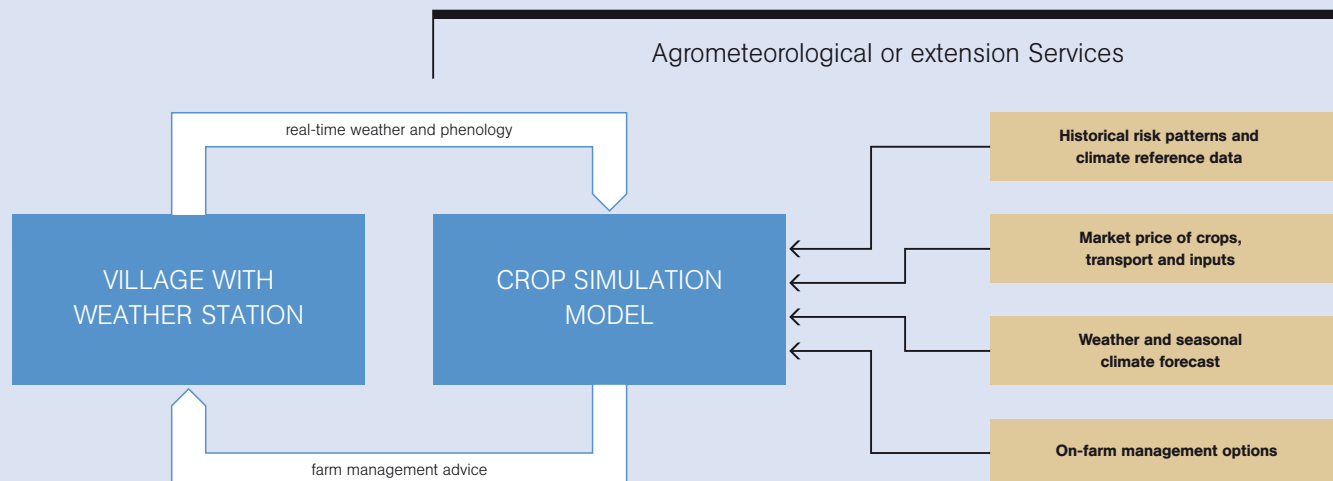
As part of its action pledge to the Nairobi work programme, FAO developed the Farm Adaptive Dynamic Optimisation (FADO) tool to strengthen the capacity of national agrometeorological and extension services for adaptation planning.^a

It consists of modern tools for data processing and communication of tailored information to the farmers (Figure III-5).

FADO promotes a 3-phase approach: the *methodology development phase*, to identify target institutions and partners, and provide inventories of existing datasets, decision support tools, operational tools and methods, including software and communication tools; the *pilot phase*, which includes implementation and training; and the *consolidation phase*, to evaluate impacts at farm level, technological opportunities to expand the approach, and the establishment of a knowledge network.

^a See <http://unfccc.int/files/adaptation/sbsta_agenda_item_adaptation/application/txt/fao_pledge_5.pdf> for details of the action pledge.

Figure III-5. Dataflow in a Farm Adaptive Dynamic Optimisation (FADO) system



Source: Food and Agriculture Organization of the United Nations (Source of African village drawing: <http://www.ec-freinet-acheres.ac-versailles.fr>).

Box III-4. Livelihoods planning toolkit

Christian Aid has developed a series of adaptation toolkits, including two modules on integrating adaptation to climate change into secure livelihoods. The first module provides a framework for integrating climate change adaptation into a livelihoods approach, while the second module looks at assessing the risk to livelihoods based on the degree of change that will occur in both trends and variability of climate, as well as likely exposure.

The approach advocates use of both scientific and local knowledge in promoting community-ownership and therefore confidence in the analysis, but also in filling the gaps that climate science currently contains. This approach is now being used by partners across Africa (through seven innovation projects), in pilot community-based adaptation work in Central and South Asia and building on existing disaster risk reduction work in Central America, as well as in ongoing development of more substantial adaptation programmes.

Box III-5. Technology for Agriculture (TECA)

The TECA database is a knowledge-sharing initiative by FAO that aims to improve access to information and knowledge about available and proven technologies in order to enhance their adoption in agriculture, livestock, fisheries and forestry, thus contributing to food security, poverty alleviation and sustainable development.

The database contains several good practice examples that contribute to climate change adaptation in the most vulnerable farming systems. This portal acts as a gateway to provide easy access to other

technology-related websites. It provides categorized linkages to information on agricultural technologies worldwide. Information related to technologies for disaster risk management and managing risks associated with extreme weather events is also included. See www.fao.org/sd/Teca/search/default_en.asp.

Box III-6. Planning for community-based adaptation in agriculture

This is a modular e-learning tool developed by FAO which aims to enhance awareness and technical capacity on planning for climate change adaptation in the agriculture sector. Building on the experience gained in the preparation of the e-learning tool *Climate and flood forecast applications in agriculture* <http://www.fao.org/nr/clim/abst/clim_071203_en.htm>. It is based on experiences from FAO field projects and includes a wide range of country-specific examples.

The toolkit consists of four interactive learning modules. The first module aims at an improved understanding of the climate phenomena and impacts of climate change in general and specifically for the agriculture

sector. The second module introduces the concepts and examples of adaptation to climate change in agriculture. The other two modules more specifically outline the procedures for planning and implementing community-based adaptation, with a major focus on participatory approaches and institutional aspects reflecting the understanding of adaptation as a continuous and socio-institutional learning process.

Designed for use by field technicians and extension staff in agriculture and other sectors, the tool will also be helpful for government and non-governmental organizations working to build adaptive capacity of rural livelihoods in agriculture.

Box III-7. Community-based Risk Screening Tool – Adaptation & Livelihoods (CRiSTAL)

CRiSTAL was developed by the International Institute for Sustainable Development, IUCN, Stockholm Environment Institute (SEI) and Intercooperation to help project designers and managers integrate risk reduction and climate change adaptation into community-level projects. Specifically, it helps project designers and managers to:

- Understand the links between livelihoods and climate in their project areas;
- Assess a project's impact on community-level adaptive capacity;
- Make project adjustments to improve its effect on adaptive capacity and reduce the vulnerability of communities to climate change.

CRiSTAL can be used through a Microsoft Excel interface or by reading the accompanying User's manual. Training in CRiSTAL has been undertaken in Africa, Asia and Latin America, and feedback from these sessions is used to continually update and revise the tool. The tool needs a basic knowledge of climate change and adaptation, and field visits and community consultations are required to generate material for analysis. Training workshops have been offered in partnership with CARE International and their Climate Vulnerability and Capacity Analysis (CVCA) framework. The tool is available online at <<http://www.cristaltool.org>>.

Box III-8. Risk Screening Tool (RST)

The screening tool has been designed by Asian Development Bank (ADB) to take into account climate-change risks and natural hazards of geophysical origin (including landslides, earthquakes,

tsunami, and volcanic eruptions) early in the project cycle. Screening results generate a corresponding risk values of High, Medium, or Low with consequent recommendations.

3.2. PRACTICAL OUTCOMES, GOOD PRACTICES AND LESSONS LEARNED

In addition to the methods and tools made available and applied through pledged actions by organizations, practical outcomes are emerging in developing countries and vulnerable communities within them. Changes in capacity of stakeholders, policies and practices are among the concrete impacts brought about through the applications of the CRiSTAL and CHANGE tools for vulnerability assessments and adaptation planning.

Through the application of CRiSTAL in Mozambique, Tanzania and Zambia in an IUCN project, seventy technical personnel were trained on vulnerability assessments and a significant level of interest has been generated among partners, including those within the governments of the case study countries. In addition, adaptation measures, based on current community coping strategies, have been identified and analyzed through consultations with key informants from the communities (government extension workers, other NGOs and project partners working in the same communities). Identified measures include: conservation agriculture, small-scale irrigation, rainwater harvesting, and sustainable use of non-timber forest products.

The application of the CHANGE tool by IUCN has shown how relating governance to empowerment for action is the key to building adaptive capacity in water resources management. Consequently, a range of practical actions have been initiated in pilot project countries and communities.

In the Pangani River Basin in Tanzania, the toolkit allowed decision-making to be better informed and hence more efficient and effective in allocating water within the current and projected limits of the river's flow, and to ecosystems in the basin that store water, regulate flows and support livelihoods. Practical ways to engage stakeholders have shown how better water governance can reduce pressure on the environment and provide the adaptive capacity needed to deal with an uncertain and drier future climate.

In the Komadugu-Yobe Basin in Nigeria, a joint basin-level intervention by IUCN and partner organizations, the federal and state governments and other stakeholders, including dam operators and farming, fishing and herding communities, negotiated a plan for coordinating and investing in an ecosystem-based adaptation response to restore and manage the basin. In addition to agreeing a Catchment Management Plan, a 'Water Charter' was drafted that spells out the principles for sustainable development of the basin and the roles and responsibilities of governments and stakeholders.

The work in Nigeria shows that reform of water governance can enable transparent coordination of water resources development, including ecosystem-based solutions such as remediation of degraded ecosystems and, eventually, restoration of the river's flow regime. Dialogue, information sharing and investment in the 'natural infrastructure' have provided people with the assets needed to make their livelihoods more resilient to future uncertainty related to climate change. Combined with adaptive capacities created by water governance reforms, more secure fisheries and reduced sensitivity to flood events are making people in the basin less vulnerable to climate change.

In the watersheds of the Coatán and Suchiate rivers in Guatemala and Mexico, empowerment of community-owned institutions, combined with governance reform, is proving an effective way of enhancing the resilience of people to climate impacts. Local communities have built micro-watershed councils to lead watershed restoration and development, to increase opportunities for economic diversification of farming systems and planning for disaster risk reduction. Through increasingly robust ecosystems that serve as natural infrastructure, watersheds are being made more secure and livelihoods less vulnerable.

(For more information, see http://www.iucn.org/about/work/programmes/water/wp_resources/wp_resources_toolkits/).

In the process of developing, disseminating and applying methods and tools, organizations also documented good practices and lessons learned. For example, ADB noted that the selection of most appropriate methods and tools is just as important as the actual application of them, because methods and tools vary depending on the sectors and geo-climatic themes for which adaptation decisions need to be made. By developing and applying its livelihoods planning toolkit, Christian Aid recognizes the importance of:

- Using local or indigenous knowledge and climate science as complementary rather than alternative information sources, one cross-checking or triangulating the other to increase the reliability of a “most likely scenario”;
- Iterative revision of the analysis as new climate science becomes available to upgrade the scenario, and strengthen linkages between climate science providers and users, sharing experience and increasing skills in the use of complex climate concepts.

Learning from its experiences in applying its modular e-learning tool, FAO emphasizes that introducing the tools early in the project and prioritizing capacity building programmes during the initial phases helps stakeholders to identify, evaluate and test the potential adaptation options. The tools provide first-hand knowledge and procedures to document examples of good practice and to facilitate sharing at wider institutional and community levels.

The application of CRiSTAL in Eastern Africa has shown that ‘conservation agriculture’ can clearly improve farming practices by enhancing productivity, reducing negative impacts on soil fertility and optimizing farm labour. It also provides the opportunity for mitigation through emissions reductions by comparison with conventional farming methods. The toolkit also provides a basis for identification and implementation of small-scale irrigation and water harvesting with watershed management activities, to improve access to water resources, and enhance resilience to drought and dry spells.

3.3. CHALLENGES AND OPPORTUNITIES

Existing experiences in developing, disseminating and applying methods and tools indicate that impacts and vulnerability assessment, adaptation planning and implementation should be accompanied by a social-learning process that explicitly aims to address the needs of marginalized populations most vulnerable to climate change. This social learning process requires participatory processes and customized tools and methods for planning and knowledge sharing. The use of toolkits for adaptation planning, actions and measures need to accompany institutional capacity building and strengthening of organizational networks across all levels and sectors.

Challenges have been experienced in developing, disseminating and applying toolkits. These include the lack of consistently collected and archived historic observational data and projections for the future, and at scales appropriate for adaptation decision making. There are also gaps in the kind of toolkits currently available – for instance, toolkits for cost benefit analysis, tools to support adaptation investment decisions and measuring progress and results in achieving vulnerability reductions, are still in the early stages of development.

However, opportunities to address these gaps and challenges do exist. A variety of methods and tools, some of which are indeed tested and proven, are available in the public domain and could be easily tuned to support policy relevant analyses and planning for adaptation interventions. The Nairobi work programme, as a significant catalyst and central knowledge sharing platform for adaptation, has the potential to catalyze further actions and promote learning in order to address the gaps and challenges.





IV. ASSESSING THE IMPACTS OF, VULNERABILITY AND ADAPTATION TO, CLIMATE CHANGE

CHAPTER COMPILED BY

Global Change SysTem for Analysis, Research and Training (START)

WITH CONTRIBUTIONS FROM

Center for International Forestry Research (CIFOR), Christian Aid, International Union of Forest Research Organizations (IUFRO), Food and Agriculture Organization of the United Nations (FAO), START, World Federation of Engineering Organisations (WFEO), World Food Programme (WFP)

Adaptation planning for climate change is constrained by, among other factors, inadequate knowledge about current and future impacts and vulnerability, under-resourced institutions, insufficient human capacity and financial resources, and a lack of awareness about potential threats from climate change. While these constraints are present in all countries and regions, their effects are most acute in the developing world, where potential risks from climate change are great and yet where systems for research and assessment to support decision-making for responding to climate change are generally weak, and sometimes non-existent.

This lack of robust, science-based, support for information and knowledge systems not only hampers adaptation planning for future climate change but also the ability of society to respond effectively to current exigencies spawned by climate variability and extreme events that set back the attainment of development goals. Moreover, these knowledge-capacity gaps hinder the ability of the global science community to effectively investigate and assess climatic and other global environmental change processes, connections and feedbacks that occur trans-nationally and trans-regionally.

Over the last several years, the climate change science and development communities have begun to respond by developing and promoting initiatives for conducting assessments to address knowledge gaps in key sectors and to enhance scientific capacity in developing countries. This chapter summarizes the activities undertaken by Nairobi work programme partner organizations within the framework of their action pledges to this end. It also identifies the impacts these case studies have generated, the lessons learned and the good practices that have emerged from the assessments. Further, it examines the challenges and opportunities for supporting more policy-relevant assessments. These efforts are directed to address the following issues as defined in the mandate of the Nairobi work programme:

- Promoting development and dissemination of methods and tools for impact and vulnerability assessments, such as rapid assessments and bottom-up approaches, including as they apply to sustainable development;⁶
- Promoting understanding of impacts of and vulnerability to climate change, current and future climate variability and extreme events, and the implications for sustainable development;⁷
- Promoting the availability of information on the socio-economic aspects of climate change and improving the integration of socio-economic information into impact and vulnerability assessments;⁸
- Promoting the development and dissemination of methods and tools for assessment and improvement of adaptation planning, measures and actions, and integration with sustainable development.⁹

⁶ FCCC/CP/2005/5/Add.1, paragraph 3(a) (i).

⁷ FCCC/CP/2005/5/Add.1, paragraph 3(a) (iv).

⁸ FCCC/CP/2005/5/Add.1, paragraph 3(a) (v).

⁹ FCCC/CP/2005/5/Add.1, paragraph 3(b) (i).

4.1. ACTIONS TAKEN AND RESULTS ACHIEVED

While the assessments described in this chapter have many elements in common, for instance:

- integration of climatic and non-climatic data;
- analysis of climate trends;
- use of climate projections and outputs from coupled models;
- socioeconomic and livelihoods analysis;

the outcomes of the assessment efforts varied, depending on such factors as:

- the types of stakeholder groups targeted;
- the methodologies employed in the assessments;
- the underlying goals of the assessment, such as training and capacity building of assessment teams, coalescence of expert analysis, or awareness raising and mobilization of vulnerable communities.

Table IV-4. Summary of activities undertaken and results achieved to date

Name of assessment	Activities	Countries/regions covered
Climate Change Innovation Fund	Mobilizing civil society in Nigeria to develop a National Plan of Adaptation, raising awareness of climate change through schools and local leaders in Rwanda, developing community-based adaptation plans in Burkina Faso and working on water, sanitation and climate change in poor urban areas in Kenya	24 projects across Africa
Tropical Forests and Climate Change Adaptation (TroFCCA)	Assessing climate change impacts on tropical forests and forest-dependent communities and their ensuing vulnerability, with a view to contributing to the integration of climate change adaptation into the development process	Global relevance
Comprehensive climate change study of agriculture in Morocco	Assessing potential threats from climate change to agriculture in Morocco, with same method currently being applied in Nigeria	Morocco
Adaptation of Forests and People to Climate Change	Undertaking a comprehensive global assessment of the world's forests with a specific focus on climate change impacts on forests and people	Global relevance
Assessments of Impacts and Adaptation to Climate Change (AIACC)	Supporting 24 sub-regional assessment teams to investigate climate change impacts, vulnerability of key sectors and systems, and to evaluate adaptation options	Over 50 countries in Africa, Asia and Latin America
Adaptation of sustainable civil infrastructure to climate change impacts	Developing a formalised vulnerability and risk assessment procedure for considering climate change risks to existing and planned public infrastructure	Global relevance
Sistema de Alerta Temprana para Centroamérica (SATCA) and Vulnerability and Analysis Mapping (VAM)	Assessing priorities for strengthening national and regional disaster preparedness networks in Central America and assessing climate risks to food security in Africa, Asia and Latin America	Central America, Africa, Asia, and Latin America

TABLE IV-4 below provides a summary of activities undertaken by Nairobi work programme partner organizations within the framework of their action pledges and results from these activities achieved to date. Boxes IV-1 to IV-6 provide more details on a few case studies.

Focus area(s)/Sector(s)	Results to date	Organization(s)
Multiple sectors	Among other things, climate risk maps that were inclusive of the physical location and livelihood context of vulnerable communities, and a detailed assessment of community capabilities and needs with respect to better managing current climate risks and adapting to climate change produced	Christian Aid
Ecosystems/ forestry	The project has developed methods for the assessment of vulnerability and impacts of climate change on forests and livelihoods; undertaken an inventory of local knowledge and adaptation strategies; analysed forest policies and governance regimes and their implications on adaptation	CIFOR
Agriculture	Provided essential information on the bio-physical impacts of climate change for economic analysis and adaptation policymaking in Morocco. A number of Moroccan national researchers were trained on climate downscaling, crop forecasting, and statistical analysis	FAO and World Bank
Forestry	A comprehensive assessment report published and a policy brief developed	IUFRO
Multiple sectors including biodiversity conservation and ecosystem, water resources, agriculture, food security and rural livelihoods, human health and tourism	A substantial body of knowledge generated; adaptation planning assisted at the national level, through strengthening the scientific basis for National Communications to the UNFCCC and through informing national delegations to the UNFCCC COP about key issues	START and the Academy of Sciences for the Developing World (TWAS)
Physical infrastructure	The engineering protocol tested successfully in seven case studies in Canada	WFEO
Multiple sectors, including disaster preparedness and food security	Rapid deployment of aid response to emergencies in Belize, Cuba, Haiti, Mexico and Nicaragua assisted by the SATCA early warning system; the number of VAM assessments increased by 80 per cent in 2008; an MOU signed between the WFP and the WMO to enhance the organization's vulnerability analysis and adaptation assessment capabilities, and that of its national, regional and global partners, in support of its early warning and preparedness systems and frameworks	WFP

Box IV-1. Vulnerability mapping

The assessment efforts by Christian Aid are illustrative of the approach that seeks to directly engage vulnerable communities. For example, in Tanzania, as part of a larger effort in semi-arid East Africa, the organization developed a strong participatory approach, which involved action research to assess the potential role of seasonal forecasts, and a participatory risk assessment to examine climate risks and the links between climate and livelihoods within a sustainable livelihoods framework. This effort brought together a range of stakeholders including agricultural extensionists, the Tanzania Meteorological Agency, district authorities, and local communities.

