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Foreword

This report has been produced as part of the project '*Linking Climate Change Adaptation and Disaster Risk Management for Sustainable Poverty Reduction*', funded by the **European Commission** on behalf of the **Vulnerability and Adaptation Resource Group (VARG)**. VARG is an informal network of bi- and multilateral institutions aiming to facilitate the integration of adaptation to climate variability and change into development processes through sharing of information and experiences.

The report based on the findings of a series of country studies conducted early in 2006 in Kenya, México and Vietnam, and subsequent discussions during an international VARG workshop in Geneva, Switzerland in October 2006 hosted by United Nations International Strategy for Disaster Reduction and sponsored by DFID, DGIS, GTZ, OECD and SIDA.

We are extremely grateful for the assistance and continuing input given to the project by all the country experts consulted, the participants in the international workshop and VARG.

All outputs from the project, including the full country study reports, a workshop report and the synthesis report, are available at www.climatevarg.org.

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1. INTRODUCTION

Hydrometeorological hazards such as floods, droughts and tropical cyclones afflict many regions of the world, but their impact in terms of lives lost and livelihoods disrupted tends to fall most heavily on the poor in developing countries. Climate change threatens to heighten these impacts in many areas, both by changing the frequency and/or intensity of extreme events and by bringing changes in mean conditions that may alter the underlying vulnerability of populations to hazards. The result in the decades to come may be an increase in the global burden of weather-related disasters: events that can threaten the sustainability of development processes and undermine progress toward poverty reduction.

Holistic management of disaster risk requires action to reduce impacts of extreme events before, during and after they occur, including technical preventive measures and aspects of socio-economic development designed to reduce human vulnerability to hazards. Approaches toward the management of climate change impacts also have to consider the reduction of human vulnerability under changing levels of risk. A key challenge and opportunity therefore lies in building a bridge between current disaster risk management efforts aimed at reducing vulnerabilities to extreme events and efforts to promote climate change adaptation. There is a need to understand better the extent to which current disaster management practices reflect future adaptation needs and assess what changes may be required if such practices are to address future risks.

At the World Conference on Disaster Reduction (WCDR) in Kobe, Japan, 2005, the inter-agency Vulnerability and Adaptation Resource Group (VARG) presented the discussion paper “Disaster Risk Management in a Changing Climate” to support a dialogue on synergies and differences between approaches to disaster risk management and adaptation to climate change. At Kobe, the link between disaster risk management and climate change was subject of intensive formal and informal debates. Overall, the outcomes of WCDR call for a strengthening of preventive measures aimed at reducing loss of human lives, and loss of economic and environmental assets of communities and countries over the next ten years. The priorities for actions were outlined in the *Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters*. The Framework supports a stronger recognition of climate change concerns in disaster risk reduction strategies and seeks to establish multi-disciplinary, forward looking approach. In this context the importance of the United Nations Framework Convention on Climate Change (UNFCCC) and the Intergovernmental Panel on Climate Change (IPCC) is recognized.

These developments prompted VARG to initiate the follow-up project ***Linking Climate Change Adaptation and Disaster Risk Management for Sustainable Poverty Reduction*** is a key contribution to this theme. The project used grounded examples in **Mexico, Kenya and Vietnam** and exchange of experiences across those contexts to provide insights into how a more integrated approach to disaster risk management and climate change adaptation can be built. Although risk assessments formed part of the studies, main emphasis was placed on analysing the institutional capacity and constraints/opportunities within the policy process. One area within each country was also selected for more detailed investigation to help ground and inform the national-level institutional analysis. The chosen areas were Nam Dinh province in Vietnam, Yucatan State in Mexico; and Kitui district in Kenya.

Each study was based upon a review of secondary information (documents, reports, papers, websites) and a series of interviews and meetings with a number of agencies, researchers, government departments and non-governmental organizations (NGOs) during a five-day visit by members of the project team. Following initial analysis of these findings, further comment, feedback and input was received from country experts, several of whom subsequently participated in an international Vulnerability and Adaptation Resource Group (VARG) workshop held in October 2006 at which the findings and implications of the studies were discussed. This report presents a cross-cutting summary of the country study findings and the workshop deliberations. (NB Some country-specific information follows in the main text and Appendix 1, but please consult the individual country study reports for more detailed information).

