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SYNTHESIS REPORT

LESSONS LEARNED ON CLIMATE CHANGE SCIENCE AND RISK COMMUNICATION IN THE ACCCA PROJECT

30 June 2009

START

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KEY MESSAGES

This report synthesizes the experiences and lessons learned by ACCCA pilot actions and technical support teams in the process of co-learning how to analyse and clearly communicate relevant climate information and risks to a broad range of stakeholders for adaptation planning. Three are the broad activities carried out by ACCCA pilot actions to support this process:

a) Context-specific analysis and interpretation of climate change science to understand and use relevant information in the preparation of climate risk communication methods and tools to approach local, regional, and national scales.

b) Implementation of risk communication strategies in ACCCA project sites and countries.

c) Identification and/or implementation of activities that directly enhance the livelihood options of vulnerable communities: development of adaptation options/measures based on robust decision-making.

Through this process, teams within the pilot actions improved their capacity to integrate climate information and communicate risk to local communities and policy makers, while the climate change science and risk communication support teams gained familiarity of and appreciation for the complexities and challenges involved in promoting improved understanding of climate change science and development of climate risk communication tools and methods to support robust decision making for adaptation.

This report is divided in two parts. Part I provides a synthesis of the lessons learned by pilot actions and technical team regarding the two-way dialogue necessary to overcome multiple analytical and interpretive challenges that are encountered in using and applying climate information for adaptation decision-making. Part II describes lessons learned from the pilot actions on developing strategies to communicate climate risks to a wide range of stakeholders. Key messages from the climate change science and risk communication teams are as follows.

- *Understanding the local decision making context for climate risk management and the baseline status of climate-related knowledge is essential for determining information needs and tailoring communication strategies.*

- *Social learning between project implementers and stakeholders, based on early and active stakeholder engagement, such as through participatory development and testing of risk communication material, is key to producing information that is relevant to stakeholders and that can empower them to act.*

- Creatively promoting interaction and learning by doing are essential for fostering stakeholder comprehension of key concepts, encouraging dialogue, and overcoming complexities in bridging science, policy-making, and practice.

- The ability of policy makers to integrate climate considerations into planning processes can be enhanced when communication strategies are deployed that promote an active dialogue between local communities and policy makers on issues of site-specific climate risks.

- *Developing clear and relevant climate risk communication messages requires collating large and often complex sets of information and knowledge from diverse sources.*
- *In promoting dialogue and communicating risk, care is needed to ensure that the effort is not hindered by:*
    - *competing information needs when addressing a wide range of stakeholders with different backgrounds and technical expertise,*
    - *a lack of understanding of foci and priorities in terms of the applicability of climate science and analysis outputs,*
    - *a mismatch in relevant spatial and temporal time scales for decision-making.*
- *Addressing these concerns requires developing and combining a diverse range of materials that address very different levels of competence, needs and expectations, expertise, knowledge and comfort with requisite terminology and methods using ingenuity and creativity.*

Several opportunities exist for sustaining the engagement with local communities and other stakeholders and building on the capacity engendered through the ACCCA project to further promote and scale up awareness-raising and decision support for adaptation. Encouraging participation and dialogue, understanding the level of information detail required, knowing the assumptions that must be considered, listening, strengthening institutional capacity and social networks, sharing key issues and strategies are all important first steps taken within the ACCCA project towards establishing a community of practice around the use of climate science and risk communication strategies for adaptation planning. This has formed the basis upon which further work to advance capacity for climate change adaptation should be promoted. Key considerations for the continuation of the work advanced in the ACCCA project are:

- Institutional strengthening and additional capacity building in support of climate risk communication for adaptation:
- Guidelines/support for mainstreaming adaptation
- Innovations that build from ACCCA and potential for an adaptation academy
- Applicability of weAdapt and other platforms for dissemination of knowledge

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PART I: CLIMATE CHANGE SCIENCE

LESSONS LEARNED BY PILOT ACTIONS

AND CLIMATE CHANGE SCIENCE SUPPORT TEAM

June 2009

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I. INTRODUCTION

The ACCCA project draws on lessons learned about communicating climate risk information in clear terms that are relevant to decision-makers; addressing climate risks and adaptation in an integrated, multidisciplinary way; the importance of engaging stakeholders substantively; and the long-term benefits of partnering institutions from scientific and policy communities for understanding and managing climate change risks. These objectives are reflected in the overall approach used to analyze climate change and are themselves an integral part of a growing understanding of the need to develop an ongoing dialogue b etween experts on climate change science and users of the information that they produce.

The proper characterization of the risks and opportunities posed by climate variability and change considerations is important for the ACCCA pilot actions, both from the perspective of understanding the role of these factors in shaping the vulnerability of target groups, as well as properly communicating those risks to the target communities. It is also important in the assessment of response options. Policy, institutional, technological, and behavioral responses to climate change can involve global actions such as international financial support for the National Adaptation Programmes of Action (NAPA); regional action such as regional agreements to promote wetlands conservation for migratory bird protection; and local responses, such as a decision by a farmer to alter land management practices to conserve topsoil. Nevertheless, the decisions that will ultimately matter most will be those taken by target groups of the pilot actions, including national governments, communities, and local land managers.

The idea of providing technical assistance in the area of climate analysis was introduced at the first exploratory steering committee meeting for the project in 2005. This was then refined through a series of meetings during the design phase of the project, shaped by the growing experience of projects on this topic (NAPAs, National Communications, CBOs- cite) and encouraged by pilot action teams when they highlighted project needs at the project inception workshop, held in Ouagadougu, in 2006. The "pilot action monitoring teams" were formed to jointly provide implementation assistance to every pilot action as per the schematic available in Figure 1.

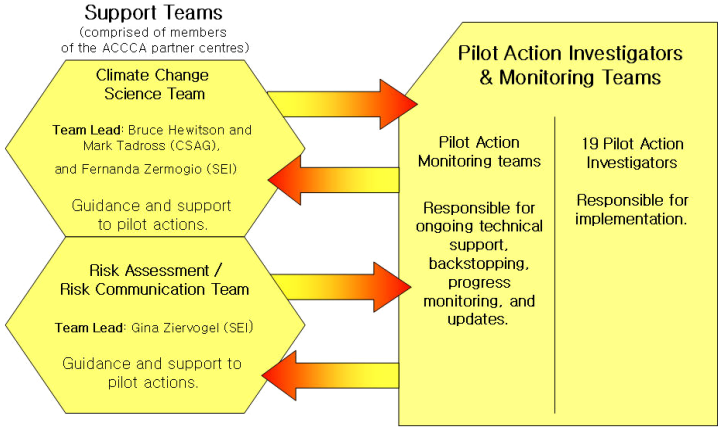

Figure 1. Diagram of Technical Support Team Structure

THE CLIMATE CHANGE SCIENCE TEAM

THE RATIONALE

Climate changes are now recognized to have a significant impact on development effort and pose a notable threat to efforts to meet the growing needs of the most vulnerable. Especially in developing countries, the increased documented occurrence of climatic changes is a critical problem for resource management activities. These impacts result from a complex variety of underlying physical, social, economic, political, and cultural forces and trends operating at scales from local to international.

A key step in improving the way these impacts are managed is to assess the extent and magnitude of potential future changes. A sound risk assessment is a fundamental first step in this process, ensuring climate change science is appropriately taken into account in decision-making. The purpose of this assessment is to identify risks that may be induced or exacerbated by climate change, and to evaluate their effects and likelihood. This allows for the identification of adaptation options, and their subsequent prioritization and comparison with other risk management practices, resource availability and costs.

Yet in the assessment of what actions to take and at what cost, there remains a lack of appropriate climate change risk assessment methodologies that take into account the best available scientific information, especially in the most vulnerable areas of the world. Moreover, rather less attention has been given to the development of pragmatic methodologies that will help decision-makers leverage the best available data and synthesis tools when addressing the problem, a point that is desperately important to identifying effective adaptation strategies.

Box 1. Activities of the Climate Change Support Team

- Liaise closely with the monitoring teams and respond to assistance requests in the area of climate change analysis for every pilot action.
- Facilitate the access to relevant data (downscaled, re-analysis, etc.) and methods for the analysis of climate change variables to pilot actions. This activity will also include, where possible, the provision of downscaled climate information to pilot actions.
- Locate, develop, and distribute, where necessary, guidance materials and documents related to climate change analysis.
- Provide technical assistance and guidance on the analysis of climate variables to pilot actions, including guidance on analyzing past climatic data and developing envelopes of future climatic conditions relevant to a specific ACCCA pilot action's needs, in close cooperation with the pilot action monitoring team.
- Organize or participate, where appropriate, as a resource person in the training workshops to be held on climate change analysis.
- Contribute to field visits decided by the Monitoring team where requested, to monitor the pilot action in

EXPECTATIONS

The objective of the climate change science team was to offer the technical and scientific support of the climate science community to the pilot actions. The capacity building activities of the climate change team aimed to set a process in motion that would encourage learning and the exchange of information between the expert modeling community and the users of the

data. The team[1] was established in 2007 and the rationale for the team's activities (Box 1) throughout the ACCCA project was to address several analytical and interpretive barriers previously identified in the use and application of relevant climate information for adaptation projects (Ziervogel and Zermoglio, 2009).

Analytical barriers refer to the weak link between climate change information and adaptation practitioners on the ground, with many adaptation practitioners continuing to rely on generalized assumptions about how the climate will change or derive very general information about climate change and its impacts from limited datasets or reports. The climate change team aimed to address analytical barriers by *improving access to model output and data*, and *offering guidance on the analysis of model data to improve the understanding and reliability of findings*.

Interpretive barriers limit the contextualization of climate change risks within a set of other climate information used in decision making, including historical data, real-time data and traditional knowledge, all of which are currently used and available to support the decision making processes. Establishing such contextualization involves setting a process in motion that will encourage learning and the exchange of information between users of climate information and providers of the same. Activities of the ACCCA climate change team aimed to provide guidance to pilot actions to *better define the climate variability and change challenges within each pilot action, guide teams towards a better understanding of causality and provide a window towards more robust adaptation planning*.

The activities of the climate change science team evolved in response to dialogue between the project partners and the pilot action teams. These dialogues helped to focus the activities of the climate team specifically on collaborative capacity building as a process through which the analysis and interpretation of climate information could be improved via the development and dissemination of various tools, data, and guidance materials to the pilot actions during the course of the project. The extent to which these activities were able to address the aforementioned barriers, and the lessons learned in the process, are discussed in the next sections.

II. SYNTHESIS OF APPROACHES IN THE USE OF CLIMATE INFORMATION

The ACCCA pilot actions made a number of significant contributions to the methods of analysis for exploring, validating and communicating the challenges posed by climate variability and change and in the identification of adaptation options and choices to a broad set of stakeholders across a variety of sectors.

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[1] ***The Climate Analysis team was led*** by Bruce Hewitson (CSAG), Mark Tadross (CSAG) and Fernanda Zermoglio (SEI).
Additional contributions were made by Ben Smith (SEI), Shuyun Wang (TEA-START) and Mousxsa Na Abou (ENDA) and Boubacar Fall (ENDA).

CLIMATE TRENDS AND VARIABILITY IN ACCCA PROJECTS

Climate trends across pilot actions over the past 3 to 4 decades show changes in temperature and rainfall. These changes in climate are causing floods and droughts, as well as an increasing incidence in water borne and vector borne diseases. In terms of likelihood, most of the pilot actions face an increase in temperature, whereas rainfall seems to show an erratic behaviour. Rainfall distributions have changed over time often becoming more "unpredictable". Increasing or decreasing total rainfall and shifting rainy seasons are causing complications to production systems during critical cultivation and harvest periods. The magnitude of change suggests an average temperature increase of 0.5 to 1°C in most of the pilot actions. Moreover, trends differ within countries, showing different behaviours in different regions. In most of the cases, pilot actions focused on the trends that relate to the region where project sites are located or to the meteorological station closest to the project site. Table 1 below shows some examples of observed trends and climate variability in the ACCCA pilot actions.