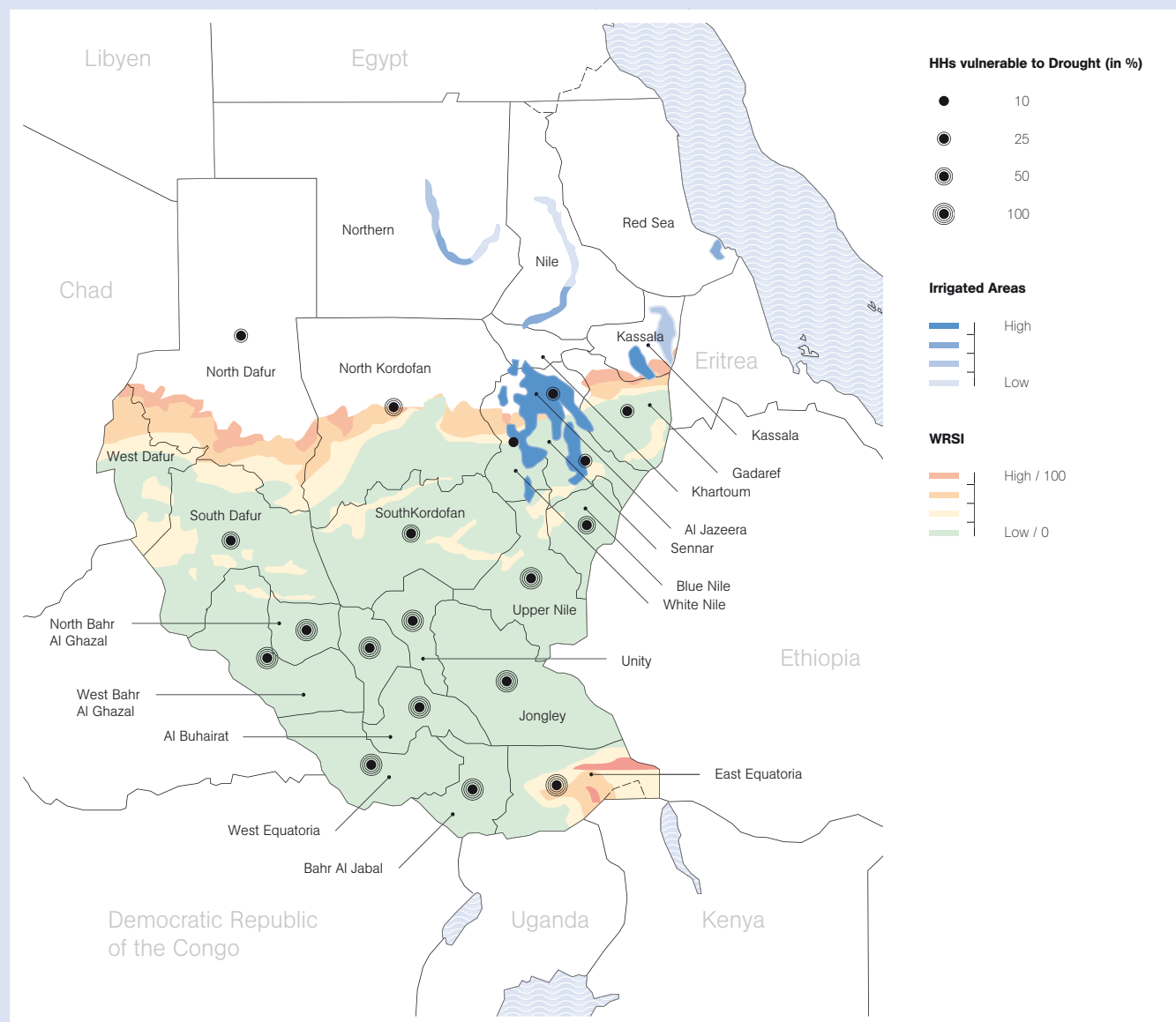
This work in Tanzania, and similar efforts in eastern Kenya, resulted in the production of climate risk maps that were inclusive of the physical location and livelihood context of vulnerable communities, and a detailed assessment of community capabilities and needs for improving the management of current climate risks and adapting to climate change. Among the strategies identified in Kenya were changing cropping patterns to cope better with recent changes in precipitation, and constructing sub-surface catchment dams. In Tanzania, the assessment revealed both innovations developed at the community level (e.g. water harvesting and the use of drought-resistant varieties) and challenges, including lack of access to credit and markets, and insecure land rights.

Box IV-2. Multi disciplinary risk and vulnerability analysis to assist the most vulnerable to manage climate risks

World Food Programme (WFP) uses Vulnerability Analysis and Mapping (VAM) as a central resource to prepare for weather-related risks and targets those who are more at risk of climate change impacts. It allows the identification of those factors that are likely to undermine livelihoods, food production or supply systems that cause increased food insecurity – including: unfavourable weather conditions; the groups of populations that may need assistance now or in the future; the types of assistance that may be required; and the situation indicators to be monitored.

Enhanced analysis allows for better programme design and prioritization on the ground. This is the case in a WFP multi-disciplinary approach that combines analysis of historical trends of disasters, household food security information and livelihood patterns, seasonality and natural environments information in Madagascar, Haiti and Afghanistan. WFP is planning to develop similar multi-disciplinary risk and vulnerability analyses in other countries in Africa and Asia.

Figure IV-6. Examples of the World Food Programme's Vulnerability Analysis and Mapping tool for assessing drought risk for food security in Sudan



Source: World Food Programme.
Abbreviations: WRSI = Water Requirement Satisfaction Index.

Box IV-3. Climate change, forests and people

International Union of Forest Research Organizations (IUFRO) led the first global scientific assessment, *Adaptation of Forests and People to Climate Change*, with a specific focus on the relationship between climate change, forests, and people. The assessment was carried out by a panel of experts from around the world and included assessments of forest responses and vulnerabilities to recent climate change, future environmental and socio-economic impacts and vulnerabilities, current adaptation measures and policies, and management, governance, and policy formulation for adaptation.

With regard to adaptation in forests, the study concluded that:

- To meet the challenges of adaptation, commitment to achieving the goals of sustainable forest management must be strengthened at both the international and national levels. The current failure to implement adaptation limits the capacity of forests and forest-dependent people to adapt to climate change;
- There is no universally applicable measure for adapting forests to climate change. Forest managers should, therefore, have sufficient flexibility to deploy the adaptation measures most appropriate for their local situations;
- Flexible approaches to policy design are needed that are sensitive to context and do not rely on a single, one-size-fits-all mechanism. New modes of governance are required that enable meaningful stakeholder participation, and which provide secure land tenure, rights for users of the forest and sufficient financial incentives.

Box IV-4. Engineering Protocol

The focus of the World Federation of Engineering Organization's (WFEO) efforts has been on climate change risks to physical infrastructure. Changes in statistical weather patterns resulting from climate change will likely alter the foundation of fundamental design data for physical infrastructure systems. Systems designed using outmoded and inadequate data are prone to failure, compromising public safety and straining financial resources. The WFEO has responded to the engineering and design challenge of climate change by developing a formalized risk assessment procedure or tool, known as the Public Infrastructure Engineering Vulnerability Committee (PIEVC) Engineering Protocol

<http://www.gnb.ca/0009/0373/0004/pdf/Keats-e.pdf>.

The Protocol is designed to systematically review historical climate information and estimate the nature, severity and probability of future climate change impacts on individual infrastructure as determined by its design, operation and maintenance. It includes an estimate of the severity of climate impacts on the components of the infrastructure (i.e. deterioration, damage or destruction) to enable the identification of higher risk components and the nature of the threat from the climate change impact. This information can be used to make informed engineering judgments on what components require adaptation as well as how to adapt them, such as design adjustments, or changes to operational or maintenance procedures.

Box IV-5. Assessment of impacts and adaptation in multiple sectors and multiple regions

Concern over the existence of substantial knowledge and capacity gaps in the developing world spurred the climate change science community, led by the Intergovernmental Panel of Climate Change (IPCC) during its Third Assessment Report period, to recommend the development of a wide-ranging programme of assessments to address knowledge gaps in key sectors, enhance scientific capacity in developing countries, and inform and support effective adaptation planning. This effort culminated in the Assessments of Impacts and Adaptation to Climate Change (AIACC) project, which supported 24 sub-regional assessments involving teams from more than 50 developing countries. The assessment teams developed a number of different methodological approaches and tools, reflecting the particular environmental and sectoral issues under investigation, the scientific and institutional strengths and capacities of the assessment teams, and the socio-economic and policy landscapes in which the assessments were conducted. Most of the assessment teams relied on case studies as a means of developing and testing their respective assessment approaches, and they drew from multiple and diverse sources of information, (e.g. biophysical and socio-economic datasets and models, climate change scenarios and projections based on data from downscaled Global Climate Models (GCMs), household surveys, and stakeholder workshops).

Some of the key findings from the AIACC assessments were:

- Systems with similar exposures to climate stimuli can vary considerably in their vulnerability to damage from exposure to extreme events, depending on the strength of institutions, resilience of livelihoods to extreme events, and overall levels of socio-economic development;
- Non-climate drivers exert a strong influence on vulnerability where natural systems are severely degraded and human systems prone to failure. Addressing these non-climate drivers is an important means for reducing the adaptation deficit with respect to current climate variability and extreme events while also advancing broad development goals;
- Development can either enable or hinder adaptive capacity, depending on how the benefits of development are distributed and how development outcomes influence interactions between climatic and non-climatic drivers of vulnerability;
- Understanding and addressing obstacles to adaptation are essential for creating the conditions that enable adaptation to proceed. Obstacles found to be common across the assessments included: competing priorities in resource-scarce settings; entrenched poverty; lack of knowledge and information: lack of financial resources: weak institutions: degraded natural resources: inadequate infrastructure: insufficient financial resources: distorted incentives, and poor governance. The Center for International Forestry Research (CIFOR) and Christian Aid's assessments noted some of these same issues.

Box IV-6. Forests in the context of household livelihoods and national development

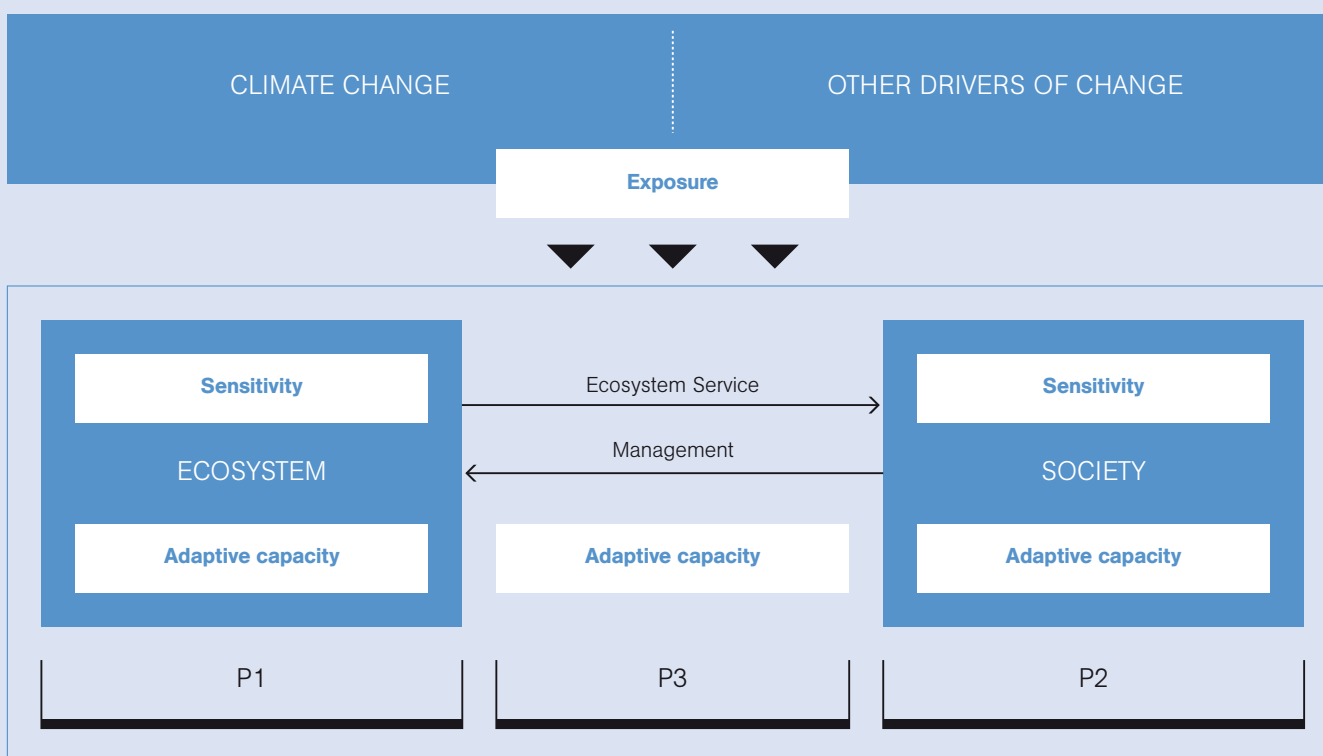
The ecosystem-based approach to adaptation planning and development used by the Center for International Forestry Research (CIFOR) places forest ecosystems within the context of household livelihoods, national development, as well as climatic and other drivers of change. This approach, (illustrated in [Figure IV-7](#)), has general applicability and implications for poverty, food security, and rural energy security and for addressing environmental degradation that constitutes a major source of vulnerability. Furthermore, the approach is applicable at regional scales, allowing regional planning for adaptation for transboundary ecosystems shared by several nations such as forests, river catchments, and watersheds.

[Figure IV-7](#) shows the principles or composite indicators for vulnerability assessment of coupled human-environment system (social-ecological system): P1 deals with the vulnerability of ecosystem services to climate change or variability and other threats, P2 deals with the vulnerability of society to the loss of goods and service, P3 deals with the adaptive capacity of the system as a whole, referring to the capacity of the human and environmental systems to reduce the loss of ecosystem services.

The analytical approach to conducting ecosystem-based assessments involved combining downscaled climate scenarios with group discussions among vulnerable communities and other stakeholders and experts that drew on shared knowledge and experiences of climate risks. In Indonesia, CIFOR assessed two priority issues related to climate risks in the forest ecosystem: vegetation fires and landslides. They conducted climate risk assessment as part of a vulnerability assessment to understand the potential impacts of climate change on ecosystem-regulating services that could, for

example, affect the frequency and potential intensity of fires, landslide frequencies and landslide risk zones. CIFOR used a similar approach in West Africa (in Burkina Faso, Ghana, and Mali) for an analysis of the risks that communities faced from changes to the natural resource base resulting from forest degradation and from warming trends and changes in annual precipitation. An important outcome of the risk assessment was to communicate projected climate change impacts in terms that would raise awareness of the issue as a starting point for adaptation planning.

Figure IV-7. Vulnerability assessment principles



Source: Center for International Forestry Research.

4.2. PRACTICAL OUTCOMES, GOOD PRACTICES AND LESSONS LEARNED

Results of the diverse range of assessment activities reported here have started to generate on the ground impacts. Following the launch of the assessment report on climate change impacts on forests and people, coordinated by IUFRO, awareness about the far-reaching impacts of climate change on people and their livelihoods through the effects on forests, and about the critical role of forests in moderating climate has significantly increased through considerable worldwide media coverage on the key messages from the assessment. Many of the AIACC studies have provided substantial inputs to the elaboration of National Communications by non-Annex I countries to the UNFCCC and the National Adaptation Programmes of Action (NAPAs), which, in turn, have been an important basis for adaptation planning and implementation at international, national and sub-national levels. The knowledge gained from the case studies applying the PIEVC Engineering Protocol is to be assessed by Canadian engineers and experts to develop recommendations, by 2011, for adjustments to infrastructure design and operation/maintenance codes, standards and engineering practices to account for climate change impacts. With the desire of the adaptation community to move from assessments to real adaptation planning and implementation, more practical applications of assessment results should emerge in the future.

A key lesson to be drawn from several of the assessment efforts is the need to examine multiple stressors and drivers of change in order to fully understand the range of factors that shape vulnerability, and develop appropriate adaptation strategies. The active engagement of stakeholders, including those from vulnerable communities, the private sector, resource management groups, and policymakers, can help to inform the assessment process on issues regarding the existence of multiple and interacting sources of vulnerability, the process through which risks are perceived and managed, and where opportunities and obstacles to adaptation exist. An important result of active stakeholder engagement is that assessment outputs tend to be more demand-driven and are thus perceived as relevant to local livelihoods and national development priorities.

Ensuring the active engagement of national-level research and policymaking communities, resource management professionals and boundary organizations that work with local communities requires a concerted effort to build, or enhance, existing capacities to generate, interpret, articulate and disseminate data and information about climate and other global change drivers. In the assessments reviewed here, the type and purpose of capacity-building varied depending on the assessment approach. For example, the FAO project focused on developing skills of national researchers to use advanced climate and crop modelling techniques so that they could more effectively provide information to decision-makers, whereas CIFOR and Christian Aid's priorities for capacity development centred around enhancing the effectiveness of climate risk communication to information users (e.g. local communities and national and regional partners) in order that they become more active participants in analyzing vulnerability and designing adaptation strategies.

A core purpose of the AIACC project was to develop the capacity of scientists from developing countries to undertake multidisciplinary, and multi-sectoral assessments. This was accomplished through a multi-pronged approach to capacity building. This involved multiple, mutually reinforcing, activities of learning-by-doing augmented with technical assistance, group training, self-designed training and networking between different research groups within the project. A substantial portion of the capacity-building resulted from the cross-project learning and sharing of methods, expertise, data and experiences. To facilitate this process, efforts were made to utilize the expertise of developing country participants in training and capacity transfers to their colleagues. This worked well and even led to some of the teams organizing a number of training workshops for colleagues on other projects.

Beyond the issue of capacity-building, the organizations that undertook the assessments reviewed in this chapter noted a number of potential entry points for reducing vulnerability and promoting adaptation consistent with development imperatives. Given the nature of the assessments, these entry points generally fell into the categories of forest ecosystem management and agriculture/food security and, for WFEO, infrastructure.

Forest ecosystem management: Assessments undertaken by IUFRO, CIFOR and an AIACC project on a forested watershed in the Philippines emphasized the importance of assessing climate change risks, vulnerability and adaptation through the lens of coupled human-natural systems in order to understand the strongly interdependent linkages among people, livelihoods, and biophysical resources, and to assess the potential for creating positive and negative spillover effects and potential tradeoffs from different policy outcomes.

The studies viewed sustainable forest management through promoting hazard preparation and early-warning systems, fire management, control of illegal logging, and peatland rehabilitation, as being essential to reducing the exposure of forests to climate-induced risks. However, limited progress has been made in adopting sustainable forest management practices, particularly in developing countries. According to CIFOR, many of these initiatives are piecemeal, uncoordinated, and unbalanced in scale, and the underlying causes of the lacklustre results (e.g. poverty, land tenure conflict, unfocused policies, poor governance and weak law enforcement) have not been effectively addressed. Integrating and synergizing existing initiatives, as far as possible, and at the same time scaling up those local initiatives that have achieved progress towards sustainable forest management and poverty reduction should be encouraged.