1.1. CURRENT HAZARDS AND CLIMATE CHANGE IMPACTS IN THE STUDY COUNTRIES

Each of the study countries currently faces disaster risk associated with climatic hazards, particularly from exposure to floods, droughts and tropical cyclones. The El Niño Southern Oscillation (ENSO) also influences precipitation and seasonal characteristics in all three countries, in some cases intensifying exposure to weather extremes. Climate change is expected to exacerbate many of these hazards. For Vietnam, flood problems are a major concern. Possible shifts in the timing of the monsoon also need to be considered, although there is considerable uncertainty in the projections. For Kenya and Mexico drought conditions are likely to worsen due to changes in precipitation and increased evapo-transpiration. This will further increase the pressure on already sparse water resources. Furthermore, climate change is likely to lead to increased frequency and intensification of tropical cyclones and associated secondary effects, such as flooding, storm surges and salt-water intrusion. The effects of climate change on ENSO are still under considerable debate, but intensification is considered a probable scenario which would have mixed implications for precipitation patterns and occurrence of climatic extremes. Boxes 1, 2 and 3 provide further summary details on current and future hazard exposure in the study countries and their implications for vulnerable populations.

Box 1. Risk profile: Vietnam

Vietnam is one of the most disaster-prone countries in the world, suffering from tropical cyclones, floods, drought, landslides and forest fires. Of these, the most damaging and frequent are tropical cyclones and floods. Vietnam is affected by typhoon and tropical storm activity from the North-West Pacific Ocean, with about 6 events affecting the coast each year. These tropical cyclone events cause extensive and repeated damage to buildings and infrastructure and losses to agriculture and fisheries. Breaching or overtopping of protective dykes in the event of storm surges can cause agricultural land to be flooded by salt-water and rendered unproductive for several years. Tens of millions of people in Vietnam live in areas of annual flooding, the vast majority of them in the low-lying delta regions in the north and south. Flood disasters can occur during extreme years, as in the Mekong Delta in 2000.

Climate change is expected to bring increased disaster risk to Vietnam, mainly from changes in precipitation and typhoons. The amount of rainfall is generally expected to increase, and may become more intense. Storms may become more frequent, stronger or patterns of storm tracks may change. Such changes in precipitation and storms may lead to an increased frequency and magnitude of flash floods, seasonal river floods and coastal floods in many parts of Vietnam. Sea-level rise of between 30 centimetres to 1 meter within the next 100 years is expected, which would substantially increase the flood risk in low lying coastal areas. As temperatures in Vietnam increase, droughts may become more frequent and intense.

Box 2. Risk profile: Kenya

Kenya is already prone to flooding and particularly drought: two periods of intense drought have caused severe crop losses, famine and population displacement in the country since 2000. With climate change, Kenya faces increased risk. While global climate models suggest that the region from Lake Victoria to the central highlands east of the Rift Valley is likely to experience increases in annual rainfall, regions in the arid east and north of the country are likely to experience decreases. Increased temperatures are likely to exacerbate the drought conditions already experienced and in the future may have a significant impact on water availability. More unpredictability in seasonal rainfall will cause an increase in short heavy rainfall periods leading to flooding, landslides and water pollution. These may be worse during El Niño years.

With the prospect of an increased risk of drought and persistent vulnerability of the poor there is likely to be a serious impact on the capacity of poverty-reduction initiatives, national agricultural economy and food security, particularly in the arid and semi-arid regions. The pastoral community may be worst affected. Although mobility and migration are high, this can translate into pressure during drought on both the environment and services. Increased risk of drought will also negatively affect Kenya's wildlife and hence the tourist industry, as well as reduce water supply and hydroelectric power generation.

Box 3. Risk profile: Mexico

Many parts of Mexico, particularly in the north and central regions, have arid or semi-arid climates, and already experience substantial pressures on their water resources and frequent drought. When rainfall does occur, it is often intense, causing flooding, landslides and soil degradation. The El Niño Southern Oscillation (ENSO) heavily influences the inter-annual climate variability, accentuating the seasonal cycle in El Niño years. Tropical cyclones affect both coastlines annually between June and November, bringing sea surges, high winds, heavy rain, landslides and coastal and riverine floods. In an average year, four or five tropical storms and hurricanes are likely to make landfall in Mexico and cause severe damage.