TABLE 1. EXAMPLES OF TRENDS AND CLIMATE VARIABILITY IN THE ACCCA PROJECTS

PILOT ACTION	PRIMARY CLIMATE RISKS	OBSERVED CHANGES AND TRENDS			
		Changes and trends	**Magnitude**	**Change in location**	**Other trends / descriptors**
Mali	Water scarcity (Droughts)	Maximum, minimum and average temperature increased since the 1970s. Rainfall variability is high, but in average there is a reduction in rainfall for the country. In the past 30 years most of the years showed reduction in rainfall. In southern Mali the distribution of rainfall shifted. The rainy season starts later in the year, from April-May in the past to May-June.	In southern Mali, average temperature increased by at least 0.5°C during years beyond the 2000s compared to historical records. Number of times the 39°C threshold was exceeded increased during the 2000s in southern Mali.	The south of Mali shows less reduction in rainfall compared to the rest of the country.	Due to soil erosion, productivity in the country has decreased. A decrease in rainfall could contribute to higher wind erosion. Southern and southeastern Mali faced floods 12 times since 1985 (especially Sikasso, Segou, Koulikoro, Bamako). Trend is primarily associated with the month of August.

Niger	Changes in rainfall patter, high wind velocity	Irregular rainfall in time and space. Rainy season starts later in the year and there is a tendency for "August shower" (or Zaaza") – period of intense fine rain in the Sahel – to disappear. Early and unpredictable stop of rainy season. Increase in the frequency and intensity of winds.	Annual rainfall for the period of 1961-2007 (based on 59 rainfall stations) show a tendency of decrease in rainfall over the last three decades. Analysis of max. min. and mean temperature over 1961-2006 show a decrease of the maximum and minimum temperature over the period 1961 – 1986, and a increase of the maximum and minimum temperature over the period 1986 – 2006.	In the study area: Increase in the annual mean rainfall over the period of 1978-2007 which varies from 341,1 mm at Chikal in the North, to 595,4 mm at Torodi in the South.	Changes in rainfall pattern, degradation of vegetation, high wind velocity and decreased in soil fertily as a result of climate changes could adversely impact on food security. In the past 15 years, poor harvests occur every two or three years causing famines and food insecurity.
Nepal	Floods, landslides due to heavy rain	Temperature is increasing. Increase in total monthly precipitation in Putalibazaar region. Early start of rain, but long monsoon breaks. Rainfall is untimely and heavy.			Farmers used plastic for shelter during rice plantation, but now they do not have to use it, as rain during plantation has reduced in the last years.
India	Precipitation increase and shifting rainy season. Temperature increase. Increase in dry spells.	Total precipitation has marginally increased, and rainfall distribution has shifted. Start of the rainy	Number of dry spells is higher when compared to historical data.		

		season is shifting to August from July in the past.			
Bangladesh	Drought	In the past four decades, average temperature has increased. Rainfall shows erratic behaviour. Total rainfall has declined during monsoon season (July, August, and September), but increased in summer.	From 1960 to 2006, average temperature in the country has increased 0.5 to 1 ^{0}C.	In the northwest temperature increase is higher than in the southwest of the country. In some regions of the country, winter is starting later.	The effects of deforestation in Himalayan upstream are / will be exacerbated by climate variability and change.
Mongolia	Drought, zud (a harsh winter phenomenon).	Average temperature has increased since 1940. Annual precipitation has not changed much, but spring season is becoming drier.	Over the past 60 years, Mongolia's temperature has increased 1.94 °C, with the greatest warming occurring during the winter months (approximately 3.6^{0}C increase) and in the spring (approximately 1.8^{0}C increase).		Water resources (and forage production) are increasingly drying out as a result of warmer temperatures and dry spells.
Tanzania	Reduced rainfall, water source quality deterioration and scarcity, increased crop pests and diseases and crisis in fishing practices.	Unreliable rain patterns and reduced rain intensity. Traditional water sources have dried. Lake water level receded. Emergence of crop diseases and ecological	Since 1961 rain has been declining. Since 1970's fish stock has been declining and some disappearing. Since 1980 pests and diseases have been		Food insecurity due to reduction in crop yield, poor quantity and quality of potable water and reduced fish stock. Papyrus wetlands are turned into farmland due to

		changes in the lakeshores. Soil has lost fertility, and crop production is declining.	attacking cassava, the major food crop.		water recession. Communities are changing to illegal fishing methods and are looking for new water sources.
Kenya	Erratic rainfall and temperature increase.	Average temperature has increased since 1978 in both Kericho and Kakagema stations, rising above 16 °C. In Kericho the increase is more dramatic than in Kakamega. Total rainfall has also changed.	Temperature has increased since 1978 during all seasons. In Kericho, over the past three decades, March to May and July to September seasons show a decrease in total rainfall while the opposite happens for the October to December season. In Kakamega, there is a decreasing trend in all the seasons.	The magnitude of the decrease in rainfall is considerably less in Kakamega compared to the Kericho case.	High temperatures (16-20°C) and wet conditions form suitable habitats for the An. Gambae mosquito that causes malaria.
Nigeria	Flood risks	Changing rainfall patterns and increasing frequency of storm surges over the past 3 decades.	Shorter rainy season from May to October as compared to March to October in the past. Increased frequency of rainstorms and storm surges resulting in increasing flood risks in the coastal area.		Flood risks have implications for food security (farm practices and harvests) and health, as impacted community depend mainly on medicinal herbs.

ANALYSIS OF CLIMATE INFORMATION

Most of the identified potential adaptation decisions of pilot actions are related to water resources and agricultural management aimed at increasing resilience of productive systems, while contributing to food and water security and diversifying income generation activities. Some pilot actions also focus on health policy, particularly related to water borne and vector borne diseases. A few pilot actions have also identified climate adaptation mainstreaming, pre-disaster planning and risk management as priority adaptation decisions. A brief description of adaptation decision taken by pilot actions and what these involve is given in section 2.4 of Part II of this report.

To analyze trends, most pilot actions have used historical meteorological data covering the past 3 to 4 decades, which were normally provided by the national meteorological offices in their countries. The parameters used for analysis were usually monthly and annual temperature (maximum and minimum) and rainfall. Some pilot actions like Nepal conducted flood and floodplain analysis, as well as landslide evaluations. The pilot action in Philippines used records of ENSO events for the analysis of trends, while the team in Ghana conducted comparative and regression analyses to identify the relationship between rainfall patterns and malaria and guinea worm incidence. To assess hotspots of guinea worm infestation and malaria incidence, the Ghana pilot action also used spatial analysis applying geographical information systems (GIS). The team in Mali also used GIS to construct risk and vulnerability maps and identify vulnerability hotspots.

Concerning the use of models for the analysis of climate variability and trends, most of the pilot actions consulted climate envelopes generated with the Climate Change Explorer (CCE) tool developed in partnership between Awhere and the Climate Science Analysis Group (CSAG) at the University of Cape Town. The data underlying the CCE tool are downscaled multi-model projections from the downscaling methodology developed by CSAG. Some pilot actions compared projected trends (changes expected from the downscaled climate change projections) to observed trends to assess the nature of adaptation decisions and actions to be taken (e.g., if observed trends and projected trends are very similar, trends will likely continue in the future and require risk mitigation actions if the current climate is close to critical thresholds). Other pilot actions used additional models, such as WEAP (water resources), FAWSIM (integrated assessment), the PRECIS RCM, CLIModel, and GCMs (climate). Most of these models were used to develop future climate scenarios for the regions where study sites are located. Mongolia used FAWSIM and CLIModel to generate scenarios up to 2020, 2050 and 2100. Ghana used future projections to compare different scenarios for 2050 using rates of change that would represent "business as usual" and health policy interventions. Bangladesh consulted scenarios that were developed using the PRECIS RCM by the Climate Change Cell of the Department of Environment and the Bangladesh University of Technology for the northwest and southwest regions of the country. India also used the PRECIS RCM to analyze climate forecasts for the period 2071-2100 for the Bundelkhand region. In addition, the team in India applied these climate forecasts to agricultural models to derive impact on wheat and soybean production.

In general, pilot action teams recognize the value of models to simulate scenarios and generate relevant information for more robust decision-making and implementation of win-win adaptive practices. However, they are also aware of the lack of in-country capacity to use models, and

particularly the lack of data availability (spatial coverage and time series) to generate reliable model outputs. Moreover, the limitations of the data, and the fact that data in itself is not information, is poorly understood. They recognize that further work has to be done in this realm to strengthen capacity and improve data availability to assess climate change and variability. Table 2 below shows some examples of climate information analyses undertaken by the ACCCA projects.

TABLE 2. EXAMPLES OF CLIMATE INFORMATION ANALYSIS IN THE ACCCA PROJECTS

PILOT ACTION	ADAPTATION DECISION	Analysis of observed trends	Analysis of Models	
			CCE envelopes	Other Models
Mali	Water management	Historical meteorological data of at least the past ten years were used and analyzed.	Location: Bougouni, Sar and Kita. Total 15 stations.	WEAP, Awhere GIS software
India	Water management, agricultural practices to ensure food security and income, addressing malnutrition among women and children	Meteorological data of the past 30 years were used to assess the trends of climate.	Location: Bundelkhand region. Total 44 stations.	Climate forecasts generated for the Bundelkhand region by the Indian Institute of Tropical Meteorology using PRECIS RCM. Climate forecasts were applied to agricultural models to derive impact on wheat and soybean yields in the Bundelkhand region. Models provided information for the time period 2071-2100.
Bangladesh	Water, and agricultural management (including fishing activities).	Meteorological and hydrological data generated by the Meteorological Department (BMD) and Bangladesh Water Development Board (BWDB) were used. Data covered time period 1960 to 2006 and the parameters analysed were min. and max. temperature and total rainfall.	Location: rural areas. Total 5 stations.	Climate change projections using PRECIS RCM have been generated by the Climate Change Cell (CCC) of the Department of Environment and the Bangladesh University of Technology.
Ghana	Water management, health policy (water-borne diseases and vector-borne diseases), agricultural management, and adoption of early warning systems.	Geographic Information System (GIS) was applied to conduct spatial analysis and identify hotspots of guinea worm (GW) infestation and malaria incidence in the study areas	Total 1 station.	Future projections were generated considering different climate scenarios using current rate of change under "business as usual" (BaU) and policy intervention (PI) for 2050.

	systems.	based on infestations recorded in 2007. Incidence of malaria and guinea worm infestation and the links to climate variability were studied with 2001-2007 datasets using regression and comparative analyses.		
Mongolia	Land management practices for livestock grazing in arid and over-grazed landscapes vulnerable to climate change.	Climate trends since 1960 were analysed with data from meteorological stations.	Location: rural areas. Total 59 stations.	Future climate change scenarios up to 2020, 2050 and 2100 were analyzed for pilot study sites using FAWSIM and CLIModel.
Tanzania	Enhance food security (introduction of fish farming practices, improvement of animal husbandry, use of new crop varieties). Introduction of irrigation schemes around the lake and alternative water sources (deep wells).	Temperature data for the past 40 years plotted using excel programme. Monthly rainfall anomalies and total annual rainfal patterns for the past 60 years plotted using excel.	Location: Musoma station and other stations. Total 15 stations. Monthly rainfall trend projected. Past and future monthly precipitation compared. Past and future temperature compared.	Performance of various IPCC model outputs for this region were compared with other research findings (e.g. AMMA).
Nepal	Disaster risk reduction using climate and weather information Disaster risk sharing using community based disaster insurance	Historical disaster data (primary and secondary), meteorological data hydrological data	Location: one station at Putalizabar, Syangja District	

EXPERIENCES IN COMMUNICATING CLIMATE INFORMATION

Almost all pilot actions focused on local communities (i.e., village residents, subsistence smallholder farmers, local leaders, as well as community schools and organizations) as their primary target group. Several pilot actions also targeted municipal-, district- and national-level governmental agencies, as well as local and national NGOs. In addition, Nepal targeted the Red Cross Society and insurance agencies, as well as community-based disaster preparedness units.

Climate data and model outputs were explained in informal talks and formal workshops using PowerPoint presentations, brochures, magazines, as well as through oral discussions. In general, graphics illustrating observed trends were showed and examples were given to explain the possible implications of trends. Informal talks, lectures, trainings, and open forums were normally

conducted at community level, while formal workshops involved community representatives, local and national governmental officials, as well as other stakeholders such as NGOs and sometimes, private organizations working in the project area. For example, the pilot action in the Philippines developed a magazine where graphs showed observed trends and climate variability, informing stakeholders about the anomalous and unpredictable patterns of temperature and rainfall. To communicate the relationship between climate and health, the Ghana pilot action trained staff of the National Health Service and the National Guinea-worm Eradication Programme to understand the links between climate change and variability and the incidence of guinea-worm infection and malaria incidence. Local leaders were also given training on climate risk management related to these diseases and a series of lectures on this topic were held in two major universities of the country. In addition, the project team distributed posters and flyers on climate change and guinea-worm and malaria. Table 3 below summarizes strategies used by some pilot actions to communicate climate information.