Agriculture and food security: The assessments conducted by Christian Aid, and several of the assessments conducted under the AIACC project (e.g. Mexico, Mongolia, North Africa, southern Africa, Sudan, and West Africa) focused on the climate risks faced by smallholder producers and by rainfed production systems, including high and potentially increasing seasonal and interannual climate variability, increasing severity of extreme events, warming trends and potential changes in the mean precipitation. The rural livelihoods approach used by AIACC and Christian Aid clearly illustrated the place-based and context-specific nature of vulnerability and the significant extent to which vulnerability was shaped by a convergence of climatic and non-climatic factors, thus underscoring the need to design adaptation strategies that simultaneously addressed multiple drivers of vulnerability and change.

WFP, in focusing on the impacts of climate change on food security, uses complex weather data in emergency preparedness, disaster risk reduction and vulnerability assessment to increase the resilience of vulnerable countries and communities to climate change. In 2008 WFP assisted 15.7 million people affected by natural disasters. In preparing for and responding to disasters, WFP stressed the importance of ensuring access to relevant weather information and a strong communications infrastructure for the timely production, dissemination and use of information about potential climatic risks to food security. In that respect, WFP activities supporting national and regional institutions in delivering better climate and food security services such as vulnerability assessments, early warning systems, as well as crop and food security monitoring systems proved to be an indispensable part of capacity-building in the context of climate change adaptation.

Infrastructure: Reducing the vulnerability of infrastructure to climate change has unique challenges related to issues of cost, permanence of the investment and the durability of components within the infrastructure “system”. The performance response of infrastructure components requires estimates of climate change impacts related to: structural integrity; serviceability; functionality; operations and maintenance; emergency response risk; insurance considerations; policies and procedures; economics; public health and safety and environmental effects.

Currently, climate change models do not provide the granularity required for the site-specific scales used in engineering design of individual infrastructures. Engineering vulnerability/risk assessment therefore provides a recognized method that handles the uncertainties inherent in climate change projections. It enables the identification of key vulnerabilities and risks in a form that enables engineers to exercise their professional judgment for infrastructure design, and for operations and maintenance recommendations.

4.3. CHALLENGES AND OPPORTUNITIES

The assessments reviewed here, and the recent plethora of assessments, projects, and programmes undertaken by other organizations and communities, have made important progress towards advancing knowledge, enhancing human and institutional capacity and improving links between science, policy, and stakeholder communities. However, the extent to which knowledge generated through an assessment process ultimately yields tangible progress towards adaptation depends on the extent to which:

- (i) Gains in capacity development can be sustained;
- (ii) Pathways exist whereby new information leads to salient and actionable recommendations for decision makers;
- (iii) Access to resources is adequate to proceed from recommendations to actions.

Actions that are needed to address these three areas include:

- Support for on-going training of developing country scientists, especially young scientists, in order to build a critical mass of expertise on climate change risks to key sectors. A targeted process of scientific capacity-building is, in itself, an adaptation response, where large knowledge gaps exist in understanding impacts, vulnerability and adaptation. However, current donor priorities for adaptation tend to focus on policy outcomes rather than on building scientific capacity to support the kinds of robust knowledge systems that are needed to address evolving and dynamic threats from climate change;
- Continuation of the development and improvement of regional and sub-regional scale models, along with developing the necessary skills of researchers to use the models for problem solving rather than to simply run existing models as “black boxes”. Access to historical data on climate and environment is also needed;

- Development of knowledge exchange mechanisms between assessment teams and relevant stakeholder groups to promote greater understanding of various decision-making contexts for managing climate risks and the integration of local and traditional knowledge, and community-based adaptation needs, into scientific assessments. Efforts to integrate the science and research community with policymakers and other stakeholder communities in a more participatory framework help to engender trust in the assessment process and a broader stake in the outcome, and opens up new avenues for communication of findings;.
- Building of technical capacity to plan and implement adaptation measures, including proposal development, project management, monitoring and evaluation.

The recent emergence of global adaptation networks, such as United Nations Environment Programme’s (UNEP) Global Climate Change Adaptation Network (see CHAPTER VIII for details) and the Ecosystems and Livelihoods Adaptation Network proposed by WWF and IUCN have the potential to provide support for the assessment process through mobilizing the resources of relevant regional centres and ground networks, and acting as a conduit for disseminating knowledge and capacity building tools. This may be particularly true for UNEP’s Adaptation Network, which aims to support implementation of the Nairobi work programme. The diverse range of mandated activities under the Nairobi work programme provide opportunities for knowledge sharing and learning among different groups of stakeholders including scientists, practitioners, policy makers and private sector entities.



V. COMMUNICATING CLIMATE RISKS

CHAPTER COMPILED BY

Environmental Development Action (ENDA)

WITH CONTRIBUTIONS FROM

ENDA, the Global Change SysTem for Analysis, Research
and Training (START), Practical Action

‘Communicating risk’ is perhaps best defined as a mutual exchange of information about a process or event between different interest groups, so that each understands the implications of the information, and can integrate it with local knowledge systems to deploy it to good effect.

Activities carried out by partners encompass the following areas of the mandate of the Nairobi work programme:¹⁰

- Promoting the development of, access to, and use of information and data on projected climate change;
- Promoting understanding of impacts of, and vulnerability to, climate change, current and future climate variability and extreme events, and the implications for sustainable development;
- Promoting the availability of information on the socio-economic aspects of climate change and improving the integration of socio-economic information into impact and vulnerability assessments;
- Facilitating communication and cooperation among and between Parties and relevant organizations, business, civil society and decision-makers, and other stakeholders.

5.1. ACTIONS TAKEN AND RESULTS ACHIEVED

Partners of the Nairobi work programme have implemented several methods and approaches related to communicating climate-related risks. Some of the main actions and results are highlighted in [TABLE V-5](#), and described in more detail in [BOXES V-1 to V-3](#).

¹⁰ FCCC/CP/2005/5/Add.1, paragraph 3(a) (iii)-(v) and 3(b) (iv).

Table V-5. Summary of activities undertaken and results achieved to date

Name of method	Activities	Countries/regions covered
Capacity-building risk communication strategy	Promoting a Participatory Assessment and Research/ Participatory Rural Appraisal (PAR/PRA)-style methodology to exchange knowledge and information on climate change between external and internal stakeholders, and support communities' own prioritized adaptation strategies	Zambia, Gambia, Niger and Senegal
Demand-driven approach	Linking developers and users of information	Nepal
Advancing Capacity for Climate Change Adaptation (ACCCA)	Supporting and building capacity for adaptation decision-making based on a sound risk communication strategy, bringing climate science and lived experience together on the same table	Africa and Asia

Box V-1. A community approach in the Upper Zambezi

In January 2007, ENDA started work on a community-based adaptation to climate change project supported by the Climate Change Capacity Development (C3D) project in western Zambia, along the eastern edge of the Upper Zambezi 'Bulozi' floodplain.

A risk communication strategy with clearly defined roles and responsibilities was central to this work. The project emphasized a locally-driven approach and much of the work was spearheaded by a community-based organization (CBO) with local legitimacy and respect, and with support from the local traditional authority and government. A Participatory Action Research (PAR)-style methodology was adopted to exchange knowledge and information on climate change between external and internal stakeholders through the following basic steps that define ENDA's current C3D risk communications methodology in Africa:

- A social and environmental history of the region was constructed. In the case of the Upper Zambezi region, this had been done already in 2001 – 2004 for use in a number of development initiatives in the region;
- The project was introduced at ministerial level to inform as well as obtain permission, with follow-up meetings at provincial and local government level to obtain permissions and cooperation;
- Preliminary field investigations were carried out by local researchers appointed by the CBO and trained by ENDA and the CBO, designed to tease out major dynamics affecting local lives and livelihoods;
- In-depth household and focus group investigations were carried out, during which indigenous/local knowledge and coping strategies from the past were investigated;
- A multi-stakeholder workshop was organized in the pilot action region with delegates from village livelihood groups, traditional leaders (also partners on the project), government extension officers from agriculture, livestock and fisheries, provincial officers from the Zambia Meteorological Department, local religious leaders, local radio and other media.

Focus area(s)/Sector(s)	Results to date	Organization(s)
Multiple sectors	Understanding of the risks from climate variability and change, and adaptation strategies with clear priorities formulated by 10 villages, with a few of the activities are already being implemented	ENDA, as a part of the Climate Change Capacity Development (C3D) programme of United Nations Institute for Training and Research (UNITAR)
Multiple, in this particular context, used for disaster risk reduction	The approach tested during a flood of the West Rapti River in June 2008; a timely warning triggered an evacuation hence saving lives and properties, at very low cost	Practical Action
Risk reduction	14 pilot actions (nine in Africa and five in Asia) initiated, with a further five currently in progress in Africa	UNITAR, Stockholm Environment Institute (SEI), START International, ENDA and the Climate Systems Analysis Group (CSAG) of the University of Cape Town

- Prioritized adaptation strategies were identified by four "pilot action community adaptation committees" on the basis of the social learning carried out during the field investigations and at the multi-stakeholder workshop;
- Capacity-building was carried out to support adaptation;
- The adaptation strategies were prepared for implementation.

By December 2007, four committees, representing the 10 villages, had provided their own understanding of the risks they faced from climate variability and change, and adaptation strategies with clear priorities were prepared. The CBO proposes to use these strategies to fund-raise. Meanwhile, some of the adaptation strategies have recently been deployed by the CBO with varying results. Significantly, many of the adaptation strategies identified involve reform of current practices, or the reapplication of existing knowledge.

For example, one issue that local people feel is in their hands is to reduce the annual burning of grasslands to reduce atmospheric pollution, the resultant health hazards, and damage to the local ecosystem. The participants agreed that burning has got out of hand and is carried out now for purposes other than to assist the re-germination of grasses, as was originally intended. Many local people felt that traditional ecosystem management, policed by the traditional royal authority was much more effective than today and that local knowledge and ancient rules to manage the floodplain ecosystem needed to be rediscovered.

A similar strategy has since been adopted in subsequent pilot actions planned for 2009 – 2011 in Gambia, Niger, Senegal and another project in Zambia.

Picture V-1. Street drama performance about flood risk in the Chitwan district of Nepal



Source: Practical Action.

Picture V-2. Community-drawn map of ‘tabia’ (peasant association), showing villages, natural resources and hydrology of area, Abraha Atsbaeha (ACCCA pilot action community), Tigray, Ethiopia, August 2009



Source: Environmental Development Action.

Box V-2.

A demand-driven approach in the Terai

Practical Action, an NGO working with communities in Nepal, Bangladesh, Zimbabwe and Sri Lanka to reduce people's vulnerability to disaster, has been implementing of early warning systems (EWS) in the Terai plains of Nepal – the most flood-prone area of the country – since 2002.

As part of the project, generators and users of information relating to flood-alerts were brought together. Community representatives visited gauge stations upriver to see what information could be made available. Similarly, employees at the gauge station visited downstream communities to explore what information would be most useful. It was agreed that the gauge stations would supply all the historical and real-time information that the stakeholders said they needed to judge the indicators of flood risk relevant to their context. With this simple intervention, the information generated by the gauge station was made demand-driven, context-specific, and therefore more effective.

The success of this approach was put to the test in June 2008, when the waters of the West Rapti River rose alarmingly. Within 20 minutes of the waters reaching the 'trigger' level, the gauge reader had informed a pre-assigned group of community stakeholders, who raised the alarm. The communities downstream spent the day monitoring the river and, in the evening, community leaders sounded the sirens as the river swelled further. A full evacuation proved that a good decision-making and information-sharing system had been set up.

Impressively, this early warning system required a relatively meagre initial investment and recurrent costs of just USD 250 per year. No major investments or scientific input was needed to save lives and property. Furthermore, the relationship between information generators proved sufficiently well established and autonomous for it to sustain without Practical Action's continued input.

Box V-3.

Advancing Capacity for Climate Change Adaptation

On a somewhat larger scale, the Advancing Capacity for Climate Change Adaptation (ACCCA) project supported climate change risk communications work in Africa and Asia over the period 2007–2009 (with funding from European Union (EU) and UK Department for Environment, Food and Rural Affairs (DEFRA) and Netherlands Climate Assistance Programme (NCAP)), with a second phase due for completion in early 2010 (with combined UK Department for International Development (DFID) and International Development Research Centre (IDRC) funding). The first phase comprised 14 pilot actions (nine in Africa and five in Asia. A further five are in progress in Africa (see map in Figure V-8).

ACCCA is managed by United Nations Institute for Training and Research (UNITAR) and implemented through a partnership including UNITAR, Stockholm Environment Institute (SEI), START International, ENDA and the Climate Systems Analysis Group (CSAG) of the University of Cape Town. The project is aimed at building capacity to improve decision-making in the face of climate vulnerability, and combines scientific evidence and lived experience to assess vulnerability. It brings together the following work areas:

- Climate science: data analysis and scenarios, and learning what part they can play in adaptation at the local level;
- Risk communications: developing and applying appropriate communications strategies;
- Lived experience: learning how local people interpret climate and integrate understandings of climate into daily lives and livelihoods;
- Participative Action Research and social (double-loop) learning;
- Technical workshops designed to build the knowledge and understanding of the pilot action project teams on climate science and risk communications;
- Vulnerability analysis: several tools employed according to local suitability;
- Adaptation planning and screening of strategies for risk;
- Communication of lessons learned to policy and decision makers and to the wider climate and development community.

Results and lessons learned in the ACCCA project to date reflect the diversity of location, theme and methods engaged, and the different capacities and knowledge available at the time of implementation. Nevertheless, some homogeneity was provided by the fact that most of the pilot actions took place in rural regions.

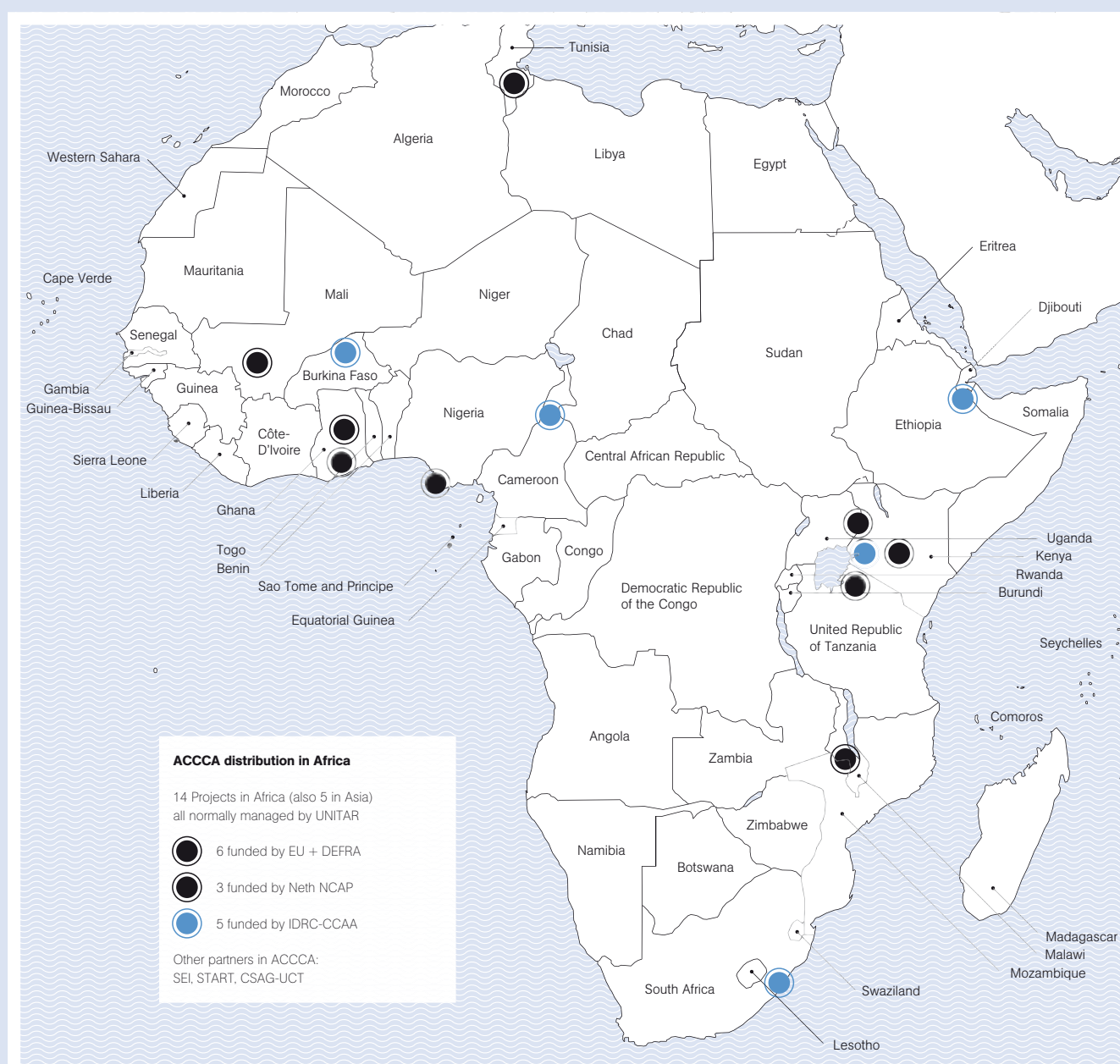
A good communications strategy was a founding requirement of the ACCCA process, and capacity-building for pilot action teams was provided at a technical workshop in Cape Town in October 2007, where a whole day was spent discussing the importance of developing a robust communications strategy with appropriate communicators. This was supported by a preliminary guide, *Risk Communications on Climate Change and Variability: Preliminary guidance for ACCCA teams*, provided near the start of implementation in July 2007.^a

A synthesis document covering the life of the project to June 2009 and discussing both climate science and risk communications work in ACCCA is available at <http://www.acccaproject.org>.^b Further resources on risk communications are also available on wikiAdapt <http://wikiadapt.org/>.

^a Flint, L. *Risk Communications on Climate Change and Variability: Preliminary guidance for ACCCA teams* (ENDA, Dakar, 2007).

^b Zermoglio, F, Devisscher, T. and Padgam, J. *Synthesis Report: Lessons Learned on Climate Science and Risk Communication in the ACCCA Project* (UNITAR, Geneva, 2009).

Figure V-8. Geographical distribution of Advancing Capacity for Climate Change Adaptation (ACCCA) projects in Africa



Source: Environmental Development Action.

5.2. PRACTICAL OUTCOMES, GOOD PRACTICES AND LESSONS LEARNED

Much of the work that has taken place under the Action Pledges on communicating climate risk relies on externally generated information helping to bridge gaps in local information. Often, the knowledge and inspiration for vulnerability analysis and adaptation is a latent resource that already exists within communities. The input required from outside often lies in the realm of buttressing and supporting locally conceived projects and ideas for understanding climate-related risks better and for enhancing resilience.

Risk communication is not solely about communicating objective or 'hard data' such as meteorological information – subjective information such as opinions and concerns are equally important. The flow of information in risk communication is not unilinear – it entails the receipt as well as the delivery of information and ideas in a process of two-way learning often known as 'social' or 'double-loop', employing the idea of 'participative action research' as its principal method.

In order to be effective, the exchange of information and knowledge must be understood, interpreted and valorised across different cognitive systems. Finally, the process of risk communication is ongoing and long-term, rather than a one-off event. The nature of risk varies over time and space. A risk communications strategy, therefore, has to be flexible and adaptable to changing conditions and knowledge.

Communicating *climate-related* risk, in particular, is partly about raising awareness of increasing climate variability (for instance, in rainfall, temperature and wind patterns) and resulting impacts (such as rising sea levels, increasing drought, and increasing storm activity) that will affect rural and urban communities. The extent to which a community is resilient or vulnerable to these impacts depends on a range of biophysical and socioeconomic factors. Climate risk is therefore also closely associated with understanding and communicating the precise factors that contribute to *local* vulnerability to climate variability and change.