Most global climate models suggest an increase in temperature for Mexico, reduction in rainfall in most seasons, but with a likelihood of increasing and possibly more intense rainfall during the wet season. There may be an increase in the strength, duration and frequency of El Niño events. Water availability is likely to be a problem in the interior and urban areas. Intensity of tropical cyclones is likely to increase further in the region (possibly increase in frequency). With the prospect of increased risk of drought and hurricane activity, and persistent vulnerability of the poor, there may be a serious impact on health, water supply, food security, poverty-reduction and the agricultural economy, particularly in the coastal areas and arid interior regions.

2. ASSESSING PROGRESS IN INTEGRATION: MECHANISMS AND BARRIERS

In each of the country studies assessment was made of current efforts to address disaster risks and climate change, focussing particularly on aspects that can help build inter-linkage between disaster risk management and climate change adaptation. In this context the country studies explored several key components of climate resilient development covering the generation and communication of climate risk and vulnerability information, institutional capacity and coordination, community level activities and financing of disaster risk reduction and adaptation to climate change. Though the studies revealed important advances in each of these components, they also highlighted major impediments to progress and elements that need strengthening if integration is to succeed. Drawing from the three studies, Table 1 summarizes the principal mechanisms (positive) and barriers (negative) that have shaped how effective that process has been to date. These and other key points are then expanded on in the sections that follow.

Table 1. Progress toward integration: cross-cutting themes

EXISTING MECHANISMS/INCENTIVES	EXISTING BARRIERS TO INTEGRATION
<ul style="list-style-type: none"> > Improving science base for forecasting/modelling climatic conditions at different spatial and temporal scales > Growing efforts to relate hazard information to vulnerability factors > Improved procedures for hazard diagnosis and risk assessment > Regular updating of disaster risk assessment and management guidelines provides flexibility over time > Improving channels for communication of information between science and users > Existing coordination structures for disaster risk management > Strategic and policy advances in strengthening disaster risk management > Political momentum from major disaster events to consider future risks > Project activity at local/community level in disaster risk management, often with focus on underlying vulnerability > Some positive examples of providing and accessing funds for long-term risk management 	<ul style="list-style-type: none"> > Inadequate provision of high-resolution meteorological data for detecting trends and validating models > Shortages or poor access to physical (e.g. hydrological) and socioeconomic datasets for assessing risk > Insufficient incorporation of implications of climate change in risk assessments > Analyses of potential climate change impacts stop short of identifying practical adaptation options > Gaps in awareness and understanding of risk and climate change projections > Relatively weak coordination mechanisms regarding climate change adaptation > Under-development of a preventive, disaster risk reduction approach > Threat of discontinuity in policies, structures, programmes, plans > Projects that address climate change in disaster management are fragmented and tend to be donor-driven > Disaster emergency response continues to divert funds > Barriers to investment in risk reduction and adaptation

2.1. CLIMATE AND HAZARD INFORMATION

The generation and provision of reliable and appropriate information on present and future climate risks is a key component of adaptation. Improvement of data sources and modelling capacity is both an adaptation in itself and a resource on which to base adaptive decisions and action. In all three countries there is an improving science base with respect to climatic extremes and climate change, including recent advances in modelling in both government meteorological/hydrological agencies and university departments. Short-term forecasting capacity is improving especially for drought and windstorms, and progress is emerging in application of long-term climate models. There is ongoing work in Kenya and Mexico to develop regional climate models driven by the input derived from global climate models. For Vietnam the development of country specific climate change scenarios is still in its early stages but application of a regional climate model for the region has now started at the Institute of Meteorology and Hydrology together with the SEA-START Regional Center.

An important bottleneck to understanding the implications of climate change remains collection of and access to meteorological data of sufficiently high resolution and continuity. This is crucial for detecting important local and regional scale climatic trends as well as validating regional projections of climate models (and hence reducing uncertainties in the projections). Insufficient spatial and temporal coverage of meteorological datasets for the study countries is a fundamental problem. Another major constraint, however, is that existing data sources are often not fully utilized and data from national and/or external sources can be difficult to access, especially for scientists and local stakeholders. Financial limitations are a further constraining factor in the study countries, particularly in Kenya and Vietnam. This often limits the ability of institutions to attract and keep skilled staff as well as strengthen computational capacities and gain access to advanced technologies.