TABLE 3. EXAMPLES OF COMMUNICATION OF CLIMATE INFORMATION IN THE ACCCA PROJECTS

PILOT ACTION	PRIME TARGET GROUP	COMMUNICATION CHANNELS (Examples)	FEEDBACK
Mali	Residents of the 3 study sites: Massabla, Kiban Diouna	• Informal talks • Posters and reports with graphics explaining mode results distributed to communities and governmental offices.	Model outputs are difficult to understand and communicate, but explained in local and simple language the general message can be passed on.
India	1. District level planning agencies 2. Rural communities 3. Local research institutions	• PowerPoint presentations • Policy document Information provided in PPT presentations and documents was integrated into folk theatre at public gatherings.	Policy makers appreciated the generation of relevan information.
Philippines	1. Upland farmers in Lantapan, Bukidnon. 2. Local Government Units at the provincial, municipal and barangay levels 3. Governmental and non-governmental agencies	• Climate change magazine with graphs illustrating climate trends Climate change magazines were distributed by stakeholders themselves to their partners and local communities. Series of consultation meetings lectures and open forum were organized to present the materials. Differen modules were prepared targeting	Stakeholders agreed with the information shared by saying 'lagi' (local term for "indeed") Stakeholders agreed that extreme climatic events are becoming more frequent and recognize tha rainfall has become more unpredictable. Stakeholders stated that the climate change magazine is very useful. The National Power

		communities, policy makers, and organizations working in the watershed where the project operates.	Corporation (NPC) is planning to reproduce the magazine in different dialects and distribute it to local communities in areas where NPC is working.
Bangladesh	1. 120 highly vulnerable households in 3 project sites 2. Local level stakeholders (local government, local NGOs, and school teachers) 3. School children 4. National-level governmental organizations and NGOs	• Focal group discussions • Workshops At focal group discussions communities shared their observations and village transects were part of the exercise. Half-day sub-district level workshops were conducted in each project site where all stakeholders were present.	Stakeholders appreciated the information. Stakeholders suggested communicating climate information through folk drama and dances as alternative strategies to convey the messages.
Ghana	1. 40 leaders and household heads in N Ghana 2. In Kwabre district, 120 community leaders, traditional leaders and stakeholders from university and the district assembly 3. National-level governmental organizations and health service environmental companies	• Trainings • Lectures • Posters and flyers on climate change and malaria/ guinea-worm infestation The director of the health services in charge of the study areaand twelve other district health workers were given a one-day training on climate change impact on malaria incidence and prevention. 40 leaders and household heads were given a 3-day training on climate risk management related to guinea worm infection. A series of lectures were held in two major universities (Kwame Nkrumah University of Science & Technology and University of Cape Coast) Posters were distributed at local level to community leaders, school teachers and district assemblies.	The trained personnel were key to disseminate climate change information on guinea-worm infestation to the rest of the population in the study sites.
Tanzania	1. Three village communities involved in agriculture and fisheries activities 2. District-level government officials	• Workshops and meetings Workshops were conducted in collaboration with local NGO FAPOEL, which has been interacting with the communities for more than 5 years.	Communities are very receptive and showed readiness to put their personal effort into implementing adaptation measures.

Kenya	1 Subsistence farming community at risk, health service providers 2 NGOs, environmental health scientists 3 Governmental health policy makers	• Trainings • Narratives • Hazard mapping Open discussions were carried out in the communities where role-plays and exercises such as hazard mapping and risk ranking were conducted to engage the participants and create awareness "Rainmakers" in Emuhaya were invited to explain to the communities that rain is more difficult to predict (higher uncertainty) because the environment (bioindicators) has changed. Health promoters were trained on the links between malaria and climate variability and change.	
Tunisia	1 Three pilot communities (Athmen, Zammour & Bhaira), 2 Multidisciplinary team of scientists 3 Two local NGOs (AJZ and APB) 4 Regional Department of Agriculture (CRDA of Médenine) and local institution (GDA)	• Workshops and informal talks • Field demonstrations and visits Field visits to the project site were conducted and communities were involved in informal talks about observed trends, and implications in water availability and production systems.	Confidence has been increased among the local partners, more involvement and contribution (financial and field work) in the action plan of climate change adaptation.
Nepal	Communities of four Community Based Disaster Preparedness (CBDP) Units of Putalibazaar municipality, Syangja District	• Community Workshops • Oral Presentations and Documentary shows • Distribution of Brochure and Poster on climate change in the community • Consultative Meetings	Community found the materials on climate change useful and suggested us to organize presentation and to distribute these materials also to the local NGOs, schools and local media for large dissemination Nepal Red Cross Society found the presentation on climate and weather information useful and planning to put it in regular refresher trainings

Oftentimes, pilot actions would target a key group of stakeholders who are then invited to trainings and workshops, and subsequently take responsibility for disseminating the information given to them further to a larger number of people living in the community or working at targeted organizations. For instance, the pilot action in Mali distributed a poster with graphics

explaining model outputs to community leaders and local NGOs, which in turn disseminated this information further in the 3 project sites. The Bangladeshi team produced posters that were discussed with key community representatives, who then distributed the posters to public places (e.g., schools, government buildings, markets and rural shops, etc.) in project sites. The team in Ghana gave a 3-day training to key local leaders on climate risk management related to guinea-worm infection. The leaders in turn shared what they learnt with households at their communities.

Climate information was generally discussed with community representatives and local decision makers. In Mali, climate data and local perceptions on climate risks were used by experts in the formulation of the "Element of National Policy for Climate Change Adaptation", which was validated at a national workshop. The Philippines project discussed the magazine they produced with local communities, integrating their feedback in the final editing. The pilot action in Bangladesh validated the climate information in informal discussions with people at risk and local government officials. In this case, scientific data were compared to local experience and perceptions and popular terminologies were integrated into the poster they produced.Case studies highlighting pilot actions implementing strategies to communicate climate information are presented in the Annexes and approaches used for risk communication are described in further detail in the Part II of this document.

OUTCOMES AND LESSONS LEARNED BY PILOT ACTIONS

In general, pilot actions were successful in communicating climate data to project stakeholders. Pilot action teams have often received positive feedback from the different stakeholders and requests to further disseminate the generated information. For example, stakeholders of the pilot action in Nepal have requested the project team to continue with the awareness programme and present the climate information at schools and NGOs in Putalibazaar region. In the Philippines, the National Power Corporation will translate the magazine produced by the project team into local dialects and distribute it to local communities where the company is working. In Tanzania, communities welcomed the information and are receptive and ready to work on implementing adaptation strategies at the district level and in collaboration with local government agencies and NGOs.

In general terms, the generation, use, and dissemination of climate information has enhanced local capacity to integrate climate considerations into decision-making processes and development planning. Adaptation strategies were encouraged by pilot actions through participatory processes and expert consultations. For example, the project in Bangladesh promoted the development of Union-level Local Adaptation Plans, which were mostly based on community inputs and were discussed at round-table meetings with local-level officials. In Malawi , the project supported the development of community-based early warning systems (Red Cross volunteers alerting villagers to the risk of floods with whistles). In Nepal, climate considerations have been integrated into community-based disaster preparedness plans and micro-insurance schemes.

In addition, pilot actions have promoted partnerships and networks between institutions working with climate change in their countries. For instance, in India a core group has been formed to discuss climate issues in-depth and formulate a district-level action plan for the first time in the

country. In the Philippines, the project helped to improve relations between the National Met Office and local organizations. In Mali, the project contributed to the establishment of Reso-Climat, a network of institutions dealing with climate change in the country that have agreed to collaborate in project development and and information sharing.

One of the key lessons learned by pilot actions is that in order to effectively communicate climate information, it is important to know first the local context and local perceptions on climate risk. Another key lesson is the use of local language. Pilot actions recognize the complexity of climate models, which oftentimes make it difficult to explain the outputs in clear terms that are relevant to local communities. According to several pilot actions, the use of local language, illustrative graphs and examples (analogies) has helped to pass on the general message. Additionally, the use of folk drama, dances and music can serve to capture the attention of local stakeholders and generate more interest and better understanding. The section on risk communication describes strategies to communicate climate risk in further detail (see Part II of this report).

The generation and communication of climate information had not only a positive effect on stakeholders and to some extent on the integration of climate considerations into local planning, but it also had an impact on team members working in the projects. In general terms, pilot action teams have improved their capacity to communicate climate information in clear terms, as well as understand and consider local know-how in the process (social learning). Pilot action teams have also enhanced their capacity to compile and analyse climate risk information and collaborate with other institutions. For example, the pilot action team in India learned about the concepts behind climate change and the implications of it for vulnerable sectors. While carrying out vulnerability assessments, the team learnt about the multi-disciplinary nature of these evaluations and the need to identify comprehensive responses. As part of the project, the pilot action team joined a core group of different stakeholders that engaged in a collaborative campaign to work further on climate issues and formulate adaptation strategies at district level.

While recognizing the benefits of using and communicating climate information, pilot actions are aware of the challenges ahead and the opportunities for improvement. Some of these opportunities are more related to capacity building of project teams and country level facilities to generate meteorological data of better quality. For example, the teams in Mali and Bangladesh recognize the need to strengthen the national capacity to improve meteorological observations and coverage in order to use the met data in models that can then generate more reliable results. The teams in Mali and Nepal also recognize the need to enhance in-country capacity for downscaling climate change projections and understanding uncertainty, while the team in Tanzania emphasizes the need to explore further the vulnerability analytical matrix as a method to carry out vulnerability assessments.

Other challenges ahead are associated with the implementation of further steps, such as promoting good climate communication practices, and implementing concrete adaptation policies and actions. For instance, the pilot action in the Philippines suggests further evaluation of the effectiveness of materials produced to communicate climate information in the project, in order to identify best practices for further dissemination beyond project sites. Tanzania highlights the need for further exploration of adaptation strategies involving local communities and

considering local development plans. According to the Tanzania and Kenya pilot actions, this step should take place in combination with further capacity building on adaptation planning and support to implement selected adaptation strategies.

III. GUIDANCE AND DIALOGUE

The ACCCA project makes a number of new contributions to the method of climate analysis for exploring future and current climate risks, and to the process of how these analyses are conducted. The materials to support these contributions evolved through an intentional and collective dialogue between pilot actions and the climate change support team. These included:

WORKSHOPS AND FIELD VISITS

Central to the goal of setting a process to encourage learning and the exchange of information were several hands-on workshops and learning sessions conducted during the course of the project. Much of the interactive efforts of the climate change team aimed to help pilot actions address two key issues that are essential to work with climate information: 1) defining the variables that are important, with respect to the relevant context of vulnerability and risk, and 2) developing a concise understanding of the temporal resolution required from the data (Box 2). Substantial training and capacity building took place to address these issues through a series of meetings and field visits ensuring a broad user base in each country. Meetings and field visits included lectures, hands on exercises and trainings aimed at understanding:

- The process by which a baseline vulnerability assessment can be used to identify key climate variables for subsequent analysis.
- Types and uses of climate data: meteorological observations, global circulation models, downscaling approaches.
- The inherent uncertainties and caveats around the use of climate data for adaptation planning.

BOX 2. The evolution of guidance materials for the Pilot actions

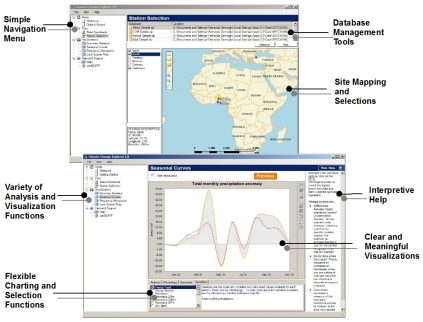
- *What variables are important?* Climate hazards strike in different ways and at different times, and impact groups differently. In climate impact assessments, one size does not fit all. Indeed, climate impacts on individuals, groups, regions, etc. are context dependent and depend on the relative distribution and resilience of the economic, social, ecological and adaptive capacities of the impacted groups.