The activities described in the [Boxes VI – VIII](#) demonstrate yet again the value of locally-driven approaches mediated by local people of standing in the community to ensure that the process can be sustained and replicated in the longer term. Some of the key lessons learned are as follows:

- Institutional capacity, preferably in the form of an existing local organization, is a key ingredient to ensure the sustainability of the process, which will span many years; updating and communicating locally-relevant information and knowledge on climate risk should be one of the fundamental duties of such an institution or organization;
- The socio-ecological history of the region provides a better contextual background and understanding of processes and approaches that have been tried in the past. Exploring and understanding the past as a starting point can lead more sensible and sensitive approaches in response to present and future risk;
- Often the means of dissemination and consultation can be as varied and locale-specific as the responses. Given the remoteness of the Upper Zambezi region, dissemination through television, radio or newspapers was not really an option. Thus religious movements (in this case the New Apostolic Church, the Seventh Day Adventist Church and the United Church of Zambia, in particular), community radio, the traditional authority (which is very influential locally) and local government extension workers (agriculture and fisheries) took on the task of raising awareness among communities;
- The use of local language and cultural contexts is an obvious but sometimes overlooked element of risk communication. In the Upper Zambezi region, the local language, Silozi, was used and the Barotse Royal Establishment, the local traditional authority composed largely of senior citizens, helped infuse local history and knowledge in risk communication;
- Communication initiatives should include accounts of existing efforts by other households and sectors. Currently, people are very uncertain about climate change and are inspired to take on board information and ideas when others have already taken the initiative;

- Communicating risk need not be costly or complicated – often common-sense interventions are all that are needed. Using local resources, where available, reduces costs but also helps to ensure community ownership. Importantly, greater interaction between generators and end-users of critical information is a key element of communicating risk;
- A well thought-out communications strategy is vital. The strategy should leave room for flexibility and revision if it is found to be ineffective. This implies the need for an accompanying monitoring and evaluation strategy with indicators related to knowledge and information;
- The choice of communicator is a critical factor. No matter how good the information, appropriate delivery vehicles are essential – including communicators rooted in local culture, and respected by communities and local government structures. The use of local languages, as well as the use of appropriate language that does not blind people with too much technical content, is important;
- Decisions on how much information to impart and how to impart it are essential. Information overload can render the effort redundant. Equally, a positive tone makes it easier to communicate information – too much negativity can lead to apathy and low morale, psychological factors that hamper actions.
- Strategies that employ high levels of participation – such as local drama, concerts, participatory video, heritage events, church meetings, school and college meetings, radio phone-in shows and role play were found to be more effective modes of communication than meetings and workshops;
- Local communities understand far more about climate change and its local impacts than they are generally given credit for – although they may express their knowledge differently. Local impacts of climate change are also well understood, but global processes less so;
- Similarly, correction of malpractice (for instance, excessive deforestation for wood fuel, or overgrazing) and ideas for economic diversification are generally well-known and understood; however, the motivation for employing adaptive measures is often constrained by worries over risk to existing livelihoods;
- In a project the size of ACCCA, working across two continents, it is important to recognize that scaling up and replication is mediated by the sheer diversity of conditions and capabilities, even when two actions take place in the same ecosystem and political region. Connectivity and learning between pilot actions, regions and continents is made possible by good networking, so that future work can benefit from the experience gained in previous case studies. Tools such as weAdapt (<http://www.weadapt.org>) and ENDA Communities (a South-South communications network dedicated to exchange of information and experience between CBOs/Civil society organizations (CBOs/CSOs), local decision-makers, local researchers in the Global South) aim to provide a bridge for ACCCA projects.

5.3. CHALLENGES AND OPPORTUNITIES

Climate risk communication continues to remain somewhat of a challenge. This can be attributed partly to the uncertainty accompanying future climate conditions and a general lack of clarity about what is needed, although there are several other factors.

Somewhat ironically, much of the knowledge and information related to climate risks for lives and livelihoods is concentrated in developed countries, and the knowledge, information, skills, infrastructure and financial resources to invest in new and alternative technologies are largely absent in the more vulnerable regions in developing parts of the world. This situation has compounded the low resilience of these regions, leading to a stronger likelihood that adaptation action, when taken, is reactive rather than proactive. Instead of forward planning to reduce the risk for current and future generations, communities in these vulnerable regions are left with coping strategies in response to climate variability and change.

Secondly, information that is made available to vulnerable communities is not 'bundled' or communicated in a way that is most useful to vulnerable communities. In order to understand and use critical information, a community must unpack, interpret and re-bundle it in the context of local priorities. This may not always be possible due to lack of capacity or time, either rendering the scientific information redundant or leading to miscomprehension and maladaptation.

There are at least two levels of disconnection – one between producers and transporters of information on the one hand and user groups on the other, and another between different hierarchies of user-groups (for instance, national governments, local communities and their representative organizations and institutions). Often, it is not a case of a lack of information as much as a case of information or knowledge that is packaged or communicated ineffectively.

Further extension of this argument is that two groups of specialists are missing from the cycle of risk communication: appropriate communicators, probably the most underrated, yet vital, specialists in the field of climate risk communication, and experienced managers of both information and people to facilitate effective communication.

Communicating climate-related risks is a complex but widely under-appreciated area of research, cutting across physical and social disciplines, and through quantitative and qualitative approaches, linked by social learning. Much of the work of communicating risk involves the exchange of subjective experiential evidence and must allow for self-expression through everyday lives and livelihoods. Many of the factors that enhance or diminish risk are socially produced and hard to measure. Issues such as morale, moral defeatism and even post-colonialism are important factors to take into account in building both adaptive capacity and a sense of ownership for both risk awareness and strategies for adaptation, as was evidenced in the Zambia and several of the ACCCA case studies.

Experience at the practical level has demonstrated that climate science knowledge can be valuable, but is not yet a critical factor in motivating awareness of risk and the need to take action – processes that can begin with social learning and experiential evidence. In the Zambia case study, climate science was employed later in the process to justify and explain the evidence of local people who are very aware of changes to the natural resources upon which their lives and livelihoods depend. Thus, the usefulness of climate science information in awareness-raising, particularly among policy and decision makers, is yet to be fully appreciated and perhaps made more deployable at the local level, a world of immediacy where adaptation takes place in response to tangible stressors. At this stage, the social indicators of vulnerability, resilience and stress and the value that local communities put on these in their own situation analysis are more potent themes that need to be buttressed and supported by applied scientific research and analysis.

Risk communication, like adaptation, calls for more attention on a local scale. It is a social process requiring social science skills to make useful linkages between biophysical, socioeconomic and cultural knowledge. Experience has shown the value of understanding the social and environmental history of a region and community as a starting point for climate-related risk communication, and employing an ecosystem or socio-ecological system approach which includes both human and physical activities.

The Nairobi work programme has encouraged organizations, the research community and policy- and decision-makers at the intergovernmental, national, and local level to be innovative and effective in developing communications strategies for dissemination of information on climate risk. This work is likely to continue to evolve as knowledge and information, as well as the climate risk itself, evolves apace.



VI. SCALING UP COMMUNITY-BASED ADAPTATION ACTIONS

CHAPTER COMPILED BY
Practical Action

WITH CONTRIBUTIONS FROM
Christian Aid, Environmental Development Action (ENDA), Institute for Social and Environmental Transition (ISET), Kyoto University Graduate School of Global Environmental Studies, Practical Action, Satkhira Unnayan Sangstha (SUS), United Nations Development Programme (UNDP), World Food Programme (WFP)

Community Based Adaptation (CBA) builds on communities' existing knowledge of their environment and livelihoods, to enable them to deal with the potential impacts of climate change and variability. Community-based approaches respond to the needs of the most vulnerable with techniques that are developed with (rather than imposed upon) communities, who have the vital knowledge and experience of their local setting, often living in the most extreme and risk-prone areas, yet now need to be linked with external actors such as scientists or policy-makers in order to deal with the new threat of climate change.

Despite their locale-specific nature, there is considerable scope for sharing through networking or for scaling up adaptation practices that have proved successful at the community level. The first step for such scaling up is the identification of good practices in community approaches that have proved particularly successful, and hold promise for flexible replication elsewhere. Community-based adaptation allows for such "learning-by-doing" approach – a good practice that can be scaled up, as a method to ensure adaptation efforts are targeting the right options for the context and also to help overcome some of the doubts raised by climate uncertainty and variability.

Activities carried out by partner organizations under this theme address the following issues as defined in the mandate of the Nairobi work programme:

- Promoting development and dissemination of methodologies and tools for impact and vulnerability assessments, such as rapid assessments and bottom-up approaches, including as they apply to sustainable development;¹¹
- Collecting, analysing and disseminating information on past and current practical adaptation actions and measures, including adaptation projects, short- and long-term adaptation strategies, and local and indigenous knowledge;¹²
- Promoting research on adaptation options and the development and diffusion of technologies, know-how and practices for adaptation, particularly addressing identified adaptation priorities and building on lessons learned from current adaptation projects and strategies;¹³
- Facilitating communication and cooperation among and between Parties and relevant organizations, business, civil society and decision makers, and other stakeholders;¹⁴
- Promoting understanding and the development and dissemination of measures, methodologies and tools including for economic diversification aimed at increasing economic resilience and reducing reliance on vulnerable economic sectors, especially for relevant categories of countries listed in Article 4, paragraph 8, of the Convention.¹⁵

6.1. ACTIONS TAKEN AND RESULTS ACHIEVED

This chapter presents a few examples of partner organizations in implementing and scaling up community based approaches and results in [TABLE VI-6](#), followed by some in-depth case studies in [BOXES VI-1 to VI-7](#).

¹¹ FCCC/CP/2005/5/Add.1, paragraph 3(a)(i).

¹² FCCC/CP/2005/5/Add.1, paragraph 3(b)(ii).

¹³ FCCC/CP/2005/5/Add.1, paragraph 3(b)(iii).

¹⁴ FCCC/CP/2005/5/Add.1, paragraph 3(b)(iv).

¹⁵ FCCC/CP/2005/5/Add.1, paragraph 3(b)(v).

Table VI-6. Summary of activities undertaken and results achieved to date

Approach	Activities	Countries covered
Bottom-up approach	Building the capacity of communities to have their voices heard	Tajikistan
Building the self-sustainability of local organizations	Training on and implementing diversification of income-generating activities including experimenting with adaptation strategies prioritized by local communities	Africa – Zambia
Community based disaster risk management (CBDRM)	Linking disaster risk reduction and climate change adaptation at local levels	Vietnam
Shared learning dialogues	Iterative small group discussions between multiple stakeholders for shared learning and engagement between stakeholders such as climate scientists, governments, and local communities, including cost-benefit analyses laying out 'who wins' and 'who pays'	Nepal, India, Pakistan, Vietnam, Indonesia and Thailand
Social networks	Creating communication channels between paddy farmers and research facilities, to engage farmers in the process of developing new paddy varieties to enhance production	Sri Lanka
Linking service and information providers with end-users	Bringing together service and information providers with end-users, and government capacity-building to enable service providers and resource management to recognize and address the adaptation needs of communities vulnerable to climate change	Global relevance. Implemented in several countries, including Nepal, Kenya, Bangladesh and Vietnam
Community-level training	Providing a range of training activities including focus group discussions, cluster meetings, in-house training and workshops, day observation events and seminars	Bangladesh
Community-based planning	Promoting the management of environmental resources to enable transitions to more sustainable livelihoods	Ethiopia
Enhancing Resilience (ER) scheme	Using participatory approach to strengthen and create community assets, improving livelihoods, and empowering women	Bangladesh
Technological options	Using new technologies, including the Internet, mobile phones, "knowledge nodes", MP3 players, multimedia formats combining participatory video, local language translations of text, and sound recordings to overcome issues of regional dialects and illiteracy	Global

	Focus area(s)/Sector(s)	Results to date	Organization(s)
	Multiple sectors	Creation of the Tajik Climate Network (TajCN), a coalition of NGOs working to raise community awareness of the threats of climate change, elaborate a common position on adaptation, and engage in international talks on climate change	Christian Aid and national partner NGOs
	Rural food security issues		ENDA Communities
	Multiple sectors	Two plans produced; several sub-projects implemented; methodology being replicated in another province in Viet Nam, in the Philippines and in India	International Environment and Disaster Management Laboratory (IEDM) of Kyoto University Graduate School of Global Environmental Studies
	Multiple sectors	People-centred, low-cost options for adaptation identified; resilience plans being developed in urban areas	ISET
	Agriculture	Farmer engagement in research ensured and widespread interest generated among farmers in areas far from where it was originally implemented	Practical Action
	Multiple sectors	Linkages between the providers and end-users of service and information established	Practical Action, ISET, UNDP, WFP and others
	Multiple sectors	Awareness of climate change issues, preparedness and adaptation options enhanced for nearly 4500 people of different age and profession in the target coastal community in south-west Bangladesh	SUS
	Food security, sustainable natural resource management	Capacity of food insecure communities and national decision makers enhanced for planning and managing development and adaptation activities	WFP
	Multiple sectors	The Government's disaster management and preparedness strengthened by providing support and training, in addition to projects targeting the creation of assets and climate proof infrastructure	WFP
	Multiple sectors	Experiences and information disseminated and shared; scaling up of successful community actions encouraged	UNDP and Practical Action

Picture VI-3.

Community-based intervention – school building as the new flood shelter



Source: Kyoto University Graduate School of Global Environmental Studies.

Box VI-1. Identifying people-centred solutions

A continuous participatory process involving multiple stakeholders and allowing for shared learning, understanding, and assessment of the viability, costs and benefits of interventions is recognized as an essential basis for community-based adaptation approaches. “Shared Learning Dialogues” (SLDs) – iterative small group discussions between multiple stakeholders – are an innovative approach for shared learning and engagement between climate scientists, governments, and local communities. Information on vulnerability of populations and sectors, and cost-benefit analyses of potential interventions that draw out “who wins” and “who pays” are part of this iterative process of learning.

The inclusion of such factors in planning processes could lead to results that belie the ‘conventional’ wisdom that favours large-scale infrastructure development, leading instead to more cost-effective, people-centred solutions. For instance, the Institute for Social and Environmental Transition (ISET) promoted the use of SLDs to discuss the relative costs and benefits of embankments versus more people-centred community based adaptation options such as raising the plinth level of houses, storage of seed grains, and forest buffer zones along river banks in Nepal. The joint assessments highlighted the social and economic viability of people-centred approaches.

In another ISET project in Tamil Nadu, India, supported by the International Development Research Centre (IDRC) and the National Oceanic and Atmospheric Administration (NOAA), SLDs initially rejected conventional approaches such as the construction of sluice gates or tidal regulators across rivers to prevent the intrusion of saline ocean water. The viability of these measures, however, was called to question when communities took into account the implications of future climate change-related predictions. With rising sea levels and/or increased storm intensity, tidal regulators would do little to limit the intrusion of saline water into agricultural areas. In fact, across most deltaic coastal areas where the gradient of the land does not increase rapidly away from the shore, it was recognized that strategies for “living with” increasing salinity would be essential. Instead of constructing large-scale physical barriers, communities opted for strategies to diversify livelihoods away from climate-vulnerable activities, develop new livelihood sources consistent with anticipated changes, and protect

assets, health and lives in ways that should enable communities to live with future climate change. For instance, an SMS Early Warning System using mobile phones was developed to deliver weather alerts, capitalizing on the high rate of mobile phone use. Computer training centres were established in some places targeting women and young people to provide them with employment opportunities independent of climate.

Another case of effective involvement of communities is WFP’s Managing Environmental Resources to Enable Transitions to More Sustainable Livelihoods (MERET) project in Ethiopia. Ethiopia is one of the world’s poorest countries, with natural resource degradation constituting a serious barrier to building resilience against projected increases in droughts and other extreme weather events. WFP has partnered with the Government of Ethiopia in the areas of reforestation and soil and water conservation for over 30 years through the MERET project. MERET currently operates in 600 communities and benefits more than a million people each year. MERET’s participatory approach clearly enhanced capacity to plan and manage development and adaptation activities. A key institutional arrangement in MERET is the community-based elected planning team, which develops five-year conservation plans subject to ratification and evaluation by the whole community. This process allows for accountability and the community voice to be heard.

In Bangladesh, WFP’s Enhancing Resilience (ER) scheme provides an innovative link between relief, recovery and development activities, enhancing household and community resilience in vulnerable, disaster-prone areas. WFP’s interventions are specifically aimed at supporting the livelihoods of disadvantaged groups, particularly ‘ultra poor’ women in highly food insecure and disaster-prone areas, through resilience-building tools including capacity-building and trainings, as well as savings and micro credit for income generating activities. For the Government, NGOs and other stakeholders, ER is an important means to meet the needs of disadvantaged and marginalised groups. At the national level, WFP is supporting the Bangladesh Government’s Climate Change Strategy and Action Plan, by building synergies between the food security, disaster management and assets and infrastructure elements of the Strategy.

Box VI-2. Making the right links

The importance of making the right links between service providers and end-users has been highlighted in the chapter on climate risk communications. It is equally important in enabling communities to plan and take action. The work of Practical Action in Kenya and Nepal, in particular, demonstrates the benefit of linking service and information providers with end-users (see Chapter V). In Bangladesh, the establishment of Community-based organizations (CBOs) has allowed communities to access financial and information resources, and to participate in local disaster preparedness planning.

Working in Bangladesh, Bolivia, Guatemala, Jamaica, Kazakhstan, Morocco, Namibia, Niger, Samoa and Viet Nam, UNDP employs a programme strategy which not only describes patterns of community-level vulnerability to climate change and identifies priority intervention areas, but also defines the institutional and policy context necessary for successful adaptation measures. Both Practical Action and UNDP's projects focus on capacity-building with governments to enable service providers and those dealing with resource management to recognize and address the adaptation needs of communities vulnerable to climate change.

In Zambia, ENDA held a workshop in Mongu, the main town on the Buluzi floodplain. The workshop involved leadership figures from four pilot action village clusters, livelihood operators, climate specialists, local government and agricultural and fisheries extension officers, representatives of local religious orders, local media and organization workers. During the meetings, the communities were able to express their concern about the lack of ecosystem policing carried out by the Barotse Royal Establishment, who were then able to respond.

SUS, an NGO working in Bangladesh, held focus group discussions at the district level to draw together agriculture and fish farmers, members of the community, and local government representatives. Together they identified different community-based adaptation measures relating to intensifying crop cultivation, supplying potable drinking water and increasing household options to respond to climate-induced hazards.