2.2. COMMUNICATION OF RISK AND PLANNING TOOLS

The generation of data is one issue; the translation and dissemination of data in a form that facilitates decision-making processes is another. There is growing effort in the study countries to relate information on physical exposure to natural hazards with socioeconomic and environmental factors that influence whether the hazard will translate into a disaster. Procedures for risk assessment for different contexts are increasingly being developed and applied. Information tools being developed in Kenya to assess drought risks incorporate data from different sectors and cover different scales. The design of the tools is demand driven and has worked well with end-users. In Mexico, the National Centre for Disaster Prevention (CENAPRED) has developed a hazard diagnosis tool and risk atlas to assist in identifying areas of high vulnerability to hazards. The mapping explicitly takes into account social and economic aspects of population vulnerability and the vulnerability of infrastructure, and is updatable to reflect changing socio-economic patterns.

Again, provision and access to physical and socioeconomic datasets can be a limiting factor in this work in some countries. Furthermore, it is important to relate the existing conditions of vulnerability to implications of climate change for hazard exposure: in both the risk assessment initiatives noted above work is needed to incorporate the implications of climate change for changes in risk. Though it may be logical for risk assessment tools to focus on short to medium-term risk, integration of a long-term perspective is needed to avoid solutions that may become maladaptive in future. In tandem with advances in risk assessment considerable work is still to be done in the identification, development and evaluation of practical actions for adaptation. The study in Vietnam points out that little work has been carried out to date on setting out adaptation options, even in the coastal zone where

the long-term future of coast protection urgently needs to be reconsidered and alternative management options costed and evaluated.

Regarding the communication of climate risks to end users, the country studies show that diverse dissemination strategies are being used. Information is increasingly tailored and packaged with the characteristics of the end-users and their environment in mind. For example, in Kenya early warning of climatic extremes and prediction bulletins are available to decision makers through the IGAD Climate Predictions and Applications Centre (ICPAC), while climate forecasts are made available to local communities by the Kenya Meteorological Department and local radio stations. These Climate Outlook Bulletins have been quite successful in generating responses because the responsibilities of different stakeholders were clearly defined and training was provided for the use and advance of early warning systems. Furthermore, the Kenya Food Security Structure allows stakeholders to reach consensus on necessary measures quickly.

However, the country studies also point to persistent gaps between the production of climate risk information and the ability of decision-makers and vulnerable stakeholders to interpret and react to such information. Despite growing links between climate science and decision makers at different levels and sectors, communication is still in need of strengthening, with deficiencies commonly remaining in the awareness and understanding of risk, particularly in relation to climate change (e.g. confusion between climate variability and long-term change, and misunderstandings over the use of probabilities in projections of future risk). The uptake of climate information is also hampered by lack of trust and may require concerted efforts in 'bridge building' between scientists and stakeholders within the implementing institutions.

2.3. COORDINATION

The effective reduction of vulnerabilities to current natural hazards and to climate change requires coordination across different levels and sectors of governance and the involvement of a broad range of stakeholders. To strengthen the link between disaster risk management and adaptation to climate change, it is also important to understand when, and at what level, coordination is required, and who should take the lead.

Adaptation to climate change is not simply an extension of disaster risk management. Adaptation to climate change not only means addressing changes in the intensity and frequency of extreme events, but also more subtle changes in climatic conditions as well as new emerging risks, which have not been experienced in a region before. Shifts in the timing of and magnitude of rainfall, rising temperatures and changes climate variability will in many ways affect natural resources and the quality of ecosystem services and hence impact on livelihoods and economic sectors that depend on them. Glacial Lake Outburst Floods or the emergence of vector borne diseases due to climatic changes may pose new challenges for a region, which had no experience in dealing with such hazards and hence limited capacity to address them. These changing risk patterns call for institutional foresight and planning, but coordination requirements and stakeholder engagement will be defined by the type of risk that is being addressed. The link with disaster risk management is one aspect of this.