- *What time period is important?* Risk varies over time. This reflects both the changing probability of the risk occurring, and the changing scale of consequences should the risk occur. A risk that exists at present may not evolve into a crisis over time, while the reverse can also be true, that a sector, community or population not currently categorized at risk may under future conditions become risk prone. Furthermore, risks can be measured across a wide temporal domain, some are chronic, sudden onset threats measured in relatively regular intervals, while others occur on sub-decadal time-scales (such as those related to the movement and attendant impacts of the Inter Tropical Convergence Zone across the Horn of Africa, and yet can be safely characterized as surprises, with relatively rare occurrences over much longer time intervals. Additionally some risks may be particular to very short time intervals e.g. drought during the crop reproductive stage or high intensity rainfall during harvesting

TOOLS AND DATA

Recognizing that a major impediment to the use of climate and vulnerability information in adaptation projects was the paucity of established methodologies to properly assess a community's risk in the context of climate variability and change, several tools and datasets, along with relevant guidance material and open lines of communication were provided to the ACCCA pilot actions. A special emphasis was given to the dissemination of tools and data that would facilitate access and analysis of vulnerability and climate information in a systematic way. These included:

THE CLIMATE CHANGE EXPLORER TOOL



The *Climate Change Explorer Tool* synthesizes information from ensemble simulations in an envelope analysis to determine the potential distributions of future climate change. Its purpose is to provide information on the results of climate models, in ways that will allow the potential user of the information to evaluate how best it may be applied. By including uncertainty analysis (arising from, for example, variable model skill, parameterizations and differing climate sensitivity) in the outputs, the approach provides guidance for prospective mechanisms through a rolling re-assessment of these conditions based on emerging scientific findings on climate variability and change. The overall objective of the analysis is to support adaptive management and planning responses to climate change by providing information and guidance on climate model outputs in a way that it is easy to understand for the user.

Access to the Climate Change Explorer Tool was provided to all the pilot actions, packaging data access routines with downscaled station level data, as well as guidance and customized analytical and visualization procedures. This gave pilot actions a sound analytical foundation from which to explore the climate variables relevant to their particular adaptation decisions. Data gaps were addressed in many cases through the provision of meteorological observations from pilot actions to the Climate Systems Analysis Group, who conducted the subsequent downscaling, as well as the calculation of statistics in a format that could be read into the Climate Change Explorer tool.

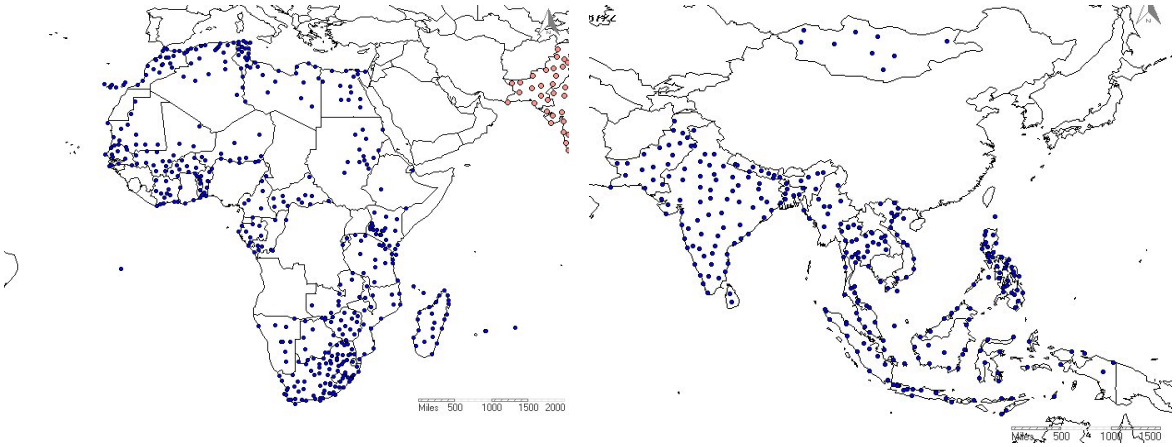


FIGURE 1. AVAILABLE DOWNSCALED STATIONS WITHIN THE CLIMATE CHANGE EXPLORER TOOL FOR AFRICA AND ASIA

AWHERE

Vulnerability is the basis of the analysis of adaptive strategies and measures. Vulnerable groups are exposed to a range of present climatic hazards, trends in climatic resources that may become significant in the near future, and other environmental, economic, and socio-political stresses. Defining who is vulnerable and to what is a key first step in the process of assessing the potential risks from climate change. Climate risk and vulnerability for a particular site or region is a collective function of a complex set of dynamics which can be evaluated with a wide variety of data sources including: peer reviewed and gray literature, local knowledge, field collected data, trans-disciplinary debates, and various models. The organization of these data requires a sound data management package such as GIS. The AWhere Spatial Information System was selected for the pilot actions because it is a GIS tool designed for non-specialists that provides readily accessible, user-friendly tools designed to help decision-makers integrate vulnerability data.

The Awhere Spatial Information System also helps to relate the local (whether a community or country or region) context to expected climate change, which is a complex 'scoping' process that pilot actions needed to grasp in order to assess their vulnerability and climate risk. A license to the AWhere Spatial Information System, along with their foundation data and several training sessions were provided to all pilot actions for their context analyses.

GUIDANCE MATERIALS

Guidance and reference materials were developed in response to the queries and needs of the pilot actions (Box 3). These included:

- A climate science library, available via the ACCCA platform, that included papers and documents on the use of climate data, climate science, the analysis of climate impacts, and vulnerability.
- A guidance note on vulnerability-exposure, providing an approach to identify the key climatic hazards for a specific region and livelihood or economic activity. The note guided pilot actions in the identification of 1) measurable climate variables that can be obtained from climate information systems for the present and archives of global climate change models for relevant time periods in the future, 2) climate variables and thresholds of concern that are required in planning adaptation strategies and measures. The note prepared teams for the construction of climate envelopes that represent the range of available model outputs for assessing potential future exposure to climate stresses, and helped them to identify gaps in knowledge where additional sectoral and livelihood studies were required or may be available but not brought into the team's expertise.
- A hands-on exercise on climate change assessment to develop a contextual understanding and have a clear baseline package of a region's information.
- A guidance note on the Climate Change Explorer tool that described how the tool could be used within pilot actions.
- A training manual on the Climate Change Explorer tool, which includes a series of frequently asked questions on the tool and a glossary of climate science for adaptation practitioners.
- A series of workshop reports which provide considerable guidance and insight into the application and interpretation of climate change information in adaptation studies.
- weADAPT wiki on climate adaptation - a collaborative platform for sharing information and experiences in the field of climate adaptation.

Box 3. The need for climate science guidance

Participants at the workshop in Cape Town indicated the following needs and suggestions for materials to be prepared, among these are those related to:

Climate Uncertainty

- A better understanding of the uncertainties in climate prediction and downscaling techniques.
- Guidance document comparing downscaling techniques: Regional Climate Models versus Empirical downscaling techniques.
- Collection of key resources on downscaling and climate science.

Climate Interpretation

- Guidance for projects on how to interpret the output of the Climate Change Explorer tool
- Exploring the coupling of socio-economic and climate data to understand risks.

IV. LESSONS LEARNED

This synthesis report highlights some of the ways in which key technical issues were addressed and activities implemented to place climate information in its appropriate context of existing stresses and within the realm of planning responses. Notwithstanding the significant contributions made, the aim of the climate change support team to design a relatively open process of interaction between the users and providers of climate information, proved to be an ambitious objective. Several lessons can be drawn from our experiences to guide future endeavors, all of which center around the notion that collective learning is more than the simple delivery of data and information, particularly in the case of adaptation planning. It requires a collective understanding of expectations, clarity of message and creative communication avenues, and an approach grounded in the principles of learning by doing. These challenges, along with examples from our experiences, are discussed below.

UNDERSTANDING EXPECTATIONS FOR COLLECTIVE LEARNING

When we began the process we assumed that the problem was simply the lack of communication and dialogue between the adaptation and the climate science communities, and that the solution would be to promote an open environment for the exchange of ideas. It quickly became clear that the challenge of communication is more than promoting dialogue, which is itself hindered by the effects and complications of:

- *Differences in backgrounds and technical expertise including the use of jargon, which can have different meanings (i.e. risk, range, uncertainty).* The diversity of disciplines, training and perspectives of the ACCCA project proved a major impediment in effective two-way dialogue between the climate science team and the pilot actions. Even what appeared to be relatively simple questions (e.g. what variables are important? What time period?) generated complications due to a general lack of understanding across the disciplinary divide. The task of conveying information from and about models required significant clarification of terms, interaction, and explanations, which were themselves demanding in light of the project loads, and in spite of the relatively difficult task of understanding how these would be relevant to project activities. These difficulties led to the work conducted at the Training of Trainer's workshop, held in Cape Town in 2008 and the development of a working document on meta-concepts of climate adaptation.

- *A lack of understanding of foci and priorities.* Pilot action teams, tasked with the challenge of developing adaptation projects, lacked the time, resources and expertise to engage in a detailed assessment of climate risks. They needed information that clearly stated the applicability of the data for decision-making at the spatial scales appropriate to their work. They were thus likely to prefer short narrative descriptions of an assessment that give qualitative insight into the causes of risk and the related uncertainties, rather than details of the climate science aimed to provide numerical results, statistical methods, and uncertainty analyses. A general lack of awareness and understanding of the applicability of the outputs, benefits and limitations of climate science, in turn, often led to unrealistic expectations and frustration. Addressing this

requires the development of materials that address very different levels of competence, expertise, knowledge and comfort with requisite terminology and methods using ingenuity (using familiar and relevant examples and noting the impacts on a project's activities), and creativity (using both qualitative and quantitative descriptions), and these are themselves challenging.

- A *mismatch in relevant spatial and temporal time scales*. Understanding the potential and relevant climate variability and changes over the next two to ten years and at the community or regional levels was clearly a priority for ACCCA projects. However, on this time scale the anthropogenic climate change is extremely small compared to the dominant internal natural variability of the climate system. The objective of climate predictions for the next 10 years remains an unattained objective of the climate modeling community. Consequently most climate change projections focus on the mid- to late 21st century. Whilst these data (for, example, the IPCC targeted period between 2045 to 2065) can shed significant light on the trajectory of expected changes for planning adaptation, both the climate science team and the pilot actions struggled with issues of relevance that this posed within short-term planning frameworks (e.g. 5-year action plans) for the ACCCA projects. In part this reflects the fact that many sectors are still dealing with adaptation to pressures from the natural variability of the climate system, quite aside from an overlaying anthropogenic signal. The question of how the climate *change* information can be used, coupled with the incomplete spatial coverage of the downscaled station data and/or the low resolution of Global Circulation Model output, was addressed in a variety of ways at the project level as discussed in Section 2. Nevertheless, untangling the relevance and value of model information for decision-making under high uncertainty and in a future that is beyond the scope of the decisions being analyzed, continues to be a subject of debate and experimentation within ACCCA and indeed the broader adaptation community.

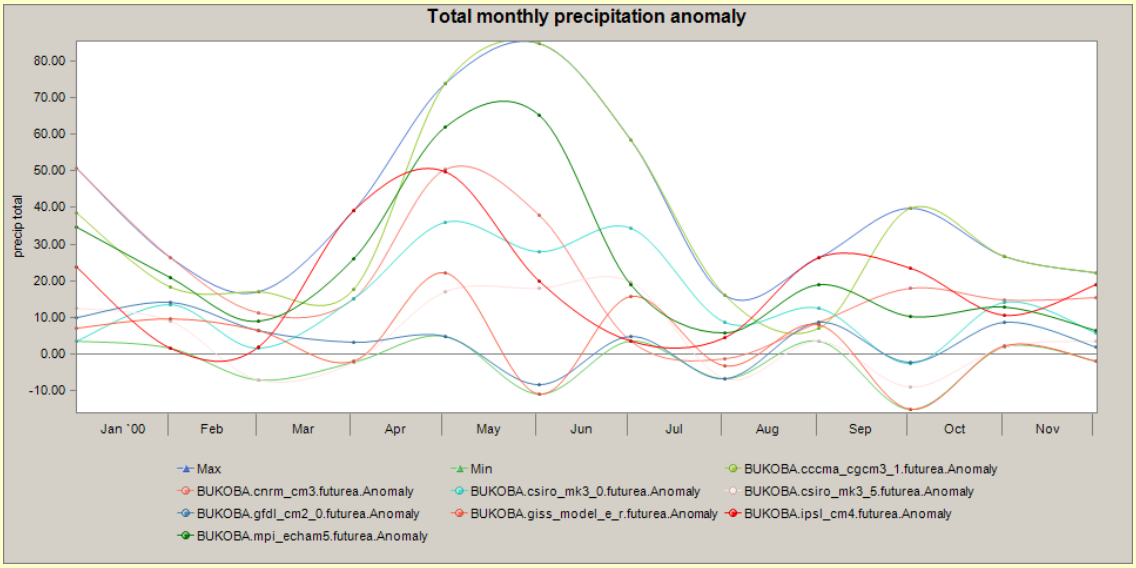
CLARITY OF MESSAGE AND CREATIVE COMMUNICATION AVENUES

Message clarity and relevance for pilot actions requires the synthesis and collation of a large and complex set of information and knowledge, often from very specialized sources and/or a recombination of primary information to provide project relevant insights and action items. Developing key messages is indeed one of the most challenging aspects of working in climate science for adaptation decision-making. Throughout the ACCCA project, learning to temper our statements in line with a growing understanding of uncertainty and how to communicate this has been a particular and enduring challenge, particularly in light of the time, resources and expertise available within each of the pilot actions. An example is provided in Box 4, where "grill sessions", an innovative process of interactive learning to communicate climate science were implemented. This creative exercise gave participants the opportunity to learn that the existence of uncertainties does not mean that climate change science cannot provide information; instead it means that interpretation needs to be contextualized and applied carefully.