Picture VI-4. Animated discussion at the local community and decision-makers workshop in Mongu, Zambia, January 2007



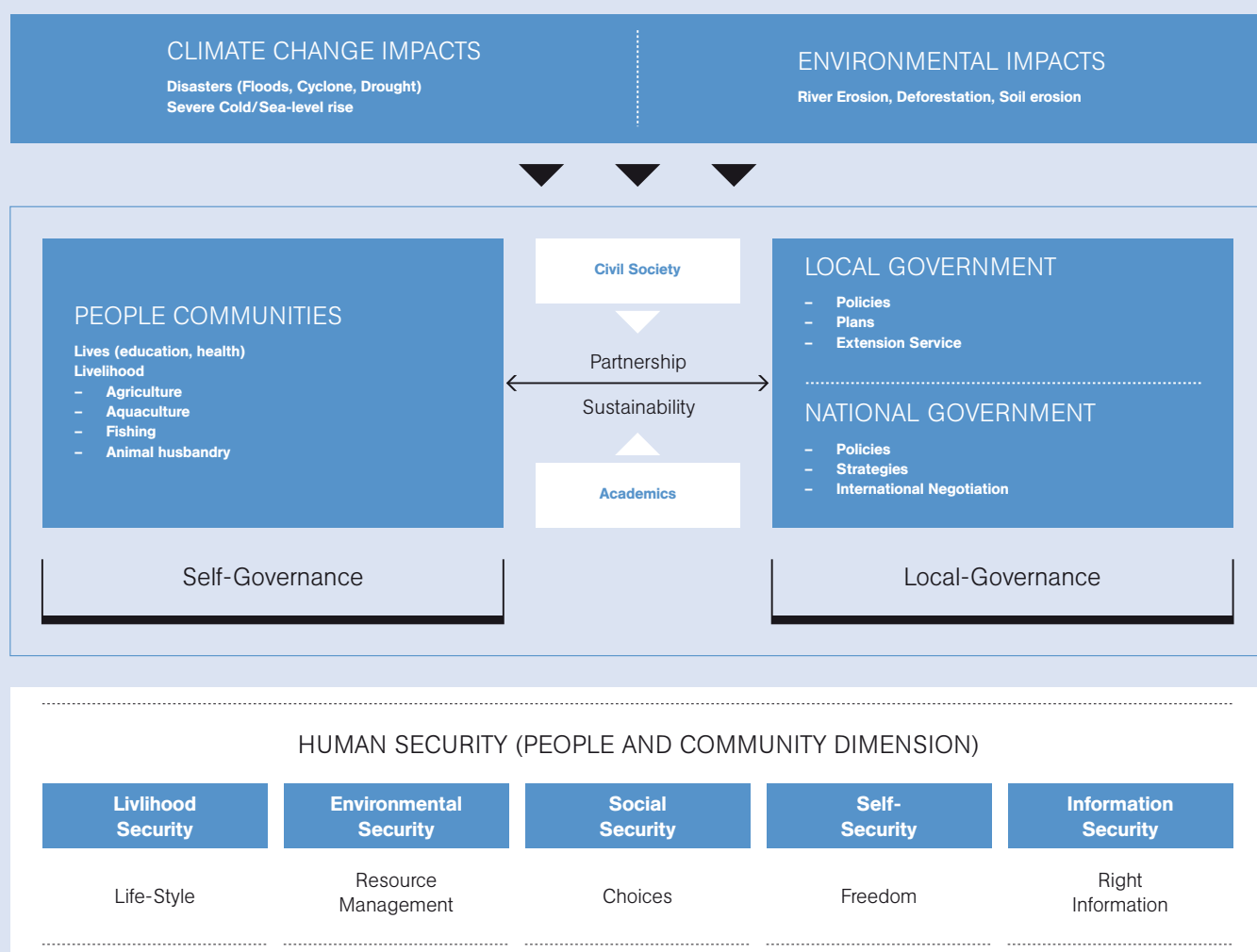
Source: Environmental Development Action.

Box VI-3. Scaling up local and community based actions

Community-based disaster risk management (CBDRM) is considered the key to link disaster risk reduction and climate change adaptation at local levels. A project implemented by the International Environment and Disaster Management Laboratory (IEDM) of Kyoto University, and Centre d'Étude et de Coopération Internationale (CECI), a Canadian NGO based in Viet Nam combined community inputs with scientific information for hazard, vulnerability and capacity assessments.

The project followed a three-step process for CBDRM: assessment (developing a scenario); planning (developing an action plan); and implementation. The assessment stage focused on the identification of hazard, vulnerability and capacity. These were done through historic profiling, mapping, timeline, ranking, focus group discussion, interviews, and questionnaire surveys.

Figure VI-9. Key elements of local adaptation and their linkages to human security



Source: Kyoto University Graduate School of Global Environmental Studies.

Before planning, structured training programmes were conducted for leaders of the mass organizations, commune and district government officers, and selected community members on climate change issues, CBDRM, building code improvements to cope with flood and cyclone, agriculture improvement, and aquaculture improvement. The planning process started with the leadership of these change agents.

Two types of plans were formulated – a “safer village plan”, which outlined specific measures to ensure the safety of the people and infrastructure of the community; and a “safer production plan” aimed at securing livelihoods, targeting agriculture, aquaculture, and animal husbandry. Developed in close co-operation with the commune and district governments, these plans were officially approved by the governments. Priorities were identified in close

cooperation with local governments, and selected items were recommended for implementation as sub-projects with co-financing from the project fund and funds from the local governments.

Selected sub-projects were subsequently implemented, including projects on livelihood adaptation, environmental protection, disaster planning, and infrastructure (boat station, irrigation canal, sluice gate, biogas). Similar projects are being implemented in Ninh Thuan province in south-central Vietnam, Albay province in the Philippines, and Tamil Nadu in India. IEDM of Kyoto University is also planning for future projects on climate change adaptation using a GET (Governance – Education – Technology) matrix.

Box VI-4. Building the capacity of communities for their voices to be heard

A bottom-up approach to influence national and international policies and processes consists of building the capacity of communities to have their voices heard. This is demonstrated by Christian Aid's work in Tajikistan, where people are severely affected by hydrological, geophysical and drought-related disasters, combined with a rough physical terrain and decaying rural infrastructure. Useable information to predict such disasters or reduce their impacts is not accessible or generally available to communities. The impacts on people's lives and livelihoods are exacerbated by limited government capacity and support services, weak civic organizations, and a poor understanding of legal rights.

Climate change presents an added layer of complication. There are few 'climate-aware' organizations working on poverty alleviation in Tajikistan, and non-government inputs are not sought for the preparation of national climate change documents. Unsurprisingly, these documents, including the two national communications, pay scant attention to the needs of communities.

With the help of Christian Aid, the Youth Ecological Centre (YEC) in Tajikistan has initiated the Tajik Climate Network (TajCN), a coalition of NGOs working to raise community awareness of the threats of climate change, elaborate a common position on adaptation, and engage in the international talks on climate change. The Network held a national conference on public participation in climate policy in February 2009, attended by community and government representatives, and public and international organizations. The conference resulted in a common vision on climate change, the national adaptation strategy, and greater public participation.

YEC have also piloted community-based adaptation with six communities in Southern Tajikistan, combining community adaptation capacity-building and planning with livelihood diversification support. These and other initiatives ([see related information in Chapters IV and VII](#)) across Christian Aid's programmes in 18 countries in Africa, Central America, South and South East Asia are focused on building livelihood resilience to both increased short-term climate variability and changing longer-term trends. In several countries (e.g. Tajikistan, Mali and India) this approach includes piloting community-based approaches to decentralized renewable energy to support a greater diversity of resilient livelihood options.

Box VI-5. Social networks

Accurate and reliable information and knowledge related to climate predictions as well as techniques or technologies to minimize adverse impacts can save lives, livelihoods and property – its widespread dissemination is of the utmost importance. A variety of channels for spreading this information are already in use – including “social networks” which can spread the benefits of a project wider than the primary communities or groups.

The effectiveness of social networks is best proven by Practical Action’s work with paddy farmers in Sri Lanka, who were suffering from failed crops. Practical Action facilitated communication between the farmers and the Government Rice Research Institute – as a result, farmers

were able to test suitable varieties rather than merely being the recipients of seeds. A farmer-to-farmer network was then established autonomously by the beneficiaries to share their experiences and lessons learned with neighbouring villages, spreading the knowledge so gained. The network generated widespread interest among farmers in areas far from where it was originally implemented.

Before supporting the establishment of social networks, however, it is important to carry out an analysis of the social context to avoid replicating existing power relationships within a community, which often exclude women.

Box VI-6. Use of technologies, old and new

Adaptation knowledge gained at the community level can often be exported or adapted to other regions in the world – and its dissemination can be facilitated by the range of technologies now available.

For instance, Practical Action combines the understanding it has gained about local needs with expert knowledge in these areas, and communicates this as advice using a range of media. The Practical Answers web service relays specific technical information on adaptation free of charge. The Adapting to Climate Change section has received 13,458 downloads, with respondents indicating that there could be 154,311 beneficiaries worldwide. The most popular technologies being looked at are water-harvesting, floating gardens, sand dams, and integrating soil fertility. Communicating knowledge in this manner is effective at linking experiences and expert information across diverse regions, which can be beyond the capacity of community-sharing networks.

Such sharing of information is useful only if it can be accessed and made relevant for the communities and individuals that need it. Web-based services will not work unless adequate internet access is available, together with printing facilities. Innovative solutions to overcome such hurdles include “Localised Knowledge Objects” which use multimedia formats combining participatory video, local language translations of text, and sound recordings to overcome issues of regional dialects and illiteracy. In Kenya and elsewhere, Practical Action has provided information to local teachers who serve as ‘knowledge nodes’ and translate the information into appropriate forms for the community. In Zimbabwe, Peru and Sri Lanka, agricultural

information has been disseminated to farmers using MP3 players storing relevant information, which can be updated and supplemented at local service areas.

UNDP is developing innovative knowledge products that raise awareness about its CBA efforts, such as the participatory videos documenting community-level adaptation work in Samoa. Using international networks and knowledge platforms, such as UNDP’s Adaptation Learning Mechanism ([see Chapter VIII for details](#)), the lessons captured through these products will be shared and disseminated to community members and also to relevant stakeholders, including other practitioners and policy makers.

Traditional media such as printed publications which disseminate lessons from community-based projects continue to be in demand. UNDP is shortly releasing a paper emphasizing how community-based efforts can be linked to national-level adaptation planning and policies through a programmatic framework. This will be accompanied by additional thematic papers explaining the linkages between CBA and issues such as gender, water, and agropastoral ecosystems.

Understanding Climate Change Adaptation, a book by Practical Action, brings together lessons from community-based project work in Bangladesh, Kenya, Nepal, Niger, Pakistan, Peru, Sri Lanka and Sudan and has been well received amongst adaptation practitioners, with nearly 700 copies sold in the first few months after publication. It has since been supplemented by shorter versions for use in the field, and 30-minute DVDs documenting adaptation project experiences in the South Asia region.

Box VI-7. Building self sustaining community organizations to support adaptation

Community adaptation may require several years to implement during which time external funding and technical assistance often migrates, leaving a support gap. This can be filled by self-sustaining organizations/institutions that enjoy legitimacy and sanction within the community. These organizations can be the driving force of adaptation, interfacing with the community and its responsible leadership, legitimating and valorising information and knowledge generated from within and without. Yet this is not an easy concept to operationalize. Many community organizations in poor vulnerable regions are, like their commercial counterparts, ephemeral entities surviving and even thriving during project work while funds funnel in, only to shrivel into shell entities once external funding ends. In so doing confidence in the adaptation process may dwindle due to lack of sustained support.

ENDA is developing innovative strategies to support CBOs to stay sustainable and focused beyond the awareness raising/risk communication period and through the implementation of adaptation strategies. Practical work has begun in Zambia, helping the CBO to diversify its income generating activities from just being mono-project based and encouraging the recruitment of people such as religious authorities, government extension officers and members of local

government to serve as organization committee members who do not seek financial or other type of advantage but who are dedicated to the ideals of the organization. In this case, experimental agriculture has been a key income generating activity, supported by the traditional roya; authority which has donated land. Small donations from diverse sources have enabled the organization to attempt to create surpluses from ecological farming practices including ox-ploughing in order to use surpluses to support village focus groups and households in the future.

Results from this work have proved differential to date (2008 – 2009 growing season) due to unexpected damage to crops from excessive flooding but have provided a very useful learning environment for the organization's committee, team members and pilot action communities in the context of what is possible and what is not. Meanwhile the CBO has been carrying out new income earning activities in areas such as secretarial and office services and catering and together, the sustainability and morale of the organization is being built. Crucially, the pilot action communities associated with the CBO, who have been supported to develop adaptive capacity and action strategies, have recognised the efforts made at CBO level that have not involved risk for local people but which have served as a valuable training ground.

6.2. PRACTICAL OUTCOMES, GOOD PRACTICES AND LESSONS LEARNED

Whilst there is still a need for more accurate climate information, there is often information available within countries on expected hazards such as flooding which do not reach poor communities in time for them to protect their lives and property. These communities are often also cut off from information related to *how* to respond or adapt to a potential climate threat. Making the right links between vulnerable communities and those controlling their access to information, services and resources is an essential pre-condition for effective adaptation.

Local-level linkages are not always sufficient to supply the needs of communities. A key lesson emerging from ISET's work in cities in India, Indonesia, Thailand and Viet Nam, as part of the Asian Cities Climate Change Resilience Network (ACCCRN), is that the governance of services required for adaptation at the local level often extends beyond "local" municipal boundaries. For instance, the management of regional watersheds or the development of social protection measures could fall under federal, or even regional, jurisdiction. This calls for coordinated multi-level planning and governance, and openness on the part of national- or regional-level agencies to enable and respond to local adaptation planning and strategies.

Scaling up community-based adaptation will require major changes in institutions, policies and processes at the national and international level. Many existing governance practices and policies exacerbate vulnerability (for instance, through lack of provision of basic needs, such as health care and education for the poorest), or obstruct people's control over their livelihoods (such as policies on agricultural extension and inputs supply which do not benefit small-holder farmers). Practices and policies need to increase support for adaptation measures that individuals and communities are taking on their own (e.g. improve skills-training and access to credit for income diversification) so that people's actions are not mal-adaptive and do not create new vulnerabilities (e.g. migrant labourers without access to services).

It is also clear, as the ENDA experience above suggests, that, while awaiting the arrival of financial assistance for implementation of adaptation at all levels, there is ample opportunity for northern organizations with technical resources and skills in knowledge management to share such resources to create more resilient community based organizations who will be fundamental in supporting and sustaining CBA in the future. This recognizes the considerable disadvantage that community-based organizations (CBOs) and civil society organizations (CSOs) face in terms of management capacity when championed to spearhead climate change vulnerability and adaptation work in their communities, a constraint that often leads to management of CBA work being led by outside agencies. Such barriers already hinder the ability of marginalized communities to adapt.

There is widespread concern that the additional resources expected to be made available for adaptation in the future will also fail to reach the poorest, unless the governance of the resources is made much more participatory. As a minimum requirement national and state governments should integrate community-based adaptation in their policy and implementation procedures. Private sector and civil society groups also play important roles in scaling up community-based adaptation actions.

6.3. CHALLENGES AND OPPORTUNITIES

The success of scaling up and communicating many of the CBA projects mentioned in this chapter is partly an indication of the level of demand there is for community-based learning on adaptation. Sharing this information and knowledge is crucial if adaptation practices are to be transferred and efforts to be scaled up. Documenting local knowledge and CBA strategies is crucial so that the accumulated knowledge is not lost over time. The Practical Answers web service mentioned above, for instance, is by no means an exhaustive compilation of CBA learning – yet it receives requests for advice from around the world.

The major challenges faced by community-based adaptation include:

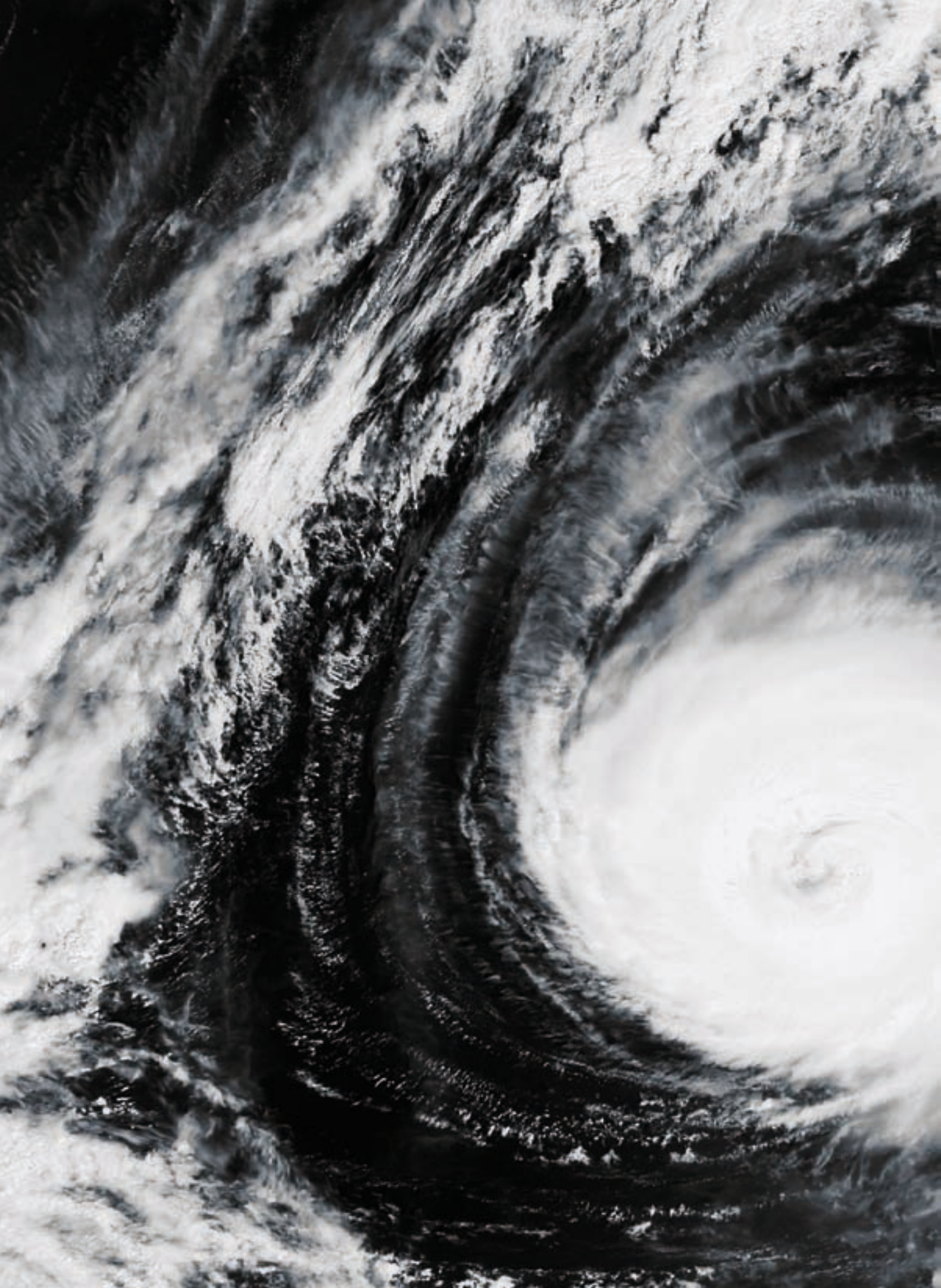
- The sustainability of the efforts at the community level;
- Incorporation of community-based issues at the policy level.

To be effective and to create sustainable impact, the application of community-based adaptation must go beyond the initiatives of the communities, NGOs, and a handful of local governments. As part of an advocacy for more responsive and effective governance, national and state-level governments should look at integrating community-based adaptation in their policy and implementation procedures.

This chapter has not mentioned the financial requirements for scaling up, given its focus on practice. However, this is a key factor that will determine the success of community efforts. In addition, there is much to be done to ensure that existing resources and policies work in favour of the people at the community level, who are often marginalized from such support. Without this, extra funds for adaptation will not enable those suffering from climate change to adapt.

For locally relevant adaptation support to reach the scale that is required globally there is a need for an international mechanism that can bring together and coordinate all of the elements of scaling up mentioned here; from identifying the needs of the most vulnerable, aiding adaptation implementation at the community level, working with national governments, to sharing adaptation information globally to the community, civil society, governmental and international level. The regional adaptation centres proposed by many governments for post-2012 adaptation support could help build linkages between communities, civil society and governments at the global level.