The country studies suggest that structures for institutional interaction on disaster risk management are steadily improving, although problems remain both in divisions of responsibility for different stages of the disaster cycle and in interaction between disaster risk management agencies and other sectors. Mexico for example has a system for civil protection that comprises formal and informal interactions between government-linked institutions and non-governmental organizations, includes fi-

nancial mechanisms, regulations and policies and incorporates also community-driven initiatives. It is also part of the regional disaster reduction organization, *Centro de Coordinación para la Prevención de los Desastres Naturales en América Central* (CEPREDENAC). In Kenya, the Kenyan Food Security Structure provides effective linkage across government ministries, climate scientists and NGOs to coordinate disaster risk management. The development of a National Platform and National Disaster Policy have further strengthened coordination across sectors for disasters in Kenya. Disaster coordination in Vietnam is achieved largely through a nested network of Committees for Flood and Storm Control, operating at central, provincial, district and commune scales. The committees bring together representatives from a range of sectors at each scale to update disaster preparedness plans and coordinate disaster relief.

Coordination in relation to managing short-term disaster risk and longer-term risks associated with climate change is generally rather less well developed at present. As common to many countries, there is continuing institutional fragmentation between management of these risks affecting all three countries. Primary responsibility for climate change adaptation lies with the environment ministries in Kenya, Mexico and Vietnam, while disaster risk management lies primarily with government structures for civil defence and/or agriculture, rural development and food security. The location of climate change within the environment sector also tends to isolate it institutionally from the development agenda. The Mexico study also notes that the fragmentation is further reflected in different forms of technical expertise concentrated in the different institutions.

The establishment of multi-sectoral committees and similar initiatives may help to strengthen inter-linkages between disaster risk management and climate change adaptation. In the study countries these include an Inter-Ministerial Commission for Climate Change in Mexico, an Inter-Ministerial Committee for Climate Change in Kenya and a Thematic Ad-hoc Working Group on climate change adaptation in Vietnam. While this is a promising development, these initiatives tend to have limited authority and mandate, and often suffer from lack of influence on budgeting processes, which limits the ability to build long-term and sustainable risk reduction efforts. Moreover, there may be gaps in inclusion of key agencies: in Mexico, for example the Inter-Ministerial Commission does not currently include the Ministry of Interior and CENAPRED, though these have principal responsibility for disaster prevention, preparedness and response.

2.4. POLITICAL MOMENTUM AND INSTITUTIONAL CAPACITY

Progress toward climate change adaptation in government agencies depends on political commitment and institutional capacity, reflected in robust policies and strategies geared toward consideration of disaster risk reduction and long-term changes in risk. Significant policy advances have been gained in strengthening disaster risk management, including key national policies/strategies in Kenya and Vietnam. In Kenya, implementation of a National Policy on Disaster Management, together with the ongoing creation of an overarching national authority for disaster risk management (NADIMA) within government offers coordination and long-term oversight for mainstreaming disaster risk reduction. To this end prioritization of climate change is likely to be closely interconnected with prioritization of disasters, and there is some evidence that the political attention raised by recent disasters such as the 2005 hurricane season in Mexico and the 2004-2006 drought in Kenya has raised concerns over climate change risks. Engagement in national communications to the United Nations Framework Convention on Climate Change (UNFCCC) and the development of National Platforms by the United Nations International Strategy for Disaster Reduction (UN-ISDR) may also have raised the profile of climate risks, and the momentum gained from such initiatives should continue to be harnessed.

However, progress in terms of integration in political agendas and institutional priorities remains mixed. Though significant policy advances have been gained in strengthening disaster risk management, including the development of key national strategies and policies in Vietnam and Kenya, the continuing under-emphasis on a preventive approach to disaster risk reduction hinders moves toward long-term adaptation. For typhoon risk in Vietnam, for example, the focus in practice remains on emergency response and reconstruction rather than long-term risk prevention and similar conclusions apply to hurricane risk in Mexico. Mexico's National Development and National Environment plans do not clearly articulate linkages between climate change, disaster risk and poverty, and the equivalent state-level plans for hurricane-prone Yucatan do not even refer to climate change. Finally, the momentum and political leadership required to initiate and sustain governmental initiatives on long-term issues such as climate change tends to suffer from the political realities of short-term electoral cycles. Issues such as climate change can suffer from the threat of discontinuity in policies, structures, programmes, plans, especially in contexts where changes in administration create staffing changes that penetrate deep into governmental structures.

2.5. GRASSROOTS CAPACITY AND COMMUNITY INVOLVEMENT

Efforts to forge greater capacity at the national scale have to be mirrored by work at the local scale to increase the ability of local institutions and communities to cope with present and future risks from climatic hazards. In many cases, when there are high levels of poverty and limited adaptive capacity, emphasis in local level risk management needs to be placed on addressing current climate variability and trends that are already having an impact – adaptation that focuses on future climate change risks may not always be feasible. In such cases, the key is to ensure that action addressing near-term vulnerabilities includes a longer-term perspective, in order to avoid initiating maladaptive processes at the local level that provide a short-term remedy but do not provide a sustainable solution.