LEARNING BY DOING

During the climate science lectures of a training workshop held for African pilot actions, many of the teams indicated that they found the lectures difficult to follow and overly technical. There was a sense of being overwhelmed by the complexities of climate science and not understanding the implications for the execution of individual projects. Indeed, it appeared that the research and analysis required was not feasible within the limited budgets and timeline, and reflected a common challenge of over-anticipating the available capacity of the pilot action teams. However, subsequent hands-on exercises, which offered ready, spreadsheet-level access to the exploration of model information provided pilot actions with the opportunities to "demystify" the complexity of climate data and showed the value of applying principles of learning by doing at the project level. Creative ways to promote this kind of interaction need to be explored and financial mechanisms established to support their advancement in the future.

Box 4: Example of Creative Communication and Clarity of Message: "Grill Sessions"



Following a discussion on uncertainty and confidence, an interpretive exercise was conducted where Bruce Hewitson, the head of the climate science team was asked to interpret the above figure, created using the Climate Change Explorer Tool. The figure shows mid 21st century expected changes (anomalies) in rainfall across a range of models from the IPCC 4th Assessment Report Model Archive, downscaled to the Bukoba station, located in Northern Tanzania. The ensuing discussion showed that a careful use of language is required when conveying the value of information presented in the models; namely, what can you say with confidence versus what details you might need to use expert judgment to speculate about, and the pitfalls of over-interpretation. In this case for example, during April and May, all models indicate an increase in rainfall = high confidence. While the range may not be important (how much rainfall is projected to increase during those months varies significantly between models (5-80mm), they all indicate a wetter April and May. The month of June, on the contrary, appears to be "uncertain", with some models indicating an increase and others a decrease in rainfall. Moreover, understanding of the climatological context of the station is paramount, even the impact of a 40-80mm change in rainfall needs to be weighed against total rainfall observed during those months. If average rainfall for the month at this station would be hypothetically 1000mm for the months of April and May, a 80mm change would not be significant. These and similar exercises served to illustrate the challenge of developing key messages from model data, emphasizing the relevance of model outputs for adaptation planning considering specific contexts.

One innovative approach to learning by doing implemented in the training sessions was the "grill the climatologist" sessions. These "Grill Sessions", a process where experts verbally walked through the

V. LOOKING FORWARD

Time pressures, a lack of understanding or familiarity with specific disciplines and terminology, varied understanding on meanings of specific words, patience and other requirements of learning by doing; all of these are challenges that must be addressed in establishing an effective two-way dialogue for collaborative work on adaptation decision making. Encouraging participation and dialogue, understanding the level of detail required, knowing the assumptions that must be considered, listening, sharing key issues and strategies are all important first steps taken within the ACCCA project towards establishing a community of practice around the use of climate science for adaptation planning. This section outlines several future engagements that seek to improve on the lessons from the ACCCA project.

CLIMATE CHANGE EXPLORER CCX

User feedback on the design and functionality of the Climate Change Explorer tool since it's release two years ago forms the basis of a recent effort to develop an improved, server side application currently underway with the support of the C3D+ project and other resources. The new tool will address many of the concerns and interpretive challenges users have encountered in the application of climate science information for adaptation planning. It will also enable progressive updates as new climate model assembles are made available.

WINTER SCHOOL – CLIMATE SCIENCE FOR ADAPTATION DECISION-MAKING

A two-week long course on the use of climate science for adaptation decision-making is currently under development with the support of the C3D+ initiative. The course draws on the lessons learned in the analysis and communication of climate science from the ACCCA project, with the aim of equipping development and adaptation practitioners with a robust understanding of the use of climate science and model information for adaptation decision making. The course is a first step in developing a professional curriculum.

WEADAPT: GOOGLE EARTH ADAPTATION LAYER

Using Google Earth as a platform to share experiences, lessons, risks communication strategies, and climate data for adaptation planning was a initiative launched in Poznan (COP14) by the weADAPT partners. The next version of the Adaptation Layer provides the facility to have a dynamic web-based database and a tour "feature" that will allow users to "travel" through different adaptation projects and scenarios, while listening to the narrative of groups at risk and stakeholders explaining their perspectives on climate risk, climatologists interpreting down-scaled climate data, and policy-makers describing different climate change issues and adaptation decisions. The collaborative wiki platform of weADAPT continues growing as more users access it and contribute its expansion. The next upscale of weADAPT.org will link wikiADAPT and the Adaptation Layer in a dynamic information system to share information and data on climate adaptation through a process of social learning.

DEVELOPING NEW SOURCES OF CLIMATE CHANGE DATA

Whilst trying to provide downscaled climate data for ACCCA and other projects it has become apparent that point station data used for the statistical downscaling is often not available for particular locations, especially in developing countries where observations have not been collected, there are too many missing data or data are not reliable. This is particularly

problematic for applications and impact models that require data over wide areas e.g. streamflow and water resource modelling that require data for a whole river catchment. Therefore techniques are under development to use gridded satellite-based observations and reanalysis products in place of the station observations. A second related aspect is that whilst statistical downscaling provides a reliable method for downscaling most of the rainfall, it does not capture potential changes in maximum rainfall and some aspects that may affect flooding (though it does provide an indication of the likely direction of change). Regional Climate Models can provide useful complementary information in this regard and methods for integrating the two approaches are being investigated. These developments will be enhanced with the creation of the data archive to serve the IPCC 5th assessment report, which will come online later in 2010 and will serve daily data for continuous periods between 2000 and 2050 – addressing part of the need expressed by pilot actions for near-term climate change data. Whilst these advancements in the ability of climate science to serve relevant data and information are welcome, problems related to interpretation and ability to use the information for policy and adaptation planning, as highlighted in this report, will remain.

PART II: RISK COMMUNICATION

LESSONS LEARNED BY PILOT ACTIONS

AND RISK COMMUNICATION SUPPORT TEAM

June 2009

Prepared by Jon Padgham and Tahia Devisscher

with contributions from START and SEI Oxford

1. OVERVIEW ON APPROACHES AND PRINCIPLES

Despite considerable scientific progress in understanding potential impacts of climate change, communicating those impacts in the context of risks to society remains a challenge. Most climate change impact assessments produce information in forms that are not readily used by stakeholders and decision makers, and adaptation efforts have generally failed to appreciate the critical importance of communicating risks in an understandable, credible and relevant manner as a prerequisite to action. The failure to develop effective risk communication has contributed to confusion and misunderstanding, and thus inaction towards developing more robust climate risk management measures.

The need for effective climate risk communication is particularly great in many areas of the developing world where vulnerability is extensive and adaptation planning is largely absent, stemming from poor understanding and awareness of the long-term impacts and implications of climate change on livelihoods and development, low institutional capacities to relay information, and lack of access to resources to support adaptation. Mobilizing decision makers across these societies to take actions that will enhance their ability to better manage climate risks and adapt to climate change is essential, given the extent to which sustainable development is impeded by highly variable climatic conditions and by extreme events and the likelihood that climate change will amplify these unfavourable climatic conditions.

Building effective risk communication systems requires developing the capacities, knowledge, and communication infrastructure of, and fostering active partnerships between, scientists, policy makers, civil society and members of vulnerable communities. The ACCCA project has sought to respond to this challenge by supporting pilot actions on climate change science and risk communication targeted at highly vulnerable groups across Africa and Asia. The climate risk communication efforts undertaken in the pilot actions have been designed to engage stakeholders (e.g. vulnerable communities, resource managers, development professionals, the private sector, and government policy makers), with scientific groups early in the process, and continue this process in substantive ways throughout implementation. The project teams have worked to ensure active engagement through actions that:

- promote participatory dialogues between stakeholder groups and scientists that can lead to 'social learning' by all participants, greater stakeholder ownership over the process, and enhanced communication between vulnerable communities and policy makers;

- enhance the relevance of the information by communicating climate risks in a broad multi-dimension context that frames vulnerability to global environmental change as a function of multiple stresses, and one that is strongly influenced by social, economic, environmental and governance factors;

- develop varied and flexible communication tools and methods that resonate with a broad range of stakeholders;

- build stakeholder capacity in multiple and reinforcing ways through in-depth learning about risks and vulnerability, training on assessment methodologies, surveys, and risk

communication, and by empowering vulnerable communities through knowledge generation and sharing; and

- engage the media (television, newspapers, and radio) in disseminating climate risk messages more broadly across society.

The pilot action teams sought to develop and present accurate, relevant, and useful information in relation to lives and livelihoods, and to convey information on important climate changes now and in the future, how this translates into risks, who will be affected and where, and, with stakeholder input, develop potential actions that could be taken to adapt to the situation. Three are the broad activities carried out by pilot actions to support this process:

a) Preparation of climate change science-based risk communication methods and tools to approach local, regional, and national scales.

b) Implementation of risk communication strategies in ACCCA project sites and countries.

c) Identification and/or implementation of activities that directly enhance the livelihood options of vulnerable communities: development of adaptation options/measures based on robust decision-making.

This synthesis paper describes the context and process through which ACCCA project teams developed climate risk communication strategies, the outcomes of that effort in terms of development of communication tools and methods and in the diversity of stakeholders reached, capacity building engendered through the projects, and concrete actions taken by stakeholders. The paper also identifies supporting policies, institutional strengthening measures, and additional capacity building would be needed to sustain the effort, and what risk communication tools could be scaled up and what resources would be needed to support that effort.

2. Project Approaches to Risk Communication

2.1 Key strategies and considerations for risk communication

Context for developing communication strategies

The ACCCA pilot actions teams produced diverse communication strategies reflective of the social and cultural norms under which the projects operated, the types of risks faced by vulnerable communities and how those risks inform decision making, as well as sources of and gaps in stakeholder knowledge. The pilot actions primarily targeted rural communities (e.g. village residents, subsistence smallholder farmers, local leaders, as well as community schools and organizations) and the relevant institutions that interact with those communities, such as municipal-, district- and national-level governmental agencies, as well as local and national NGOs. Thus the definition of stakeholder group was fairly broad, encapsulating local as well as district and national levels.

The main focus of the communication effort concerned risks to rural livelihoods (e.g. crop production, livestock and pastoralism, and fisheries) and to human health from climate-based hazards. These hazards were identified in terms of potential changes in the hydrologic system, manifested as a greater severity and frequency of floods and drought, increase in high intensity precipitation events and increasingly erratic rainfall, combined with temperature rise. Strategies that could help vulnerable communities adapt to these increased risks were framed in terms of current climatic and non-climatic stresses to livelihoods and to the resource base, the prevalence of current risks resulting from climate variability and extreme events, and the likelihood that shifts in weather patterns produced by climate change will amplify existing climate stresses, and interact with non-climate stresses, to exacerbate vulnerability.

ASSESSMENT OF STAKEHOLDER KNOWLEDGE

The process of developing appropriate risk communication strategies was informed by assessments, conducted early in the project timeline, to determine the baseline status of stakeholder knowledge of climate risks—their awareness of and current practices for managing climate risks, where sources of knowledge reside within communities and where knowledge gaps exist, and perceptions of risk. Knowledge assessments at the community level were largely conducted using household surveys and participatory group discussions to gain insight into pre-project understanding among communities about the climate-relevant issues they face. The assessment of policy-maker knowledge about climate risks was done through individual meetings and formal workshops.

Understanding the local decision making context for climate risk management and the baseline status of climate-related knowledge helped the pilot action teams to better understand information needs and tailor communication strategies. In addition, the use of participatory fora in many of the assessments enabled a process of early stakeholder input, resulting in the occurrence of social learning between pilot action teams and stakeholders, which was seen as a key factor for producing information that could be used by stakeholders and acted upon.