VII. REDUCING RISKS OF EXTREME EVENTS AND CLIMATE-RELATED DISASTERS

CHAPTER COMPILED BY

United Nations International Strategy for Disaster Reduction
(UNISDR)

WITH CONTRIBUTIONS FROM

Christian Aid, Ibero-American Network of Climate Change
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Nations Development Programme (UNDP), UNISDR, World
Food Programme (WFP)

The scientific evidence is now clear: climate change is likely to increase the frequency and intensity of weather and climate hazards, such as heatwaves, floods, cyclones and droughts.¹⁶ In addition, it will also likely lead to other changes such as ecosystem degradation, the reduced availability of water and food, and changes to livelihoods, all of which will increase the vulnerability of communities and lower their capacities to cope with natural hazards. Together, these factors are likely to result in an increased incidence and scale of disasters. Approximately 75 per cent of disasters are currently weather- and climate-related,¹⁷ a figure expected to grow as a result of climate change, and developing countries are disproportionately affected.

Disasters can plunge families and communities into poverty, or prevent them from escaping from poverty by destroying their assets and means of livelihood; this undermines hard-won development progress and hopes of achieving the Millennium Development Goals. Cost-effective strategies for reducing disaster risk are central to both responding to the challenges climate change will present to all actors in society, particularly the poor, women and other vulnerable groups, as well as meeting development goals. By aiding adaptation to extreme events, development programmes will be able to address and manage climate risks even in a changing climate.

Activities carried out by partner organizations under this theme aim to promote an understanding of the impacts of, and vulnerability to, climate change, current and future climate variability and extreme events, and the implications for sustainable development, as defined in the mandate of the Nairobi work programme.¹⁸

This chapter synthesizes the achievements and lessons learned to date in implementing Action Pledges under the Nairobi work programme by eight partner organizations in response to the call for action to reduce risks related to climate-related disasters and extreme events.

7.1. ACTIONS TAKEN AND RESULTS ACHIEVED

In collaboration with each other and dozens of other organizations, the Nairobi work programme partners have carried out a range of activities at various levels: providing financial support, strengthening the capacity of communities to monitor and respond to risk, supporting governments to develop initiatives that reduce current and future climate risk, and assessing vulnerability. [TABLE VII-7](#) below summarizes examples of the actions undertaken so far and early results obtained to date by these partner organizations. [BOXES VII-1](#) to [VII-5](#) provide more detail on such actions.

¹⁶ Published by the Intergovernmental Panel on Climate Change; IPCC 2007: Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A. (eds.)]. IPCC, Geneva, Switzerland, 104 pp.

¹⁷ EM-DAT: The OFDA/CRED International Disaster Database.

¹⁸ FCCC/CP/2005/5/Add.1, paragraph 3(a) (iv).

Table VII-7. Summary of activities undertaken and results achieved to date

Actions	Objective(s)	Countries/regions covered
Risk analysis		
Climate Risk Management Technical Assistance Support Project (CRM -TASP)	To develop and apply methods for assessing risks of both climate variability and change	Indonesia, Armenia, Ecuador, Mozambique
Vulnerability Assessment and Mapping (VAM) and Livelihoods, Early Assessment and Protection (LEAP)	To develop tools for mapping risks, and monitor livelihood stress	Global relevance
Managing disaster risk in urban areas		
Climate Disaster Resilience Index	To measure climate disaster resilience using a five-dimensional index	16 cities in Asia – with a further 70 cities in India and 17 cities in Metro Manila, 10 cities in China
Development and assessment of climate resilience and disaster risk reduction (DRR) strategies in urban and rural context in Asia	Assessing climate risk and vulnerability, testing and demonstrating climate resilience strategies, building a replicable knowledge base and a capacity to incorporate climate change considerations in urban management	India, Indonesia, Nepal, Pakistan, Thailand, Viet Nam
	Cost-benefit analysis of strategies for DRR and adaptation.	
Strengthening cooperation		
Cooperation among meteorological, climate change and civil defence communities	Institutional cooperation, exchange of knowledge, experiences, tools and methods; development of participatory projects.	Ibero-American region
Cooperation with the DRR community	Opportunities for DRR practitioners to meet climate change counterparts during regional DRR platforms and the Global Platform for DRR.	Africa, Americas, Asia Pacific, Europe
Community-level disaster risk management		
Building disaster resilient communities	To reduce community vulnerability to future climate-related shocks and crises across Africa, Asia, Latin America and the Caribbean; to integrate responses for risk reduction and adaptation in order to secure livelihoods	Bangladesh, Burkina Faso, Central America, Central Asia, Haiti, India, Malawi, The Philippines
Disaster risk transfer tools		
Climate-related insurance	To provide information for enabling a sound discussion of the benefits and challenges of linking DRR and insurance mechanisms to adress climate impacts	Global relevance
Weather Risk Insurance	To facilitate access to index-based risk management tools for smallholders and develop sustainable and replicable models that can be scaled up	Ethiopia and China

	Focus area(s)/Sector(s)	Results to date	Organization(s)
	Risk analysis	Capacities of national meteorological services to undertake climate analysis strengthened	UNDP
	Multiple sectors	Weather risk for food security monitored and quantified	WFP
	Urban management	Actions by city government to address vulnerability motivated by disaster resilience index	Kyoto University Graduate School of Global Environmental Studies, International Environment and Disaster Management Laboratory (IEDM)
	Multiple sectors	A combination of methods been used for multi-stakeholder assessment of cost-effectiveness, ethics, and robustness of various DRR and climate resilience strategies	ISET
	Multiple sectors	Sub-regional cooperation enhanced, including the production of sub-regional reports to guide strategies for adaptation and DRR	RIOCC
	Multiple sectors	Heads of state, key ministers and technical officers engaged in activities linking DRR and adaptation	UNISDR
	Rural livelihoods	Early warning systems/seasonal forecasts operationalized at community-level; risk reduction and adaptation (especially, food security) concerns integrated; community risk reduction planning capacity enhanced, linking local leaders, Government, UN and NGO stakeholders; small scale protective infrastructure completed	Christian Aid and partners
	Multiple sectors	Work with research, NGOs, governments and private sector actors to provide detailed examples of how to put risk sharing tools in place	MCII
	Risk Financing	A drought and flood risk management system established for the vulnerable poor; technical assistance and capacity-building for Governments provided	WFP

Box VII-1. Analysing risks to development associated with climate variability and change

Understanding short- and long-term risks is essential in managing weather and climate-related disasters effectively, in order to minimize the impacts on development efforts. The Nairobi work programme partners have implemented several projects aimed at enhancing risk analysis and management at different timescales.

United Nations Development Programme (UNDP) is piloting a Climate Risk Management Technical Assistance Support Project (CRM-TASP), implemented by the Asian Disaster Preparedness Centre in four countries (Indonesia, Armenia, Ecuador and Mozambique) to analyse risks posed by climate variability and change to development in order to define and prioritize risk management measures in the short- and long-term. Analysis generated by the project will contribute to greater coherence in national strategies for managing climate variability and change and the effort will help to bring about a "unified climate-risk management effort" within the government, UN agencies and the donor community.

Hands-on training was provided in these countries, strengthening capacities of the national meteorological services to undertake climate analysis, especially in using statistical tools for data quality, analysis

of extremes control, derivation of extreme indices and statistical downscaling. The project also brought together national climate risk information providers and users in climate-sensitive sectors (such as agriculture, power, and water resources, among others) for discussion. With the success of the four pilot countries, the project is now ready to be expanded for implementation in 22 additional countries.

The World Food Programme (WFP) has developed tools to analyse risks in agriculture and food security sector. Vulnerability Assessment and Mapping (VAM) enhances understanding of disaster risk, which helps identify current and future weather-related risks to livelihoods and food security, hence allowing for advance planning to respond to extreme events. Another tool, Livelihoods, Early Assessment and Protection (LEAP), allows users to monitor livelihood stress related to drought and flooding for populations dependent on rain-fed agriculture or forage, and estimates the financial magnitude of the livelihood-saving interventions needed in the event of a weather shock. LEAP conveys information in near real-time to ensure that the response to drought-related livelihood crises are timely and effective. A software platform, *RiskView*, quantifies weather-related food security risk in operational cost terms.

Box VII-2. Strengthening cooperation between disaster risk reduction (DRR) and adaptation practitioners

The DRR community, including many national stakeholders, has considerable experience in dealing with climate-related disasters. Cooperating with DRR practitioners will help adaptation efforts take advantage of this existing experience and get off the ground more quickly.

The Nairobi work programme partners have worked to bring these two communities together. For instance, United Nations International Strategy for Disaster Reduction (UNISDR) provided opportunities for DRR practitioners to meet their climate change counterparts, by supporting the participation of adaptation focal points at its regional platforms for DRR in Africa, the Americas and the Asia-Pacific region. In addition, UNISDR's Global Platform for Disaster Risk Reduction, which brought together 140 governments and 100 organizations in June 2009, featured a high-level panel on climate change and risk and was preceded by a closed policy forum where senior adaptation and risk reduction policy makers exchanged views on possible ways

for increasing synergy between the two areas of work. The Global Platform was seen as pivotal in engaging heads of state and key ministers to link DRR and adaptation. UNISDR also supports the participation of DRR experts in some developing country national delegations to the UNFCCC negotiations.

UNISDR has also supported the development of adaptation strategies that take advantage of existing DRR institutions, policies and mechanisms in Viet Nam, Gambia and Peru. In addition, UNISDR has been disseminating information on climate-related DRR – including a film on action to reduce the risk of climate-related disasters in Colombia, Viet Nam and the city of London; a briefing note highlighting some initiatives pioneered by municipal and national governments to consolidate adaptation and risk reduction plans; and a briefing note on opportunities and constraints of insurance as an instrument for reducing disaster risk.

In the Ibero-American region, the Ibero-American Network of Climate Change Offices (RIOCC) promotes cooperation among the meteorological, climate change and civil defence communities, with a view to strengthening the basis of information and knowledge of the national institutions responsible for the implementation of programmes and strategies.

A work programme with the UNISDR Regional Office for the Americas supports institutional cooperation; encourages the exchange of knowledge, experiences, tools, and methods; promotes the development of participatory projects on climate change adaptation; and contributes to sub-regional reports to guide the formulation of strategies and programmes for DRR and adaptation.

Box VII-3. Reducing climate disaster risks in urban areas

With the growing percentage of the world's population concentrated in urban areas, adapting cities to be resilient to climate impacts will be a major challenge in the years to come. Tools such as the Climate Disaster Resilience Index (CDRI) can help raise the awareness of city managers and practitioners on this challenge.

Kyoto University's Graduate School of Global Environmental Studies, International Environment and Disaster Management Laboratory (IEDM), in partnership with organizations such as the Regional Network of Local Authorities for the Management of Human Settlements (CITYNET) and UNISDR conducted a study to measure the climate disaster resilience of 16 cities in Asia and produce the CDRI. The index, which categorized five resilience-based dimensions (natural, physical, social, economic and institutional), helped raise the awareness of city managers and practitioners and could be used as a training tool for city governments in the future.

Recommendations based on the results encourage city governments to address vulnerability through specific city services, as well as institutional and capacity-building. IEDM is now analysing 70 Indian cities differing in terrain and hazard exposure, and a similar exercise is underway for 17 cities in Metro Manila, and 10 cities in China.

The Institute for Social and Environmental Transition (ISET) is also engaged in a number of collaborative projects in cities in Asia, including the Asian Cities Climate Change Resilience Network (ACCCRN) supported by the Rockefeller Foundation and implemented with city and national partners in India, Indonesia, Thailand and Viet Nam. This project is supporting city stakeholders to: assess climate risk and vulnerability; develop climate resilience strategies; build a replicable knowledge base and capacity to incorporate climate change considerations in urban management; and foster a network to share ideas, lessons and insights.

Table VII-8. List of variables considered in the five dimensions of the CDRI

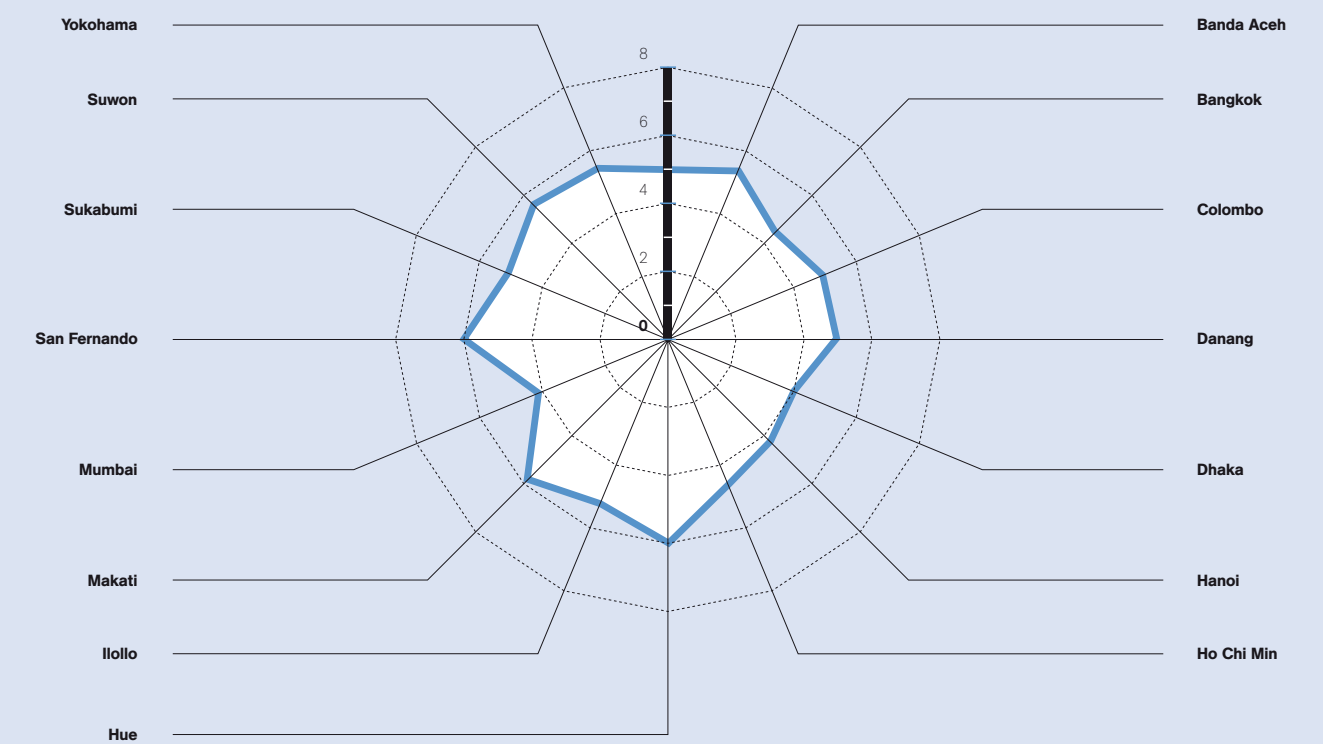
Dimension	Variables considered
1. Physical	Electricity, Water supply, Sanitation, Solid waste disposal, Internal road network, Housing and land use, Community assets, Warning system and evacuation
2. Social	Health status, Education and awareness, Social capital
3. Economic	Income, Employment, Households' assets, Access to financial services, Savings and insurance, Budget and subsidy
4. Institutional	Internal institutions and development plan, Effectiveness of internal institutions, External institutions and networks, Institutional collaboration and coordination
5. Natural	Hazard intensity, Hazard frequency

Source: Kyoto University Graduate School of Global Environmental Studies.

In the Risk to Resilience Study supported by the UK Department for International Development (DFID), ISET, with partners, has supported the identification of cost effective and equitable DRR strategies in India, Nepal and Pakistan, including structural (engineering) and non-structural measures, such as capacity-building and disaster risk management planning. This has been facilitated through iterative shared learning processes involving multiple stakeholders to make adaptation planning, investments

and trade-offs inclusive and transparent. ISET is also engaged in research on the access to, and understanding and perceptions of, weather and climate change information in local contexts in South Asia. It is evaluating the gaps between the understanding and perceptions of climate science experts and communities on the ground, and working to understand local autonomous adaptation strategies that individuals, households and communities take in response to weather-related hazards.

Table VII-10. Overall CDRI



Source: Kyoto University Graduate School of Global Environmental Studies.

Box VII-4. Reducing disaster risks at the community level

Central America is vulnerable to a variety of both fast and slow onset climatic changes, the most well-known being the regular occurrence of hurricanes. It is likely that future hurricanes will become more intense, with higher peak wind speeds and increasingly heavy precipitation. Christian Aid partners in El Salvador and Nicaragua have supported risk reduction and adaptation at both local government and community levels.

For instance, in El Salvador, Unidad Ecologica Salvadoreña (UNES) has been working since 2006 with the municipality of San Francisco Menendez to develop a municipal risk reduction strategy, following the impact of Hurricane Stan in October 2005. UNES provided relevant training to a network of government and NGO stakeholders concerned with risk management, putting them in touch with the meteorological department; worked on setting up flood early warning systems; trained local leaders to collect information and interpret/publicize forecasts to

their communities; and piloted and successfully replicated in several municipalities small-scale adaptation models, which were based on both traditional and scientific knowledge.

More recently, this approach has broadened from flood risk reduction to expanding the municipal strategy to include other aspects of climate change (such as sea level rise, drought and forest fires), initially focusing on the next five years but moving towards a longer-term mapping and strategy process. This has involved gathering both scientific and local knowledge, including scientific climate information gathered through downscaling and outputs from general circulation models for 2020, 2050 and 2080.

Integrating both the science and community understanding aims to develop an adaptation approach that works at local level, and can be replicated in other municipalities.

Box VII-5. Engaging science and private sector expertise to support risk management policy

Risk transfer mechanisms, such as insurance, if properly designed, can be a valuable risk management tool to support comprehensive risk reduction. To harmonize climate risk insurance with adaptation, it is essential to align incentives with DRR.

The Munich Climate Insurance Initiative (MCII) provides countries – particularly developing countries – with information to enable a sound discussion of the benefits as well as the challenges of DRR and insurance mechanisms as possible complementary tools for adapting to climate change. Since 2005, MCII has engaged with Parties to the UNFCCC, international and humanitarian organizations, academics, the private sector and the media in discussing the use of insurance as a tool to incentivize DRR and adaptation. With these partners, MCII has put together briefing papers, submissions to the UNFCCC, presentations, expert panels, and workshops.

These efforts prompted discussions with insurance associations such as the EU Insurance Association, the Association of British Insurers, the Samoan Insurance Association, ClimateWise, the UK DFID Task Force on the Financial Sector and Climate Adaptation, and the

German Association of Insurers. As a result, private sector actors have helped to provide detailed examples of existing experience with DRR and insurance, and ways that risk-sharing tools might be put in place.

WFP has piloted weather risk insurance for farmers in China and Ethiopia. In partnership with the International Fund for Agricultural Development (IFAD) and commercial insurers from these two countries, WFP designed weather risk insurance policies that pay out in case of pre-defined weather shocks, in particular drought and heatwaves and flash floods. In Ethiopia, WFP has led the disaster risk financing work since 2005 and demonstrated that livelihood risk can be weather-insured. In 2007, the project was scaled up, partnering with the government, to design a comprehensive drought risk management framework that includes risk financing. Currently, WFP is designing flood, drought and pastoralist indices to temporarily scale up the number of the Productive Safety Nets (PSNP) Beneficiaries. In China, WFP and IFAD are testing the viability of weather risk transfer tools in order to diversify and enrich the agricultural risk management options available to protect the livelihoods of small-scale farmers vulnerable to drought and flood risk.