Initiatives targeted at local and community level in disaster risk management and related fields are evident in all three study countries, led largely by NGOs but with increasing governmental involvement. Processes of decentralisation in state systems may have helped foster local level work. Vietnam possesses a network of local scale disaster management organizations through its nested system of flood and storm control committees, which bridges local and national scale activities. These may also be used as vehicles to raise awareness and record observations of the impacts of changing climatic conditions. The importance of decentralized systems was also underlined in the assessments in Mexico, where it was suggested that NGOs working in disaster response tend to focus on working with state and municipal governments because this makes action on the ground easier to coordinate.

Some of the local level disaster risk management projects explicitly include attention to climate change and long term vulnerability reduction needs, and may place this forward-looking view within an approach that emphasizes strengthening of livelihood resilience and wellbeing of the poor. Linking long-term disaster risk management with poverty reduction can be seen as an inherently flexible mechanism of planned adaptation, because greater resilience (in terms of income stability, economic diversification, access to resources, information and material assets) in the livelihoods of the poor raises their capacity for autonomous adaptation to changing risk. Existing holistic projects with broader integrative goals relating to climate change include housing reconstruction programmes in Yucatan, drought management projects in Kitui, and mangrove reforestation in Nam Dinh (see Box 4). However, the three country assessments suggest that most work on the ground explicitly including climate change adaptation tends to be ad hoc, based largely on opportunities provided by donors and international NGOs. There is no evidence of a systematic integration of disaster risk manage-

ment and climate change adaptation in terms of concrete project activities, other than coordination and awareness-raising. It is also often not clear to what extent donor-driven projects activities mesh with national level policies and local development priorities, raising implications for their sustainability. For instance, in some sites in Vietnam mangroves have already been cut again as local communities take up fisheries activities in the areas where mangroves were replanted. One exception has been the Special Project on Arid Land Resources Management (ALRMP) in Kenya, which considers a livelihood approach to managing the environment and adapting to climate risks. The key characteristic has been the ability to facilitate a coordination mechanism between different stakeholders on the ground and between the competing objectives of different District Ministries.

Box 4. Selected examples of adaptation/disaster risk management/poverty reduction activities

Mexico

In Yucatán, a scheme for housing reconstruction after tropical cyclones includes provision of cement houses alongside typical houses of the poor. These houses have much improved sanitation facilities, and through a federal funded program, families are given health education tips and encouraged to use them. The houses may be lived in permanently or used as storerooms that provide temporary shelter during storms. These structures were designed to withstand 400km/h of wind – significantly stronger than any storm yet recorded in the region.

Kenya

The Kitui Sand Dams project is an example of an effective and manageable approach to storing and conserving water for use during the dry season. Sand Dams are a small-scale community-led technology promoted in Kenya by an NGO, the SASOL Foundation. The foundation considers developing the inherent adaptive capacity of the region as vital to improving current conditions and preventing further livelihood deterioration under future climate change. The methodology encourages stakeholder dialogue, provides database development and brings long-term sustainability improvements. There are numerous other programmes in the district that support rainwater harvesting.

Vietnam

In Nam Dinh and other sites in Vietnam there has been replanting of mangrove forests in coastal areas vulnerable both to sea level rise and increased storm surges. Although the positive effects on coastal protection have to be assessed more precisely, preliminary investigations show that the mangroves are capable of protecting the coast and in particular the dyke system that is present along the Nam Dinh coastline. At the same time, the mangrove plantations increase the amount of habitat for various plant and animal species and may also help diversify the livelihoods of local communities in providing opportunities for fisheries.