Through the process of doing a knowledge assessment, most of the pilot actions observed that local knowledge of current climate risks was substantial, and the perception that the local climate was changing, through changes in local weather patterns, was quite evident amongst surveyed communities. For example, local communities were aware of changes in rainfall and water availability, as in the case of herders in Mongolia who noted a decrease in snowfall and disappearance of springs, small streams and lakes leading to an intensification of dry periods; and communities in Bangladesh who are experiencing a gradual increase in salinity and drought. Presently, the coping strategies that communities within the pilot action areas use to respond to climate risks are generally geared towards reducing their exposure to current climate variability and to a lesser extent to climatic extremes and change, though some pilot actions detected more proactive planning. For example, communities in Nepal are establishing Community-based Disaster Preparedness Units and are implementing community-based disaster preparedness practices.

Across the pilot actions, there was no substantive local understanding of climate change as a global and an enduring phenomenon, nor of the risks of long-term climate change to their livelihoods. For example, the project team from India noted that "Vulnerable communities are experiencing some changes in weather patterns but are not so much aware of climate change

per se. Many among the community members believe that this change is a temporary phenomenon. Because of this, it is believed that there is no real need to change current behavior since conditions will be back to normal in some time." Policy makers in many of the project countries had some awareness of issues related to climate change and variability at the national level and a few institutions (i.e., research centres, NGOs) were knowledgeable about climate risks affecting the project site. However, the overall awareness level of climate risks amongst policy makers was inadequate for supporting effective policy development that would address increased risks to vulnerable communities. Additionally, the pilot action teams noted very little use of climate data and consideration of climate projections in decision making processes and planning.

USE OF RISK COMMUNICATION TOOLS AND METHODS

Pilot actions employed different methods and tools to communicate climate risks. Some teams produced videos and showed them in combination with folk drama and music, and followed this up with guided discussions. Other teams produced brochures and posters that were discussed at community gatherings, while still other teams prepared reports, concept notes, briefs, PowerPoint slides and papers that were presented and discussed at workshops with practitioners, policy-makers and/or the scientific community. Table 1 below summarizes risk communication tools and methods used by some pilot actions..

In most of the cases, pilot actions combined different tools to communicate climate risk to different stakeholders. For example, in order to create awareness at the local level, the pilot action team in India developed an awareness programme that involved a village gathering where a poster is presented by a community leader, followed by folk music with lyrics pertaining climate change and an interactive theatre where the main narrator involves community members in discussing solutions with an expert in climate change and the village leader. To disseminate the discussions and create further awareness, a local radio converted the interactions during the event into radio programmes for broadcast. At the same time, the pilot action team in India sought to create awareness at the district-level by distributing brochures to policy-makers and scientist working in the region, as well as by discussing concept notes and PowerPoint slides at district-level workshops and stakeholders' consultations. The team in Ghana also used a combination of strategies, including drama, traditional drums, role-plays, group discussions, posters, flyers, papers, and radio and TV casts. Dramas portrayed messages about the link between climate variability and malaria and other diseases, posters were discussed at trainings with community leaders, and radio and TV stations captured the trainings to reproduce modules through a series of broadcasts. More detailed descriptions on the strategies used by some pilot actions to communicate climate risk are presented in the case study boxes in Annexes.

Insights about how to produce effective climate risk communication emerged from across several of the pilot action teams. These included:

- The use of local language is critical for effective risk communication.
- Interactive strategies such as folk dramas and role-plays have more impact among local groups compared to other strategies such as dissemination of brochures and/or informal meetings.

- Quantitative approaches to communicating information about climate risks is less successful for reaching local communities than narrative approaches that relied on examples to convey information.
- The use of diverse public spaces (including schools, governmental buildings and rural markets) to display large size posters increases their impact on local stakeholders.
- A tightly focused agenda helps to enhance the impact of meetings.

TABLE 1. EXAMPLES OF RISK COMMUNICATION STRATEGIES IN THE ACCCA PROJECTS

PILOT ACTION	LEVEL OF ACTION	Strategies to communicate risk	Outcomes
Mali	Local communities and national level	**Material:** CD ROM produced by local communities and documents written in local language. **Strategy:** CD ROMs and documents were disseminated among local NGOs, local authorities and residents of the project sites. Audiovisuals (photos), theatre and music were used to communicate in simple language the risks related to climate change. Trainings on how to use these techniques/ audiovisual materials were given to local NGOs and residents of each site.	Enhanced capacity of local authorities and residents to integrate climate risks in decision-making processes.
Malawi	Local farmers	**Material:** two video tool sets (a video tool set for training Red Cross staff and volunteers on climate change predictions and adaptation and a set of audiovisual tools to support community-based adaptation. **Strategy:** through collaboration between the Red Cross and the Meteorological Services, subsistence farmers learned how to operate a video camera, develop a script and make a film showing examples of the adaptation practices they have been developing. The film was shown in neighbouring villages, and its effect was evaluated through surveys and video interviews.	Through a participatory process the project team is able to communicate the risks. The participatory video was very empowering, enabling local groups to take action to solve their own problems and to communicate ideas to decision-makers and/or other groups and communities. It is feasible for vulnerable people to make an educational film reflecting their own perspective, and people that watched the film have learned the main messages. Thus, participatory video is a suitable tool for up-scaling successful community-based adaptive measures.
Kenya (drylands)	Subsistence farmers	**Material:** reports for practitioners, papers/articles for scientific communities; DVD/ Video for general use.	Involvement of farmers as training of trainers helped to speed up change and adoption.

		Strategy: workshops with stakeholders to disseminate the material are intended.	
Nepal	Municipality and district level	**Material:** oral presentations, documentary show, poster and brochures. **Strategy:** Brochure and posters were distributed and documentary presented during workshops.	Communities have improved their capacity to interpret and integrate climate risks into their own decision-making processes Project team improved capacity in producing communication material, organizing local group mobilization, collaborating with other stakeholders, and implementing evaluation tools.
India	District level and local level (rural communities and local research institutions)	**Material:** brochure communicating the impact of climate change in the area and possible adaptation strategies Includes a brief summary of the about the India's "National Action Plan on Climate Change" and is developed in two languages, English and Hindi. A concept, in addition to a set of PowerPoint slides with research findings. Furthermore, communications programme to create awareness at community-level. **Strategy:** brochures were explained and handed over in person to policy makers and scientist in the region. The concept note and PPT were presented and discussed with decision makers at stakeholder consultations. In addition research findings and the brochure were widely disseminated to various government and other agencies operating in the area. Communications programme was implemented a community gatherings including a poster ceremoniously unveiled by an important figure in the village, folk music an interactive local theatre, and the involvement of the community audience in discussions on solutions with an expert and the village leader. Community Radio converted these discussions into radio programmes for broadcast.	A Core Group of decision makers has been formed to meet regularly and discuss climate change issues in-depth with the aim to formulate and implement an appropriate strategy and an action plan for the district. The project team has indeed learned how to use the various media to communicate risk in a correct but positive manner so as to induce preparation rather than panic among the stakeholders. Furthermore, the team's capacity to conduct dialogues and communicate the risks has been greatly enhanced.
Philippines	Local level (farmers and local governmental agencies) and national level (national governmental	**Material:** climate change magazine popularized and translated into local dialect. Video produced and translated into local dialect. **Strategy:** both communication materials were reproduced and disseminated to all stakeholders.	Project team more confident in assessing climate risks if given the chance to do similar things in other site. Stakeholders are more aware

	governmental agencies and research institutions)	and disseminated to all stakeholders.	They recognize they are vulnerable and are interested in exploring adaptation options that are specific to their context.
Bangladesh	Local level (households, schools, and local governmental agencies and NGOs) and national level (governmental agencies and local level NGOs).	**Material:** posters and brochures to be used in the communication strategy. **Strategy:** based on participatory risk assessments, a communication strategy has been developed, and Union level (cluster of villages, lowest tier of local government Local Adaptation Plans have been promoted. Posters and brochures have been printed and distributed in communities, schools, village markets, and all local government offices. Posters have been posted in visible public places in the 3 project areas.	Local community members are more aware about climate change and its risks. Project team has improved its capacity to communicate climate risks in clear and relevant terms to a targeted audience of stakeholders. Union level local Adaptation Plans were developed mainly based on community inputs.
Ghana	Local level (households and community leaders), district level (universities and district assembly) and national level (governmental agencies and health service environment companies).	**Material:** drama, role-plays, group discussions, posters leaflets, photographs, documents, radio casts, and traditional drums. **Strategy:** dramas relayed the message about climate variability and the links to malaria and other diseases. At training workshops, leaders from various communities were given posters that describe the link between climate change and malaria/guinea worm. The posters were designed to use at community level to create awareness among people. Local radio and TV stations captured the trainings, which included modules on: (a) concept of weather, climate variability and climate change; (b) strengthening local capacities in managing climate related risk; (c) medium and long-term adaptation to climate risk and (d) communicating climate risk management. In addition, an article on climate change and guineaworm infestation is being prepared for national dissemination and an international paper has been prepared for presentation at a conference in South Africa.	Project team members have gained practical experience in effective communication of climate risks through interactive and participatory approaches. Awareness of the impact of climate change at the community and national levels has been enhanced through project dissemination via local radio and national television and through the involvement of relevant stakeholders. National health service personnel were trained on climate change impacts, as were members of the National Guinea-worm Eradication Programme. The workshops also attracted stakeholders from other national organizations and ministries.
Mongolia	Local level (herders and local authorities) and national level (Ministry representatives).	**Material:** brochures, video, TV program. **Strategy:** the brochure "Desertification is Knocking at Your Door" was distributed to local communities. Participatory meetings were also hold in communities to show and discuss a video depicting effects of drought and poor pasture management, as well as good land	Local observation, data information and knowledge were gained. There was a great deal of social learning in both ways. Capacity of local authorities and residents to integrate climate risks in decision-making

		management practices for the project sites. The brochure "Policy on climate change adaptation of pastoral systems was also produced and disseminated to communicate information on climate risk and adaptation to herders, local government officers, and national policy makers. Finally, a TV program on climate change adaptation policy will be produced, and 6 local participatory workshops held for local government officers and vulnerable herders groups. These will help identify adaptation options to increase resilience and will involve social learning, scoring of adaptation options, and using scenario-building methods.	processes was enhanced, and the collaboration between different stakeholders on climate change issues was improved.
Tanzania	Village level (three village communities involved in agriculture and fisheries activities) District-level (local government officials).	**Material:** Informal discussions, brochures, video material and TV programme. **Strategy:** Visits and meeting were conducted in collaboration with a local NGO. Risk was also communicated through media and various national strategies.	Communities interacted with local government officials. Trust was created between communities and government officials. Communitie's quest for the video for future use as it was considered to be the first documentation of their livelihood problems.
Kenya (malaria)	Subsistence farmers, health service providers	**Material: Workshops,** radio broadcasts, songs and dance pamphlets and posters **Strategy:** Health promoters were selected and trained during workshops on the links between climate change and malaria, as well as preventive measures (e.g. use of Napier grass). Two malaria control groups were established in the project sites. The groups are in charge of further disseminating information on preventive measures among community members..	The selection and training of health promoters embedded ownership of the project in the communities.
Nigeria	Artisan fisher folks in coastal area. Coastal management planners and policy makers.	**Material:** Photo documentation of flood risks in project area, video clip: "On the trail of a storm surge", project information brochure, power point presentation of study findings at workshops and stakeholder meetings, newspaper publications, television report, poster for policy makers on adaptation options for coastal communities, posters for communities in English and Yoruba language, policy brief and executive summary for policy makers is being developed **Strategy:** The materials were disseminated at stakeholder meetings and workshops while the posters will be distributed to households and schools in the coastal communities and local and state government offices. Project's communication material was tested by eliciting feedback on content from target stakeholders.	Communication to policy makers and planners received favourable response as target audience indicated that their knowledge of climate risks in the coastal communities was increased by the workshops and stakeholder meetings.

2.2 IMPACTS OF RISK COMMUNICATION STRATEGIES ON DECISION MAKING

POSITIVE OUTCOMES OF RISK COMMUNICATION

The risk communication strategies produced rewarding effects on several levels in that community concerns were given voice through the multi-stakeholder dialogues with policymakers; the trainings and dialogues contributed to a growing realization among policymakers of the implications of climate change on sustainable development within their countries; and the nature of participatory development and testing of risk communication material gave a sense of stakeholder ownership over the learning process and engendered capacity for action. Importantly, the insights and skills in risk communication gained through the pilot actions can potentially be replicated in other contexts.

Overall, the pilot action teams expressed satisfaction with the outcomes of the risk communication efforts. Their responses included:

- Mali: "The project enhanced the capacity of local authorities and residents to integrate climate risks in decision-making processes. For instance, in Massabla the community has decided to protect the areas where they are planting trees and organizing hunting activities. The protected areas help the community to conserve biodiversity and thus improve resilience to climate risks."