7.2. PRACTICAL OUTCOMES, GOOD PRACTICES AND LESSONS LEARNED

The range of cooperative activities between climate adaptation and DRR practitioners described above has already resulted in a rich crop of emerging good practices and lessons.

Underlying drivers: The underlying drivers of vulnerability to both climate and disaster risk, including poor governance, unsustainable livelihoods, food insecurity and environmental degradation, are still the main barriers to sustainable development and DRR, particularly at the local level.

People-centred strategies: The experience of the Nairobi work programme partner organizations reinforces the message that people-centred DRR strategies are more cost-effective and can be more equitable than large-scale structural measures in reducing weather and climate-related disaster risk. Such people-centred DRR strategies that enhance access to, and understanding of, information and promote livelihood diversification are more likely to provide a robust defence against a number of stresses, not just weather-related hazards.

Coordination and partnerships: The successful reduction of disaster risk requires close interaction and coordination across relevant institutions. This requires advocacy to, and leadership by, the overseeing ministries, such as those concerned with finance and planning, as well as specific mechanisms such as interdepartmental committees and joint planning to systematically link policies on adaptation and on DRR. Local DRR can be effective only if communities, civil society (including private sector, academia) and governments work in real partnership. These partnerships ensure that resources and skills are pooled, thus optimizing outcomes. Developing these partnerships requires an enabling environment for participation, and significant investment in capacity-building and resourcing of local government.

Usable information: The way in which weather and climate change information is packaged, delivered and presented is often not immediately usable to everyday decision-making that shapes the lives, livelihoods and responses of ordinary people to climate variability and ultimately, change. Packaging and communicating information in the local context and facilitating interaction between communities and other actors to increase awareness, understanding and responsiveness are vital preconditions for success.

Access to relevant information, and iterative processes:

A combination of qualitative and quantitative methods (including cost-benefit analyses), used to inform an iterative series of shared learning dialogues with communities and other key actors, is necessary to:

- Identify the broad cost and benefit areas of different combinations of DRR strategies;
- Identify social preferences and the distributional impacts of certain strategies, recognising that some strategies will favour some more than others;
- Identify the robustness of such strategies in the face of uncertain and highly variable climate, in which the frequencies and intensities of flood, drought and other extreme weather events are likely to change in uncertain ways;
- Identify the synergies between social, environmental and climate change;
- Work with communities to develop acceptable and sustainable DRR strategies.

Accountability: Increased accountability of both government and NGOs vis-à-vis communities and donors is critical to long-term effectiveness – and can only be achieved by improving both transparency (i.e. giving an account of: decisions, information etc.) and responsiveness (i.e. taking an account of: communities perspectives etc.). One good way of increasing transparency and responsiveness would be to establish an independent local-level monitoring function of development/DRR plans and budgets with strong participation from at-risk groups and civil society.

Insurance: When linked with effective DRR strategies, climate risk insurance can be a useful component of a comprehensive risk reduction strategy. Insurance solutions can support effective adaptation only where they are implemented with measures to reduce disaster risk and increase societal resilience. Insurance alone will be neither sufficient nor sustainable to help developing countries manage the impacts of climate change.

7.3. CHALLENGES AND OPPORTUNITIES

Despite considerable progress made in raising the awareness of and in promoting the synergies between disaster risk reduction and adaptation to climate change, challenges remain. Attributing a price tag to a specific DRR initiative is still difficult. It is no simple matter to measure in economic terms the human suffering avoided in a disaster by preventive measures such as the allocation of an additional 10% in the budget to make a hospital disaster-resilient. Often the benefits of prevention go unseen and unappreciated while disasters win sympathy and immediate responses nationally and across the world. To promote risk reduction, the case needs to be made in economic terms. Although efforts have begun to close this gap, this remains an important challenge.

As described above, the Nairobi work programme partners have a wealth of practical experience and knowledge in reducing disaster risk that is applicable for adapting to climate risk and extreme events. There are also important opportunities that the Nairobi work programme partners may seize to further build the knowledge base for adaptation.

An important contribution to adaptation will be the IPCC's Special Report 'Managing the Risk of Extreme Events and Disasters to Advance Adaptation' to be released in 2011. The report will assess the breadth and depth of DRR knowledge, including policies, practices, tools and systems and will be an important contribution to the objective of the Nairobi work programme; likewise, its preparation is an unparalleled opportunity for the Nairobi work programme partners to ensure that information on reducing disaster risk is available for assessment.

Another important opportunity is the development of national adaptation strategies. As governments begin to plan for unavoidable climate change impacts and, in particular, to reduce risks associated with extreme events, the Nairobi work programme partners can share good practice in setting priorities and in planning, including developing strategic national action plans to reduce disaster risk, based on decades of experience in managing climate variability and the associated disaster risks. This policy guidance, based on proven methods and initiatives will strengthen the Nairobi work programme's store of adaptation tools.



VIII. PROMOTING KNOWLEDGE SHARING AND LEARNING

CHAPTER COMPILED BY

United Nations Environment Programme (UNEP)

WITH CONTRIBUTIONS FROM

Environmental Development Action (ENDA), Ibero-American Network of Climate Change Offices (RIOCC), Institute of Development Studies (IDS), Kyoto University Graduate School of Global Environmental Studies, Stockholm Environment Institute (SEI), United Nations Development Programme (UNDP), UNEP

Adaptation is a knowledge-intensive undertaking, and access to relevant and usable knowledge is an important prerequisite for success. The need for information and knowledge spans the interlinked stages of adaptation from climate change projections, impact assessment and vulnerability analysis, through capacity-building, policy formulation and planning, to piloting, demonstrating, and full-scale implementation of adaptation actions. Uncertainties associated with climate change and its impacts, and the societal responses to them render adaptation necessarily a process, including iterations of these stages. Knowledge sharing and learning is critical to informing this iterative process, through enhanced understanding of scientific, technological and socio-economic aspects of adaptation. This importance has been recognized by the Parties to the UNFCCC.

Knowledge sharing is a process that involves the identification, collection, interpretation, management and communication of knowledge between suppliers and users. For adaptation, the goal of knowledge sharing is to meet the knowledge needs for adaptation policy setting, planning and implementation, contributing to the objectives of the Nairobi work programme: to assist all Parties in improving the understanding and assessment of impacts, vulnerability and adaptation; and in making informed decisions on practical adaptation actions, with credible scientific, technical and socio-economic knowledge.

This chapter draws on examples from actions pledged and undertaken by Nairobi work programme partner organizations under the theme of knowledge sharing and learning. Activities carried out by partner organizations under this theme address several issues defined in the mandate of the Nairobi work programme. In particular, they contribute towards its expected outcome of enhanced development, dissemination and use of knowledge from practical adaptation activities.¹⁹ This chapter also summarizes the lessons learned in undertaking these actions, and describes further challenges and opportunities in the area of knowledge sharing and learning.

8.1. ACTIONS TAKEN AND RESULTS ACHIEVED

The Nairobi work programme partner organizations have carried out a wide range of activities under their pledged actions to promote knowledge sharing and learning. [TABLE VIII-9](#) below summarizes the initiatives synthesized in this chapter, and the results that have been achieved to date. More details on some of the initiatives are provided in [BOXES VIII-1](#) to [VIII-5](#).

¹⁹ FCCC/CP/2005/5/Add.1, paragraph 2(c).

Table VIII-9. Summary of activities undertaken and results achieved to date

Initiative	Objective(s)	Region
ENDA Communities	To provide a communications tool and help desk for adaptation practitioners, including small organizations, civil society and community-based organizations	Africa
Exchange of experience and information in the context of the Ibero American Programme for Adaptation to Climate Change (PIACC)	To promote a permanent dialogue on climate change for a better understanding of the priorities, needs, and gaps in the region	Ibero-America
Eldis Climate Change Resource Guide and online climate change community	To provide a central platform for all IDS Knowledge Services on Climate Change	Global
Joto Afrika series	To develop and disseminate a series of printed briefings and online materials with practical information on how people are adapting to climate change in Africa	Africa
Community Based Adaptation Exchange (CBAX)	To develop and manage an online resource bringing together the CBA community, for exchange of up-to-date information including news, events, case studies, tools, policy resources, and videos	Developing countries
AfricaAdapt knowledge-sharing platform	To develop and manage a French-English bilingual network, facilitating the flow of climate change adaptation knowledge for sustainable livelihoods between researchers, policy makers, civil society organizations and local communities in Africa	Africa
Asian University Network for Environment and Disaster Management (AUEDM)	To develop a network to share educational products, experience and actual implementation for higher education; to seek possibilities of mutual collaboration on field-based action research; to broaden the scope of education and learning in the environment and disaster management field through collaboration with other stakeholders such as non-governmental organizations (NGOs) and local governments	Asia
weADAPT	To provide a platform to capture emerging experience, bringing together a growing number of contributors and partners to shape new, innovative and practical tools, and to build competence through learning-by-doing	Global
Adaptation Learning Mechanism (ALM)	To support evolving efforts to integrate adaptation to climate change in development planning by developing country climate and civil society actors and practitioners, bilateral and UN organizations	Global
Global Climate Change Adaptation Network (GAN)	To help build climate resilience of vulnerable human systems, ecosystems and economies through the mobilization of knowledge and technologies to support adaptation policy-setting, planning and practices	Global

Results to date	Organization(s)
Interactive platform for sharing knowledge and information, dedicated to its core members	ENDA
Exchange of experience and information through annual meetings; outreach materials, a website, capacity-building and on-line training courses; compilation of a portfolio of adaptation projects, feeding the knowledge base in the region; assessment of adaptation measures and their effectiveness	RIOCC
Redesigned Resource Guide; full summaries of over 400 adaptation projects and related research; policy documents added in 2009; the number of subscribers to the guide grown by over 30% in the last year	IDS
First two issues released in 2009	IDS, in collaboration with Arid Lands Information Network (ALIN) and AfricaAdapt
The interactive web space re-launched in 2008; CBA community membership over 400, from 75 countries; over 60 news and discussion items hosted in the past year	IDS and International Institute for Environment and Development (IIED)
Platform launched in May 2009; membership of over 500, with 80% of members based in Africa, nine grants awarded to local knowledge sharing projects, supporting community-based radio journalists to link global to local climate change adaptation issues at COP 15	IDS, in collaboration with ENDA, the Forum for Agricultural Research in Africa (FARA), the Intergovernmental Authority on Development (IGAD) and the Climate Prediction and Applications Centre (ICPAC)
Pilot projects carried out at local levels, with emphasis on education in schools for adaptation; guidelines and basic principles of higher education in environment and disaster management being prepared; a text book on climate change adaptation and Disaster Risk Reduction (DRR) being prepared	Kyoto University Graduate School of Global Environmental Studies
An operational network of groups working on various aspects of adaptation established; a range of tools and support for users developed; technical aspects of the platform substantially developed; understanding of user needs improved for guiding the further development of the platform; 700 editors for the wiki element of the platform registered	SEI
The Knowledge platform features, in particular, guidance and good practices on adaptation and details of lessons learned from around the world, as contributed by practitioners from the field; 140 country profiles with country-specific adaptation information included in the ALM knowledge platform; ALM website re-launched in September 2009 with a more interactive and user-friendly interface; over 500 members across agencies and from more than 120 countries signed up to the ALM	UNDP in partnership with UNFCCC, UNEP and World Bank
A clear understanding of needs, demands and gaps, as well as the function and structure of The Network achieved as a result of a comprehensive and inclusive consultation process (including the international and four regional consultations); regional networks launched in Asia-Pacific and Africa with steering committees put in place	UNEP

Box VIII-1. Global pool of knowledge on adaptation

Through its knowledge services, the Institute for Development Studies (IDS) acts as an intermediary between researchers, policy makers, and practitioners, seeking to identify and bridge knowledge gaps and use innovative knowledge sharing approaches to provide better access to the global pool of knowledge on development. IDS hosted a two-day workshop "Coordinating web-based knowledge sharing for climate change adaptation" in early 2009, attended by Nairobi work programme partners, the Adaptation Learning Mechanism (ALM), Stockholm Environment Institute (SEI), ENDA and the AfricaAdapt network (supported by the International Development Research Centre (IDRC)) to increase harmonization and enable content-sharing between platforms. The *Eldis Climate Change Resource Guide* is the focal point for all the IDS Knowledge Services on Climate Change. *Joto Afrika* is a new series of printed briefings and online

materials providing practical information about how people are adapting to climate change in Africa, and the issues, constraints and opportunities they face. *Community Based Adaptation Exchange (CBAX)* is a shared online resource designed to bring together the Community Based Adaptation (CBA) community. It provides a site for the exchange of up-to-date information about CBA, including news, events, case studies, tools, policy resources, and videos. *AfricaAdapt*, launched by IDS, ENDA, the Forum for Agricultural Research in Africa (FARA) and the Climate Prediction and Applications Centre (ICPAC) in May 2009, focuses on adaptation knowledge sharing in Africa and, in particular, on overcoming the French-English divide as well as integrating local climate-vulnerable communities into knowledge exchanges.

Box VIII-3. Adaptation in education and in practice

Recognizing the importance of synergy between research, education and implementation, Kyoto University in partnership with 16 other universities and organizations from 15 Asian countries has formed the Asian University Network for Environment and Disaster Management (AUEDM). The objectives of the network are to share and work together in promoting environment and disaster management in higher education, to seek possibilities of mutual collaboration on field-based action research, and to broaden the scope of education and learning in the environment and disaster management field through collaboration with other stakeholders.

Close cooperation with civil society organizations is a unique feature of AUEDM. Non-government organizations (NGOs) have direct field access and experience in grassroots project implementation. However, this experience is not properly reflected in the educational curriculum. Thus the network aims to bridge academic research, education and field practice.

Box VIII-3. A range of knowledge tools

The Stockholm Environment Institute (SEI)'s weADAPT platform captures emerging experience, providing the opportunity to widen the geographical coverage and deepen the level of understanding across the spectrum of adaptation advice. The collective platform brings together a growing number of contributors and partners to shape

new, innovative and practical tools, and to build competence through learning-by-doing. A range of tools, described in the [Table VIII-10](#) below, have been developed to capture and transfer knowledge on adaptation, leverage available data and assist users in taking adaptation decisions.

Table VIII-10. Overview of tools currently available through the weADAPT platform

Tools	Description	Potential users
Climate Change Explorer	A software tool for accessing and visualizing downscaled climate data from multiple climate models	Adaptation planners needing to review historical climate trends and scenarios of future climates
wikiADAPT	A collaborative website where multiple users can easily create and edit interlinked web pages on topics pertaining to climate adaptation	Those seeking guidance and information on adaptation and keen to share experience and lessons
The weADAPT Adaptation Layer in Google Earth	A set of placemarks viewable in Google Earth, showing the location and a synopsis of existing adaptation efforts	Those who need to locate existing adaptation projects, studies, organizations, downscaled climate data, etc.
Adaptation Decision Explorer (ADx)	A software tool to screen and support the selection of adaptation options	Those tasked with selecting adaptation measures and balancing different priorities
Water Evaluation and Planning (WEAP)	A software tool that takes an integrated approach to water resources planning	Water planners and managers evaluating various adaptation measures

Box VIII-4. The Adaptation Learning Mechanism (ALM)

The ALM is an inter-agency global knowledge platform on climate change adaptation. The United Nations Development Program (UNDP) is facilitating the knowledge platform in partnership with the UNFCCC Secretariat, UNEP, the World Bank and a growing number of UN-specialized agencies including FAO, and World Health Organization. ALM is seed funded by the Global Environment Facility and was launched in December 2007.

provides easily accessible country-specific information on climate change scenarios, impact assessments, national strategy documents, adaptation measures, programs and projects.

The ALM website has been re-launched beginning in September 2009. It has undergone a substantive change and has turned into a more interactive, and user centered knowledge platform.

The ALM supports evolving efforts to integrate adaptation to climate change in development planning by developing country climate and civil society actors and practitioners, bilateral and UN organizations. The Knowledge platform features, in particular, guidance and good practices on adaptation and details of lessons learned from around the world, as contributed by practitioners from the field. The ALM

The ALM promotes learning on the ground through documenting and sharing lessons. ALM members, which include a range of stakeholders (i.e. UN agencies, government staff, donors, practitioners, civil society organisations) provide a wealth of ongoing project and initiative profiles, and good practices from operations on the ground. For example, the ALM has developed, together with the

UNDP Community-based Adaptation Programme, a simple and user-friendly guidebook on participatory development of stories to allow communities to develop their own stories on local adaptation practices, which include photos, narratives, and music. The tool seeks to foster knowledge exchange from the ground and promote community-based adaptation to climate change. The tool also allows local communities to monitor adaptation activities in a participative way (from conception, to implementation, to monitoring and evaluation), and supports efforts to strengthen community mobilization.

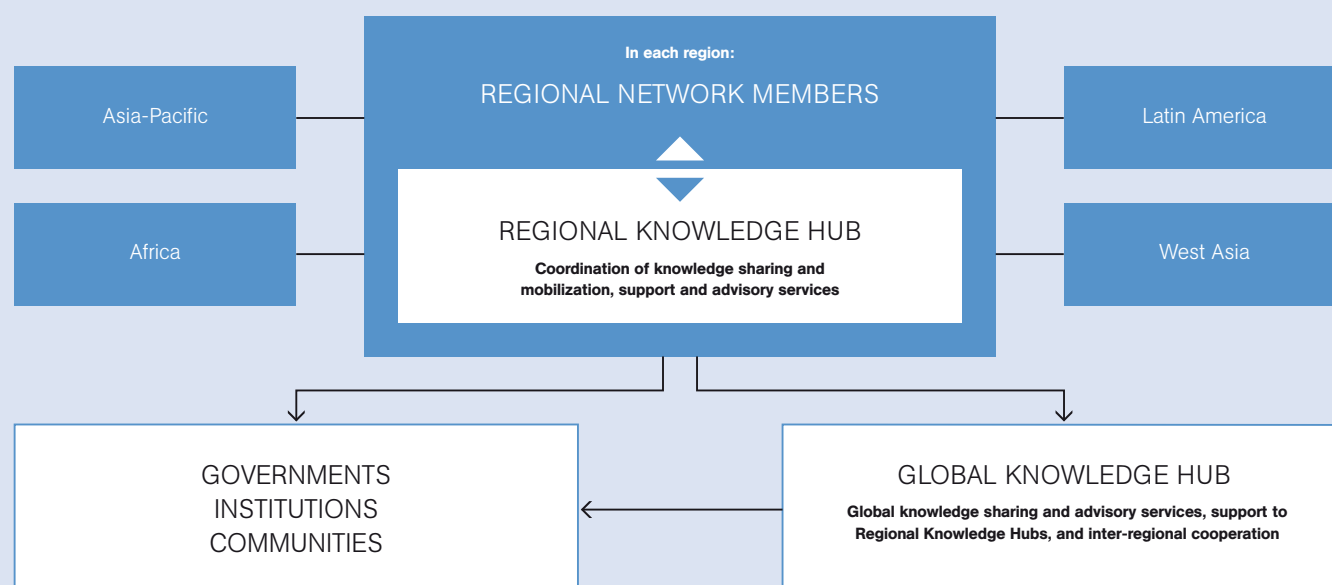
The ALM also facilitates social networking between members as a way to access tacit knowledge on the integration of adaptation into development planning and implementation. The global platform works with and taps into existing, evolving regional and national climate networks to outreach to as many users as possible and facilitate learning and dialogue in the most resource efficient way.