2.6. FINANCING ADAPTATION

Financing for disaster risk reduction and climate change adaptation can come from national budgets, international donors and private sector sources. With regard to national budgets, one recent positive development in Mexico that may foster a longer-term approach to risk is the newly-created Fund for the Prevention of Disasters (FOPREDEN), intended to secure more stable financing for disaster risk reduction. It complements the already existing disaster fund, FONDEN, which is aimed mainly at support for rapid relief and recovery. Internationally, UNFCCC adaptation funds are available to help mainstream climate risk management into policies and planning. All three countries have developed proposals to these funds, via the Global Environment Facility (GEF). For example, in Vietnam one new project and two current proposals to GEF are being coordinated by the United Nations Devel-

opment Program (UNDP). These and other public financing sources for adaptation stand in addition to an increasing emphasis among donor agencies on financial incentives toward disaster risk reduction as a complement to emergency relief. The Hyogo Framework for Action (HFA) provides a framework for disaster risk reduction actions for governments, as well as a means to track progress.

Overall, however, concrete investment in adaptation efforts in the study countries remains limited at present and financial mechanisms for disaster prevention in both the short-term and long-term remain inadequate. This is a situation common to most low and middle income countries. This is a problem because disaster emergency response continues to divert resources away from building capacity to reduce future risk across the study countries. Short-term planning horizons and difficulties in evaluating long-term benefits in cost-benefit analysis both appear to have hampered justification of investment in risk reduction at the national scale. Several participants in the project workshop stressed that disaster risk reduction and climate change adaptation require budget lines if they are to become mainstreamed, but that, in order for this to be achieved, a clear cost-benefit or cost-effectiveness case needs to be made to convince finance ministries that public spending is justified. Workshop participants also highlighted a lack of awareness and understanding of available funding mechanisms from donor sources and how to access them successfully. It is also important to explore further in the study countries how the private sector can help create incentives for adaptation action and finance the costs.

Many DRR and adaptation projects are currently driven by governments and NGOs, such as mangrove rehabilitation, better land-use planning and building regulation. There was limited evidence in the countries case studies of private sector support for the integration process, with a focus primarily on risk transfer and insurance. It will be important for the international community to consider mechanisms to improve engagement of the private sector, which although beyond the capacity of this project, will be especially critical given that national governments and the UNFCCC alone may not have the financial capacity to support all costs associated with adaptation and vulnerability reduction. For example, private capital flows, such as Foreign Direct Investment (FDI), could be influenced to support investment in infrastructure, business, or energy. Governments could look for ways to influence the major private investments in climate sensitive sectors, for example by providing incentives for risk reduction, and through regulation and setting of standards. The engagement of corporate sectors that calculate risk, such as the insurance sector, could provide opportunities to gain insight in risks, and ways to either transfer or reduce risks. At the local scale and community level, NGO's and self-help groups have started initiatives to reduce vulnerability to drought for example (e.g. SASOL in Kenya or micro-insurance support). It would be worthwhile to further explore synergies between private, public and local non-governmental efforts.

3. CROSS-CUTTING RECOMMENDATIONS

The foregoing discussion has underlined a number of cross-cutting and inter-linked themes that need addressing if progress is to be made in reducing the impacts of disaster and climate change on developing countries and particularly on the poor. The need for an adequate information base for decision-making includes an understanding of disaster risk exposure as well as socioeconomic and environmental dimensions of vulnerability. Furthermore information needs to be provided in a format that meets the practical demands of the targeted stakeholders, and there needs to be a process of monitoring and updating if it is to reflect the dynamics of risk implied by a changing climate and shifting parameters of social vulnerability. However, information is only useful if it is embedded in an enabling framework that allows for action aimed at reducing vulnerabilities at the local to national level. Hence, the ability to coordinate expertise and galvanise action at all scales are important components to consider, including the crucial ability to leverage financing. Furthermore, risk management cannot be viewed in isolation from other pressures of development, but should rather be part of an integrative effort toward reducing vulnerability and promoting livelihood resilience. Many of these themes are not exclusive to future disaster risk: they can apply to other aspects of climate change adaptation.

We present here a series of recommendations, drawing from the country studies and from the discussions at the VARG workshop associated with the project. These are listed in Table 2 and expanded on in the pages that follow. The recommendations are made with multi-hazard and cross-sector consideration. They highlight aspects of technical/institutional capacity and the strengthening of procedure and policy for linking climate change adaptation and disaster risk management in the context of poverty reduction. Finally, Figure 1 presents a framework based upon the Case Study findings and Workshop. It draws together the commonalities in enabling factors in the implementation of an integrated approach.