- Malawi: "The capacity to interpret and integrate climate change risks into the community's decision-making processes can be demonstrated by the development of a community based early warning system and community based contingency plan in case of a disaster."

- Philippines: "During focus group discussions, participating stakeholders were given the opportunity to describe climate change related problems they were facing. During the training workshop, participants from various institutions recommended policy revisions and programs that would promote adaptation to climate change."

- Mongolia: "The project enhanced the capacity of local authorities and residents to integrate climate risks in decision-making processes. For instance, in Hujirt *sum*, after fencing a spring to protect against grazing, the local government was discussing whether to fence a second spring to further protect water resources."

- Kenya: "The communities are now able to link conditions of heavy rains and high temperatures with increased malaria risk, the local government officials are now willing to place malaria as a priority issue of concern and apply for national development funds to combat it, and the local dispensary is better able to provide malaria testing and treatment."

- Tanzania: "The project enhanced the team's capacity to interpret and correlate narrated stories and climate information. Climate information helped to authenticate communities' narration and to reach consensus, it also contributed to estimate the scale of climate impacts for different seasons."

- Niger: "The local population knowledge was improved on the causes of climate change and the possibility to take action to improve their resilience. They also understood they can participate in reducing the causes through their day to day activities avoiding not environmentally-friendly activities such as wood cutting, burning, etc."

Network building was another important legacy of the ACCCA project, with several of the project teams reporting an increased potential for developing integrated problem solving between institutions and for enhanced communication between local communities and policy makers. For example:

- Malawi: "The Red Cross, MetMalawi, Malawi Institute of Management's Audiovisual Unit and IIASA's researchers plan to create a sustainable partnership for disaster management and climate adaptation in Malawi, and lay the foundations for scaling up this innovative approach in other developing countries. Outputs will include the production of video tools, posters and other materials to support adaptation at the community level though a participatory process. The project will also improve institutional cooperation and decision-making processes in order to mainstream the availability of new information about climate risks and adaptation options into existing community programs."

- Niger: "A partnership was established between local population and the following intervening institutions: Ministry of environment and desertification control; local NGOs; Sahel and Sahara Observatory; University of Niamey; and the Directorate of Meteorology. A local task force composed of local mayors and representatives of the above institutions was put in place."

- India: "As a result of this project, stakeholders (local research institutions, NGOs and government line departments) now understand and appreciate each other's roles better and are communicating with each other. They have started thinking in local terms about what is perceived to be a global problem, and are coming together with enthusiasm and fresh perspectives."

- Mali: ACCCA helped promote the establishment of Reso-Climat, an institutional data and information sharing arrangement. Participating institutions include: national scientific research institutions, international NGOs working in Mali, local NGOs, and governmental bodies.

- Nepal: Institutions of relevance to climate change had no interaction with insurance institutions prior to the project. Now, a partnership has been formed across these and with the Nepal Red Cross Society.

- Mongolia: The ACCCA project promoted collaboration between a Mongolian NGO and the government. The Global Change National Committee was established for Mongolia in order to facilitate communication between scientific institutions and policy makers.

- Ghana: The cross-sectional representation at the trainings, and participation of all relevant stakeholders in the project, enabled open communication across stakeholders.

- Kenya: Outreach and communication among the five stakeholder groups was embedded in the project design. Each site used a Participatory Rural Appraisal (PRA) to bring together the pilot communities, identify different groups, and form a working group that was representative of them. The multi-stakeholder project team (MPT) in each of the two pilot sites comprised three working group representatives, three health promoters, two scientists, two health service providers, and one NGO. The role of this team was to share information and encourage communication across the two sites.

CHALLENGES ENCOUNTERED IN DEVELOPING RISK COMMUNICATION STRATEGIES.

Three broad challenges arose with regard to the communication of climate information. They were:

1. *Presenting complex climate information in locally-relevant terms:* Several of the teams expressed difficulty in relaying technical and scientific information in an easy-to-understand manner because of the complexities of the subject and the tendency for the nature of the scientific information to become transformed during translation. For example in Kenya, the project teams reported that it was difficult to maintain the original intent of the messages on climate change and malaria during translation from English to Swahili to the local languages. In Ghana, communities had difficulty making the connection between anthropogenic actions and climate change, and were of the opinion that climate change, being an act of God, is unavoidable. However, the creative use of drama, songs, and storyboards aided the learning process and helped to diminish the inherent difficulties of relaying complex information.

2. *Using diverse approaches to conveying climate information within individual projects:* Climate risk communication strategies had to target multiple stakeholder groups with diverse backgrounds, educational levels, and priorities with respect to climate-influenced decision making. For example, the Philippines project on climate risks to water and land management in upland areas demonstrated strikingly different decision making contexts: priorities for upland farmers concerned the choice of crops and timing of planting, for local governments the priorities were health policy, disaster risk management and domestic water supply management, watershed management was important for the government forestry agency, while the main priority for the National Power Corporation concerned hydropower generation. In Nepal difficulties arose in conveying the results of downscaled models during a series of participatory workshops in various local units for which community members were randomly chosen. It turned out the range of educational backgrounds in the meeting was vast, which proved a challenge in communicating scientific information. The team realized that people with the same educational level (preferably teachers, high school students or NGO workers) should be chosen for such meetings and trained, and then asked to disseminate the information further.

3. *Providing information that the communities perceive as relevant:* For the most part, communities seemed generally aware that the climate was changing. However, they often wanted information that was of a shorter-term nature than that provided; weather

information, such as weekly to seasonal forecasts, rather than climate information; and relevant climatic information in areas where gaps still exist (e.g., communities in Nepal wanted more information on hail and lightning trends). The short-term nature of these information needs underscores the fact that while communities may come to recognize the importance of long-term changes in climatic trends, coping with short-term fluctuations is a primary concern for them. On the other hand, the technical professionals and policy makers involved in the projects were generally able to take a longer view of the problem. The different information needs at local and national scales implies that longer term planning is perhaps more appropriate and effective at national scales.

2.3 CAPACITY BUILDING FOR RISK COMMUNICATION

Capacity building occurred at multiple levels over the duration of the project and was central to the process of developing effective climate risk communication. The project teams, through the process of executing the pilot actions, were exposed to multidisciplinary learning opportunities and became more skilled in analysis, assessment, and communication. For example, project team members:

- engaged in in-depth learning about sector-specific climate risks;
- gained first-hand knowledge of the constraints and opportunities that vulnerable communities face, and learned methodologies for conducting vulnerability assessments;
- received training in data collection, use of GCM models, downscaling, and GIS;
- became adept at facilitating participatory discussions and communicating complex issues in a manner that could be understood by stakeholders of various educational and professional backgrounds; and
- learned how to effectively use different kinds of media to communicate risks.

Developing and implementing risk communication strategies not only benefited project stakeholders, but it also enhanced communication capacity of pilot actions teams and improved capacity to integrate local know-how. For example, a series of trainings in risk communication and facilitation of participatory processes at community-level helped several of the pilot action teams to improve their capacity to communicate risks and to organize local group discussions. Teams also improved their ability to produce risk communication materials, such as posters and brochures, as well as documentaries and radio broadcasts, and to integrate local perceptions and know-how into participatory videos, folk dramas and music that enhanced the process of social learning.

TRAINING OF TRAINERS

Rather than aim at informing a finite number of individuals directly through the project teams, some projects initiated a 'training of trainers' approach that could potentially have a cascading effect on information dissemination and thus a much wider reach. These trainers were taught about climate change and its interplay with existing community vulnerability, modes of communicating risk, and participatory approaches to community learning. For example, the

pilot action in Mali distributed a poster with graphics explaining model outputs to community leaders and local NGOs, which in turn disseminated this information further in the 3 project sites. The Bangladeshi team produced posters that were discussed with key community representatives, who then distributed the posters in public places (e.g., schools, government buildings, markets and rural shops, etc.) of project sites. The team in Ghana gave a 3-day training to key local leaders on climate risk management related to guinea-worm infection. The leaders in turn shared what they learnt with households at their communities.

Trainers were selected from across the spectrum of stakeholder groups. For example in the Kenyan project to reduce malaria incidence, multi-stakeholder working groups were assembled comprising village-level health promoters, scientists, NGO workers, representatives from health service providers (nurse or clinical officer), and people in the area of health policy (district public health officer). In Malawi, extension workers and Red Cross staff and volunteers were trained in risk communication methods and climate change projections and adaptation strategies, while in Ghana village leaders and other people with high stature within local communities were trained, in addition to training professional staff (Box 1). Selecting trainers perceived as having credibility within the stakeholder communities was an important consideration.

Box 1. 'Training trainers' about Malaria Risk and Guinea-worm Infestation in Ghana

In Kwabre district, 120 community leaders, traditional leaders and stakeholders from university and the district assembly were trained to be trainers or trainers about malaria epidemics relating to climate change. It was estimated that this workshop would ultimately lead to the training of over 200,000 people in the district.

- 40 opinion leaders and household heads were given a 3-day training on climate risk management relating to guinea worm infection.
- Staff from the National Health Service and from the National Guinea-worm Eradication Programme were trained on the association between climate change and the incidence of guinea-worm infection. These trained personnel then disseminated climate change information on guinea-worm infestation to local communities.
- The director of the health services in charge of the area, a public health specialist, and twelve other district health workers were taken through a one-day orientation of climate change impact on malaria incidence and prevention.

ROLE OF RISK COMMUNICATION SUPPORT TEAM

A risk communications support team was established within the ACCCA project to provide technical support to all pilot actions on matters related to risk assessment and communication. The team worked in close coordination with the climate change science support team (see Part I of the report). The role and specific activities of the risk communication team are described in the Box 2 below.

Box 2. Responsibilities ACCCA Risk Communication team

1. Liaise with the pilot monitoring team to identify the needs for assistance in the area of risk assessment and analysis to each pilot action.
2. Provide technical assistance and guidance on climate change risk assessment and communication to all pilot actions, including guidance on the selection of appropriate and relevant methods and tools that can be used to develop communications materials and establishing successful dialogues for addressing risks.
3. Develop where necessary guidance materials and documents rel ated to risk assessment and communication.
4. Organize or participate, where appropriate, as resource person in the training workshops to be held on risk communication and assessment.
5. Contribute to field visits decided by the monitoring team where requested, to monitor the pilot action in addition to the local team knowledge.

The risk communication team held two technical assistance workshops. The first one was held in Cape Town in 2007. The first two days of this workshop were taken up with teaching on climate science and tools, and data and climate information analysis. The third day was devoted to Communications and Adaptation. This session was designed to get ACCCA project leaders and experts to consider the way in which they deliver messages about climate, vulnerability and adaptation as well as building the knowledge base on which their work is premised. Role-play sessions were conducted to exercise how to communicate a composite message in difficult conditions (time, space and available information). The second technical workshop was held in Bangkok in 2008 at which the Asian project teams were guided through information on tools, data and methods required to successfully implement the pilots. The workshop covered climate projections, risk assessment, the formulation and implementation of adaptation strategies, and risk communication. Risk management approaches discussed at the workshop focused on addressing current climate risks within the context of potential long-term impacts.

In addition, the team produced guidance and compiled reference documents to support the formulation and implementation of risk strategies. These documents have been compiled in the ACCCA site, which is a database of all the material produced by the pilot actions, as well as by the project support teams. Documents and presentations produced by the risk communication team and pilot actions can be found at:

http://www.acccaproject.org/evolution/modules/knowledgebox/external2/index.php?kbid=2

Some examples are:

- Risk Communication on Climate Change and Variability
- Identifying Climate Vulnerability Exposure
- Risk Communication and Social Learning (a presentation on communication of climate risk

- Risk Communication for Adapting to Climate Change (risk communication session in Bangkok)
- Developing Communications Strategies (ENDA presentation)

2.4 MAKING DECISIONS FOR ADAPTATION

Through actions that supported awareness raising and capacity building, communities were empowered to develop response strategies aimed at bolstering climate risk management and adaptive capacity. Most of the adaptation decisions were related to water resource management and agricultural practices that would enhance the resilience of production systems, while contributing to food, water, and income security. Some pilot actions also focused on health policy, particularly related to water borne and vector borne diseases, and a few others identified adaptation mainstreaming, pre-disaster planning and risk management as priority adaptation decisions. In most of the cases, adaptation decision-making led to concrete local adaptation options and actions. Some examples include:

Bangladesh

Several adaptation options for different regions were favoured to pilot and test: In waterlogged lands (i) hydroponics, (ii) ring based vegetables, (iii) duck rearing, and (iv) fish trap making. In saline areas: (i) reed cultivation, (ii) mat making using reeds by vulnerable women, and (iii) crab cultivation. In drought-prone areas: (i) homestead drought-resilient vegetable cultivation, (ii) mini ponds/ditches for small-scale irrigation, and (iii) sheep rearing for indigenous women.