Box VIII-5. Mobilizing knowledge and technologies

United Nations Environment Programme (UNEP), in partnership with key United Nations and other international organizations, is facilitating the development of the Global Climate Change Adaptation Network (GAN). The overall objective of the network is to help build climate resilience into vulnerable human systems, ecosystems and economies through the mobilization of knowledge and technologies to support adaptation policy-setting, planning and practices. The network aims to contribute to the achievement of three key outcomes:

- Improved availability and accessibility of knowledge for adaptation, and strengthened dissemination of good adaptation practices;
- Increased targeted knowledge support and advisory services to governments, planners and practitioners;
- Enhanced capacity for adaptation of national and regional institutions in the developing world and improved quality and sustainability of their services.

Table VIII-11. The structure of the Global Climate Change Adaptation Network (GAN)



Source: United Nations Environment Programme.

8.2. PRACTICAL OUTCOMES, GOOD PRACTICES AND LESSONS LEARNED

Access to information should not be viewed as an end in itself, but as a contributor to development processes and social change. Some practical outcomes of the actions undertaken by the organizations are starting to emerge.

For example, through the weADAPT platform, connections between leading organizations working in different fields critical to supporting climate adaptation have been strengthened. These collaborations have generated innovative results that would not have been possible in isolation. These engagements have given rise to new problem framings and laid important ground for enabling knowledge integration. Training efforts have improved the capabilities of the stakeholders involved by bringing together a variety of expertise and taking a learning-by-doing approach.

The ALM has provided a global knowledge sharing platform that is accelerating the process of learning through experience. It is contributing to an improved understanding of climate change adaptation and mainstreaming it into development planning. It is expected that the future up-scaling of adaptation practices will be strengthened through participation in a knowledge sharing platform, by learning from past experiences and replicating good practices. The ALM also promotes knowledge sharing and learning on the ground. ALM members have provided a wealth of ongoing project and initiative profiles which provide lessons learned from operations on the ground.

IDS has improved coordination across the different IDS-hosted knowledge services to make the wealth of resources on climate impacts, vulnerability and adaptation as widely accessible as possible, and to create easier and clearer interfaces with complementary platforms. Individual stories from users of the IDS Knowledge Service have helped in developing a framework to guide future work and improve planning, evaluation, analysis and targeting of services. The resulting theory of change sets out how the Knowledge Services have an impact on information use in development. The model will evolve as it is tested, debated and used in planning, evaluation and research.

ENDA communities has resulted in the provision of a meeting place for southern organizations, a resource base of methods, tools and advice, and information on activities, news, and opportunities. The AUEDM initiative has promoted South-South cooperation in the field of environment and disaster risk reduction, with climate change adaptation as the common research theme of the network. RIOCC, through PIACC, has engaged several regional organizations, institutions and initiatives active in climate change adaptation in Latin America and the Caribbean, increasing synergies and working together with the countries, initiating new projects, and exchanging knowledge and know-how.

Organizations have identified and documented several good practices and lessons learned in the process of facilitating knowledge sharing and learning. First of all, there is a clear agreement on the crucial importance of *understanding the needs and gaps in knowledge*, and *tailoring the information to the specific needs of stakeholders*. For example, the process of the development of the GAN has focused on clarifying user demands through consultation, in order to develop a demand-driven network responding to real needs – both immediate ones, and those associated with preparing for longer-term climate change impacts. The ownership of the network lies within countries and regions, and the development of the network must therefore be guided by the Regional Steering Committees. Similarly, the PIACC initiatives plays an important role in Latin America and the Caribbean as an open and participative forum for the identification of needs and actions. The AUEDM initiative has concentrated on demonstrating the importance of customizing adaptation knowledge products for education, which are closely linked to implementation.

Further, the work of the ALM has shown that as stakeholders work to integrate climate change adaptation into national development programmes and policies, *knowledge needs are changing* over time and vary depending on the capacity of the national stakeholders involved. The ALM, as well as the other initiatives, must therefore continue to engage with relevant regional, national and local actors to identify evolving knowledge needs to provide appropriate tools and guidance to respond to apparent gaps.

The value of a *multi-institutional approach* was highlighted by many of the organizations. Each of the initiatives described in this chapter is a collaborative effort between more than one organization or institution. The SEI notes that the innovative work in weADAPT occurred as the result of collaboration between organizations with diverse areas of expertise and different ways of approaching problems. The diversity obtained by combining knowledge and experience from a variety of perspectives and domains is necessary for addressing complex challenges such as adaptation to climate change. To this end, the AUEDM initiative aims at bridging academic research, education and field practice through a multi-disciplinary approach, going beyond the traditional educational institutions to work with local NGOs, local government, and international organizations to share educational results, experience and actual implementation, and strengthen this synergy.

Similarly, the ALM has also shown the value of an inter-agency approach to learning. Active participation and involvement of the GEF's implementing agencies has supported the sharing of lessons learned between different focal areas of the GEF, as well as other thematic areas, and across all relevant stakeholders including the United Nations, governmental and civil society organizations. Through such collaborations, various practices can be examined and analysed and a broader scope of lessons can be extracted to support future adaptation practices and decision-making. Learning from this experience, the development of the GAN has taken a multi-institutional, open and inclusive approach, where different United Nations agencies, international and regional organizations, governments, foundations and research institutions both contribute and benefit from the Network. It is crucial that the network members receive clear benefits from it: greater visibility, facilitated access to knowledge, methods, tool and approaches, possibilities for scaling up work, improved access to new initiatives and related funding, and support for resource mobilization. In the context of collaboration at the regional level, PIACC aims to increase the number of regional projects, and establishing more synergy between the regional centres active in climate change adaptation.

SEI notes that while collaboration is a widely held aspiration, in reality growing a partnership is usually a challenging and protracted process that requires long-term engagements to establish common goals, identify shared benefits and overcome many barriers, in an effort to establish and maintain an effective working relationship. That said, it is exactly this iterative process of mutually seeking the most appropriate way forward that leads to really effective and productive work on adaptation.

Working together on knowledge sharing and learning has to go even further, beyond the collaboration within individual initiatives, to embrace *coordination and collaboration across actors and initiatives* in order to build a collaborative and integrated effort on climate change adaptation. SEI points out that there is often a strong desire for 'easy answers' or 'simple solutions' to adaptation. This leads to an overemphasis on individual tools or an overreliance on single information sources, when climate adaptation in most instances requires a much more nuanced and contextual approach, using a variety of tools and information streams in order to deal with the complexity of the issues. ALM, for example, continues to actively promote a community of practitioners working in climate change adaptation, to include all stakeholders.

IDS has been actively contributing to processes that reflect the overall adaptation knowledge domain and identifying new and more efficient forms of collaboration. Similarly, it has been realized that the GAN must build on existing adaptation and other relevant networks, initiatives and institutions, learning from, supporting, complementing and upscaling their work. In addition to strengthening collaboration within the region, RIOCC is looking beyond the continent to foster linkages and collaboration with other regions. The AUEDM initiative, in contrast, encourages academic and formal education institutions to go beyond the traditional boundaries of the school or university compound, and communicate more with the communities, and learn from their practical experience.

Finally, a number of good practices and lessons learned around *web-based knowledge-sharing and learning* instruments have been identified. Greater harmonization of content management (formats, thematic categorization, etc.) is required between the services to facilitate the sharing of resources. Channels of communication between the services must improve to enable a mutual promotion of resources, and more effective sharing of resources for tracking and identifying new content are needed to avoid unnecessary duplication of work. Better integration of certain tools and resources across platforms will provide added value and coherence for end-users.

IDS, through its own experience and through its global network of organizations, has identified a number of lessons around the design and implementation of web-based interfaces or so-called “portals” (see Box VIII-5).

On a more general note, since adaptation is a relatively new field, the first generation of climate change adaptation projects is still under implementation, making it difficult to identify operational lessons from projects on the ground. Nonetheless, an ALM survey in 2007 (Climate change adaptation knowledge needs survey, November, 2007)²⁰ identified examples of good practice and lessons learned as one of the most requested knowledge products or services. Practitioners and project implementers need to work towards identifying, documenting and disseminating lessons in the early phases of implementation, rather than waiting until implementation is complete.

8.3. CHALLENGES AND OPPORTUNITIES

The organizations that have contributed to this chapter see common opportunities, in particular, in expanding and enhancing knowledge sharing and learning activities. The knowledge base and the community of practitioners is expected to grow and develop, facilitated by emerging knowledge needs and opportunities for collaboration. As discussed above, the increasing number of groups working on climate adaptation, creating knowledge platforms and networks, provides the potential for much greater collaboration and innovation, as well as some constructive competition and diversity. The approach of bringing together people working on different areas of adaptation can be replicated to enable innovation and aid groups in building an understanding of others, thereby identifying what is needed and what is possible in terms of supporting adaptation. The realities of creating enduring and meaningful partnerships present a challenge and will require resources specifically aimed at fostering new links and collaboration within the adaptation community, but also with those in related fields that have important experience and lessons to share that are relevant to climate adaptation.

²⁰ Report of the survey results is available at <<http://www.energyandenvironment.undp.org/undp/indexAction.cfm?module=Library&action=GetFile&DocumentAttachmentID=2357>>.

Box VIII-5. 10 Portal Pitfalls

1. Don't assume that a portal is necessarily the best solution
2. Don't do it if someone else already has – and don't go it alone
3. Don't ask stakeholders what they want from a portal
4. Don't try to be everything for everybody
5. Don't start if it does not fit with your organization's vision and mission
6. Don't over-obsess about the technology
7. Don't forget about the content
8. Don't set up complicated or untenable delivery teams
9. Don't assume that if you build it 'they will come'
10. Don't think that you can set it up and then sit back

See <<http://ikmediaries.pbworks.com/10-Portal-Pitfalls>> for more details

There is an ever-expanding amount of guidance, advice, methods and tools for adaptation, yet there is a great divide between the types of knowledge on offer and the need for knowledge and information conducive to action-oriented adaptation decisions. On the one hand, there is a growing supply of scientific knowledge and information; on the other hand, decisions and actions by policy-makers and practitioners are hindered by the lack of practical knowledge and information. The quality of the information available varies greatly, as does the suitability of the tools to achieving different purposes. It is therefore becoming more of a challenge for users to distil useful lessons and select the information most appropriate to their context. There is a need to ensure that knowledge and information is delivered to the users in an appropriate format. Regional centres and networks could act as knowledge intermediaries to help bridge the gaps between the suppliers and users of knowledge and information products and services. At the same time, emerging technologies such as semantic searching, user-tagging and social bookmarking provide an opportunity to help users navigate web-based content and find relevant and credible information.

There is still a huge global inequity in terms of access to information and resources for tackling climate change. We cannot be complacent about the continuing problems of poor connectivity and high cost for internet access in the developing world. There is a danger of reinforcing existing vulnerability distributions, and a challenge is to find ways of overcoming this. Print and offline products are still vital to reach these audiences. The potential of delivering information via mobile phones is expanding, and could help to address some of the problems associated with limited internet access.

Finally, there are both challenges and opportunities associated with maintaining the momentum of climate change adaptation. There is a need for dedicated, sufficient and sustainable resources to support the development of coordinated actions and mechanisms for knowledge sharing and learning. The political support from governments also needs to be strengthened, through, amongst others, more direct and integrated support for the implementation of the Nairobi work programme.



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IX. KEY MESSAGES AND CONCLUSIONS

With contributions from Nairobi work programme partner organizations, this publication provides a synthesis of a small selection of adaptation actions as pledged and implemented by these organizations. Reflecting the diversity of the partner organizations, these efforts cover a wide spectrum of adaptation practices from the more capacity-oriented undertakings, such as the provision of basic datasets for analysis, the development of methods and tools, the assessment of current and future vulnerability and adaptation to climate change, to more action-focused practices such as climate risk communications, community-based adaptation, disaster risk reduction and knowledge sharing. These actions are necessarily multi-scale and involve different social groups and focus on their needs. Nevertheless, some common messages are emerging from these diverse actions on:

- What is achievable;
- What has worked;
- What should be avoided;
- What mechanisms and processes have the potential to further promote adaptation.

These are summarized below in this concluding part of the publication.

Ongoing actions are already delivering concrete results on the ground.

Although many organizations are still in the early stages of implementing their pledged adaptation actions, a wide range of “on-the-ground” results have been reported. They include, among others:

- An increase in public awareness of climate change and its impacts, and the need for adaptation;
- The establishment and strengthening of institutional structures to facilitate dialogue, as well as the production and sharing of knowledge and information;
- An enhanced technical capacity for climate risk analyses and adaptation planning, particularly in developing countries;

- An enhanced knowledge base on the science of climate change, as well as the social learning processes of adaptation;
- Changes in policies and practices to better manage the risks of climate change.

As the implementation of actions progresses, it is expected that this list will grow and the scale of on-the-ground results will be more visible.

Good practices and lessons learned are being documented and shared within the adaptation community.

From the multiplicity of adaptation actions summarized here, the following good practices and lessons learned can be drawn:

- Adaptation is a process.

The uncertainties associated with climate change and its impacts, compounded by the complexity of social, economic and political systems, mean that adaptation is necessarily a social learning process. This recognition is critical to managing adaptation. It is an iterative process and must be guided by continuous review, knowledge and information, including that derived from local communities.

- Engagement of all stakeholders, particularly the most vulnerable, is key.

The participation of stakeholders, particularly those most vulnerable and in poor communities, in the entire adaptation process is essential. Stakeholders possess the most authoritative and insightful information on their adaptation needs, and are vital partners to design, deliver and sustain adaptive solutions.

- Adaptation must be consistent with development needs.

Good practices such as “people-centred” and livelihoods-based adaptation highlight the importance of addressing grassroot vulnerability factors and building societal resilience.

- Effective adaptation relies on successful communication of knowledge and information.

Adequate provision and effective communication of knowledge and information on climate risks and potential solutions to key stakeholders at all levels is a prerequisite for effective adaptation. Sound adaptation decision-making and engagement of stakeholders need to be based on the fine balance of up-to-date science as well as traditional knowledge and wisdom. Making data and information available is one, but only one, part of the challenge. Innovative means of communicating is important, to address the poor access to information in remote and poor communities. Knowledge and information also need to be packaged and communicated in ways that “make sense” to the relevant stakeholders.

Challenges as well as opportunities exist for further building adaptive capacity and delivering adaptation actions.

As reported by organizations contributing to this synthesis, a multitude of challenges hinder adaptation from taking place or having long-lasting effects. These are related to:

- Poor access to data, information and knowledge and inadequate technical capacity to interpret, communicate and apply them;
- Insufficient practical methods and tools (including guidelines) for risk assessment, adaptation planning, implementation and evaluation;
- Inappropriate institutional and financial mechanisms to foster partnerships and to facilitate information flow between different levels and sectors.

Meanwhile, organizations also identified opportunities where these challenges could be addressed effectively through the following ongoing and planned synergistic processes, programmes and initiatives:

- A comprehensive framework for adaptation under the post-2012 climate regime, including enhanced actions on adaptation, with required financial and technological support, institutional structure and capacity development;
- The development and implementation of the Global Framework for Climate Services, one of the key outcomes of the World Climate Conference-3, held during 31 August – 4 September 2009 in Geneva, Switzerland;

- The preparation of a special report on managing the risks of extreme events and disasters by the Intergovernmental Panel on Climate Change, to be completed in 2011;
- A wide range of specialized networks, learning platforms and communities of practice, to further enhance knowledge sharing and learning.

The Nairobi work programme has the potential to assist in realizing these opportunities and to facilitate the implementation of adaptation in a future climate regime.

With broad support from Parties to the UNFCCC and its partner organizations and through the lessons learned through the implementation of activities to date, the Nairobi work programme offers a unique framework to capitalize on the opportunities identified above and to support furthering adaptation actions in a future climate regime. The Nairobi work programme could assist all Parties to the UNFCCC, particularly developing countries, and including the least developed countries and small island developing States, through:

- Working to engage stakeholders at all levels, sectors and disciplines, and encouraging them to share knowledge and learn from each other;
- Acting as a catalyst and motivating stakeholders to coordinate their activities and to collaborate with each other.





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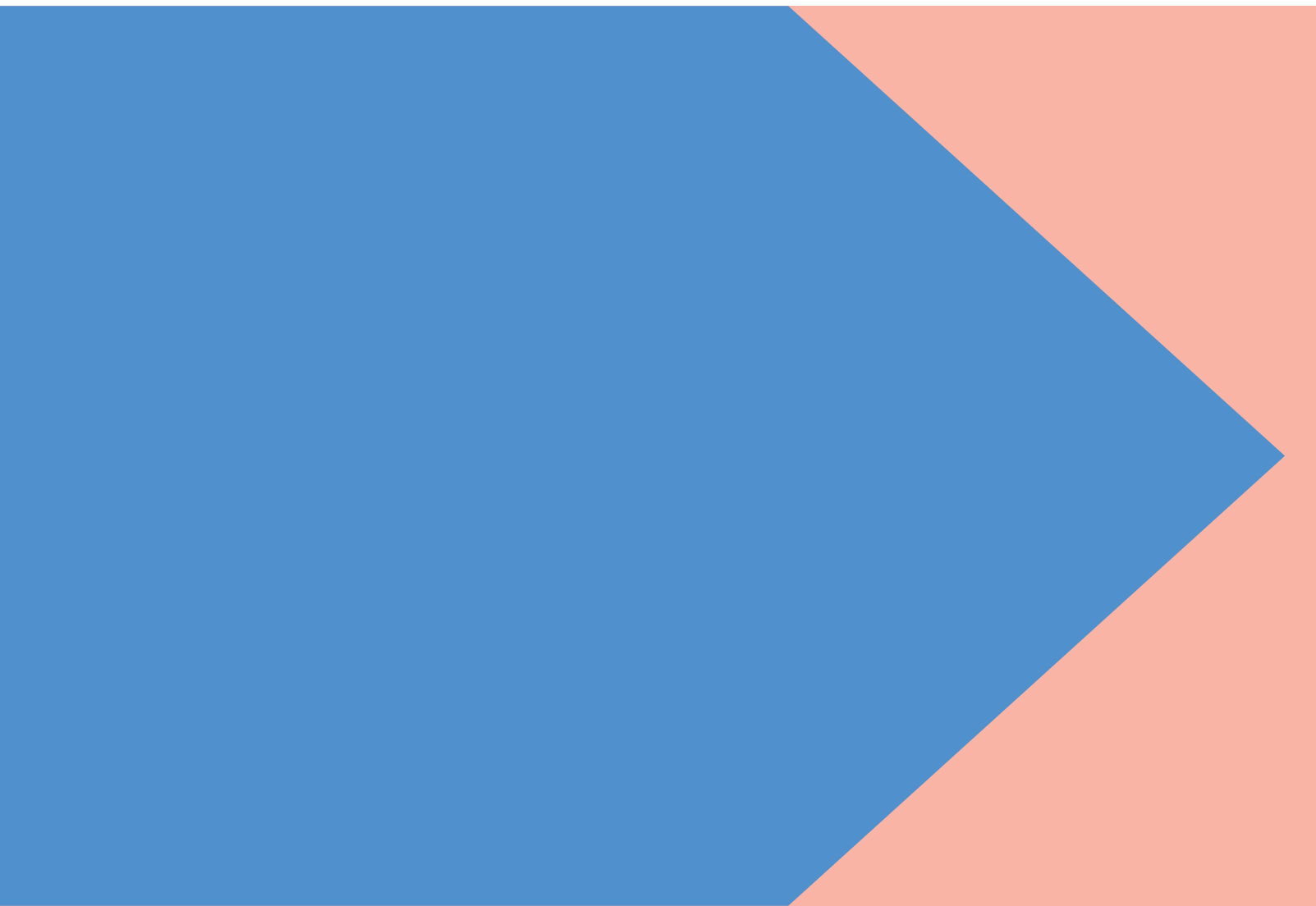
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