Malawi

The participatory video produced by the project stakeholders was screened in the communities of Kasache, Pemba, Mwanza, Maganga and Mphunga (all in the Salima District), and more than 100 villagers watched. The main adaptation messages filmed were: (i) the importance of crop diversification; (ii) irrigation farming; (iii) changing poultry/livestock options; (iv) building storm drains and planting elephant grass to protect against flood damage; (v) storage of food (keeping the grains in bags inside houses versus granaries, as bags are easier to transport when sudden floods happen); and (vi) early warning system (Red Cross volunteers alerting villagers to the risk of floods with whistles).

Mali

The adaptation options identified by the pilot action pertain to water supply and include: (i) the establishment of irrigation canals and infrastructure for the communities in Diouna, as well as access to potable water; (ii) rehabilitation of the village canal in Kiban, as well as installation of solar pumps to provide access to potable water; and (iii) construction of a small dam on the Mono river in Massabla, and installation of solar pumps to provide access to potable water. In

addition, one adaptation strategy in the project sites that could be further explored are micro-credit schemes, which could enhance stakeholders' capacity by helping them improve water management systems to cope with droughts and water scarcity.

Kenya (malaria prevention project)

Adaptation options to prevent malaria incidence exacerbated by climate change were implemented in each site. In Kebeneti, 1 142 houses were sprayed, as a result of which the malaria cases reported by the health clinic declined considerably. In Wekhome, the Emutete Swamp was restored by planting Napier grass, thus reducing malaria-carrying mosquito populations that bred in the swamp areas that had been cleared. During the field demonstration exercises for Napier grass planting, different issues wee discussed such as the planting methods to be adopted, the type of planting material to be used (which depended on availability and cost), appropriate seed spacing, planting distance from the water channels, and areas considered suitable for planting.

Kenya (livelihoods in drylands project)

Since most of the farmers in the project site are resource poor, the team recognizes the need for injection of capital to help the farmers implement rainwater-harvesting technologies such as construction and management of reservoirs. Moreover, training is needed to equip farmers with affordable, locally tested ways of harvesting run-off, which is a technology already in use by some of the farmers in the project site. Support is also needed to give access to farmers to drought tolerant tree seedlings and promote reforestation programmes in the region.

Nepal

The project identified two pilot actions as adaptation measures to weather and climate related disasters: (i) a weather and climate (including climate change) related information dissemination (WCID) scheme for the community developed by establishing interactive communication between National Meteorological Service of Nepal with the vulnerable community of Putalibazaar Municipality and suburbs; and (ii) a community based disaster insurance (CBI) in order to share disaster losses among government, community and insurance agencies.

Mongolia

Several community-level and policy level suggestions have been made for climate adaptation. During the participatory community workshops, adaptation options put forth included: (i) community based conservation and sustainable use of natural resources; (ii) the addition and protection of water points for additional pastureland; (iii) agreement between neighboring *sums* for communal use of *otor* and reserve pastures; and (iv) the enlargement of administrative territorial units by coming several *sums* into one unit to restore cultural landscapes.

For pastoral communities living in riparian zones, the following options were proposed: (i) diversification of the economy and intensification of the livestock industry through ecotourism and farming; (2) prevention of riparian ecosystems from degradation and desertification; and

(iii0 taking animals to *otor* pastureland during summer. Protection of springs from degradation by livestock was critical for communities living in the mountain and forest steppe.

Nigeria

Women groups were organized to share knowledge, skills and support activities that enhance adaptive capacity including livelihood diversification. In this respect two community training/empowerment programs were organized.

1) Post-harvest fisheries management: Practical field demonstrations on fish handling/smoking, fish meal production and fish feed production were given to one hundred fisher folks, mostly women beneficiaries, of the pilot communities. Improved fish handling and smoking, and fish meal and fish feed production has potential for enhancing the livelihoods and providing an alternative income generating source for the women folk while reducing the losses incurred during the flood periods.

2) Soap making workshops: Two soap making workshops were organized; one in each community. The activity was planned based on a participatory needs assessment of vocational skills for the women folk to complement their fish processing and marketing activities.

In addition, some of the identified coping strategies at the community level include: (i) building of flood bridges within communities and routes leading out of communities to aid movement; (ii) channeling of water from beels into the Atlantic Ocean as this facilitates the draining of flood waters within communities; (iii) sand filling of road tracks; (iv) use of canoes for transportation; and (v) moving communities closer to the sea.

Niger

Capacity building activities increased awareness among the farmers, stakeholders and policy makers, resulting in the integration of climate change adaptation in watershed management plans in the local districts of Diantiandou and Bitinkodji. Some of the measures implemented by local communities at individual level involve water-harvesting practices using techniques such as Zaj and half moon. Some of the adaptation measures validated by the communities are now increasingly being integrated in the revised NAPA programmes of Niger.

Tanzania

In Tanzania, adaptation options were suggested based on three priority areas identified by communities to have been the most affected by climate; these include food availability, water quality and quantity and energy sources. Climate can have considerable impact on the three priority areas given the fact that agriculture is largely rain-fed, fisheries activities are dependent on Lake Victoria's capture fisheries, energy source is based on forest products, and water sources are traditional wells.

To alleviate the impacts of rainfall scarcity and crop disease on agriculture, it has been suggested to introduce irrigation schemes managed by community production groups.

Improved livestock breeds and livestock keeping have also been suggested as adaptation measures to provide improved animal production. The introduction of fish farming has been proposed as an alternative to capture fisheries and initial efforts have shown communities acceptance of the practice. Construction of protected shallow wells and deep wells were identified to be ideal and reliable water sources. On the energy source issue, the introduction of woodlots for family wood requirements are expected to alleviate the energy problem in combination with the introduction of biogas for cooking and lighting.

3. LOOKING FORWARD

The diverse risk communication strategies developed through the pilot actions enhanced understanding by local communities and policy-makers of site-specific climate risks, which in turn helped to foster a dialogue between these two types of stakeholder groups, while also enhancing each group's ability to integrate climate considerations into planning processes, including the empowerment of local communities to develop their own appropriate adaptation measures.

The pilot actions were generally quite successful in communicating climate information and risks; however, there is still a long path to walk towards building local capacity to implement adaptation strategies. A common lament of the projects teams was that additional support would be needed to move from awareness to action for adaptation. Pilot actions recognized that building upon the capacity engendered through the ACCCA project to further promote and scale up awareness-raising and decision support for adaptation involves social learning and change in behaviour, for which sustained research, communication, knowledge management, and participatory engagement will be needed. By strengthening institutional capacity and collaboration, enhancing understanding and social learning, and generating interest among project teams and stakeholders, the ACCCA project has built a strong basis upon which further work to advance capacity for climate change adaptation can be promoted.

Several key questions or considerations emerge with respect to how the progress made under the ACCCA project can be strengthened and sustained in order to support the communities of practice who were involved in the process. These considerations are:

Sustaining the ACCCA effort— institutional strengthening and additional capacity building in support of climate risk communication for adaptation: The two primary areas where support is needed to sustain the ACCCA effort concern how to 1) move from awareness to action on implementing appropriate adaptation measures, and 2) how to scale up and scale out climate risk communication in a practical and cost-effective manner.

1. Awareness to action: Each of the project teams, as noted in the synthesis report, developed a set of concrete recommendations for adaptation, and yet there was unanimous consensus that most of the recommended adaptation options would likely not be implemented without additional follow-up support. The teams noted that support would be needed for activities such as working with vulnerable communities to further elaborate plans for implementation, and for the teams to act as an intermediary between policy makers and vulnerable communities to advocate for policies that encourage adaptation. Raising the profile of the major findings and capacity built

through the ACCCA project within the UNFCCC NAPA process is one potential avenue for integrating the project's major recommendations into the NAPA policy channel at the national level.

2. Expanding climate risk communication: There is very good potential to expand the reach of the various communication methods, such as the posters, pamphlets, radio and television spots, drama and songs to a much wider audience, which will require financial resources to produce the material for a wider audience and to train additional trainers. However, the cost of expanding these tools and methods needs not to be prohibitive given that the tasks of developing a climate risk communication strategy and the subsequent tools and methods to support that strategy have already been accomplished. Pursuing small grants from development agencies with country missions, such as UNDP or USAID, to cover language translation costs, printing, or taping of electronic material for example, may be one way to secure support.

Guidelines/support for mainstreaming adaptation: The ACCCA pilot action teams and support teams agreed that the key lessons and insights gained from the project should be distilled into a concrete set of recommendations in the form of briefs; one set would be specifically targeted at policy makers and one would target communities of practice. Policy briefs written for national policy makers would focus on how to improve dialogue between policy makers and vulnerable communities in order to foster more climate resilient policy action, and ways to support its implementation, while the policy brief aimed at the donor community would stress the importance of supporting processes for improving climate risk communication within funding for adaptation projects and capacity building initiatives. The practitioner briefs would provide a set of guiding principles for climate risk communication and would contain recommendations for developing and deploying risk communication tools and methods, preferably in multiple languages.

Innovations that build from ACCCA—potential for an adaptation academy: Creative exercises used to communicate climate information to trainers from vulnerable communities (e.g. "grilled sessions") and tools and methods used to communicate climate risk and build a two-way dialogue between policy-makers and local communities (e.g. communication materials, community exercises, interactive activities, open discussions) can serve as the basis for an academy model where experts and leaders at different country scales (from local to national) are trained in specific areas of critical value for building capacity for climate adaptation. Incorporating climate science analysis and risk communication in the academy curricula can prepare practitioners, local leaders and policy-makers to better understand the site-specific challenges related to climate change and associated risks, and explore effective ways of communicating this information further. The academy, which would include final examination and the recognition of international experts in the field of climate change adaptation, would involve participants in a process of social leaning and knowledge sharing that will ultimately lead to more robust decision making for adaptation.

Applicability of weAdapt and other platforms for dissemination of knowledge

Two are the knowledge platforms that share the spirit of the ACCCA project in promoting social learning and participative action: weADAPT, which was developed during the project, and the Global Community Vulnerability and Adaptation Network, which commenced operating during the closing stage of the project. Both knowledge platforms are currently supported by the C3D+ project (also funded by UNITAR) and could serve as platforms to further disseminate the knowledge generated by the ACCCA pilot actions and support teams, sharing it with similar projects and the global community of practice. WeADAPT and GCN can be linked to each other and the ACCCA site to enhance collaboration, as well as to other initiatives such as AfricaAdapt, CBAx, SENSA, and interact with other adaptation networks at the global and regional levels.

weADAPT is a collaborative space of open access where organizations and individuals working on climate change adaptation all over the world can access data, tools and methods, and share experiences, key findings, and learned lessons from projects and studies to move from an initial stage in the process of adaptation of awareness raising and generation of data, to a more advanced stage of integration and analysis of data and communication to generate knowledge and ultimately implement adaptation actions based on robust decision-making processes.

weADAPT allows for a process of dynamic knowledge sharing that supports and strengthens communities of practice in fields related to climate change adaptation. One of the main components of weADAPT is the wikiADAPT platform, where participants can directly contribute with and access to information, data, methods and tools relevant to their work and needs. Another main component of weADAPT is the Adaptation Layer, which allows for a localized search and visualization of climate adaptation related projects and studies, exposure groups, partners working in the field, and strategies to communicate climate risk. weADAPT is currently being redesigned to enhance the services provided by the dynamic system to be comprehensive, ready-to-use, and tailored to the needs of the growing communities of practice. weADAPT is part of the Global Climate Adaptation Partnership (GCAP), formed to provide value-add services to practitioners and users. The GCAP Academy will implement a professional development course.

The Global Community Vulnerability and Adaptation Network (GCN) is a platform that focuses on communities, climate vulnerability and adaptation, and development. The GCN links together Community-Based Adaptation to Climate Change, Indigenous Knowledge Bank and the GCN. The latter two will work in Africa, and the Small Island Developing States but can also include Asia. The overriding theme is knowledge sharing and management at community and local decision maker (LDM) level. The GCN aims to put CBO/CSO/LDM level organizations and institutions into direct communication with each other, as well as feeding relevant information on a supply and demand basis into the system. ENDA will act as a nodal point of communication, driving from below. The platform is intended to be dynamic and completely southern driven and owned. Modes of communication within the GCN will include e-mails, snailmail, CDs plus a multi-purpose interactive platform that will feature all community projects.