Table 2. Key cross-cutting recommendations

<p>INTEGRATING INFORMATION PACKAGING AND COMMUNICATION</p> <ul style="list-style-type: none"> > Improve the spatial and temporal coverage of climate data > Increase use of existing data sources > Strengthen integration of climate and hazard data with social and economic data > Create forums for communication between science and local agencies/communities > Identify appropriate adaptation options by considering risk over different timescales > Enhance climate modelling capacity, with emphasis on investment in regional initiatives > Support greater application of user/sector-specific risk assessment tools > Use risk information to apply land use planning as a tool for adaptive disaster risk reduction > Ensure continuous monitoring and updating of risk information to enhance flexibility > Invest in personnel with the skills to act as 'translators' of science
<p>INCORPORATING LIVELIHOOD RESILIENCE</p> <ul style="list-style-type: none"> > Strengthen local level capacity to initiate and implement adaptive measures > Critically assess the potential role of traditional practices in managing disaster risk > Ensure local solutions to current disaster risks take climate change into account > Tackle underlying vulnerability and livelihood resilience as an adaptive measure

COORDINATION
<ul style="list-style-type: none"> > Build and strengthen coordination networks/institutions at different scales > Provide a single coordinating body at national level > Promote political leadership to build lasting political momentum toward integration > Develop mechanisms for coordination/integration that target specific development themes
FINANCING
<ul style="list-style-type: none"> > Build a financial/business case for adaptation in national budgets and ensure that Ministries with broad responsibilities such as Planning and Finance are involved in the process > Promote access to external funding sources for disaster risk reduction and adaptation > Promote private sector adaptation mechanisms > Promote financial mechanisms such as insurance and credit schemes
CREATE AN ENABLING ENVIRONMENT
<ul style="list-style-type: none"> > Demonstrate the benefits of taking action by finding entry points for adaptation projects > Develop high-level policy dialogue on integration between donors and governments > Use existing policy mechanisms to facilitate policy windows and forums for discussion, e.g. national government plans (and reforms) such as Poverty Reduction Strategies, NAPAs, UNFCCC process, National Platforms

3.1. ASSESSMENT OF CURRENT PHYSICAL AND SOCIAL VULNERABILITY AND FUTURE RISK

Information packaging and communication

▶ ***Climate data: Improve the spatial and temporal coverage of climate data***

A continuous priority in many developing countries is maintaining and strengthening meteorological observations. There is a need to increase policy level awareness of the importance of continuous climate data records for risk evaluation and prevention, and strengthen support for improved climatic data coverage across space and time. Where the Meteorological Services have taken a lead or disaster monitoring services increased their responsibility has increased, often through capacity building and technology sharing.

▶ ***Accessing existing data: Increase use of existing data sources***

In some cases, the problem is not lack of data but problems of securing access to global, regional or national datasets, especially for independent scientists and local stakeholders. Efforts should be made to reduce barriers to utilization of existing datasets, for example through collaborative national and regional initiatives. At the same time, consideration should be given to assessing and, where appropriate, utilizing alternative data sources, such as local and traditional knowledge, which can provide initial insights into (changing) hazard exposure and conditions of vulnerability.

▶ ***Vulnerability data: Strengthening integration of climate and hazard data with social and economic data***

Risk is not just an outcome of physical climate/hazard processes: it is the combined product of physical exposure to hazards and social vulnerability (characteristics of people and society that shape human vulnerability). In order to understand the character and dynamics of risk, there is a need to create opportunities for better integration of physical and socioeconomic data, including

information relating to population vulnerability, sectoral economic risk and critical infrastructure, and awareness of trends that affect vulnerability over time. Critically, this development should be demand-led. Risk is also likely to vary greatly from place to place and the consultations supported the need for better location-specific analysis to capture the context-specific dynamics of risk under a changing climate

▶ *Communication at local level: Create forums for communication between science and local agencies/communities*

At the local level, extension systems should be strengthened because they help to integrate climate information and advice on adaptive measures into local contexts and build trust in external information. This may be fostered by development of skills and capacities at the local level, including systems of training of trainers to interpret risk information. Some projects have already targeted knowledge transfer at the local level including the 'Capacity Building for Adaptation to Climate Change' project of Canadian Centre for International Studies and Cooperation in Vietnam.

▶ *Options for adaptation: Identify appropriate adaptation options by considering risk over different timescales*

In tandem with advances in risk assessment, considerable work is still to be done in the identification, development and evaluation of practical actions for adaptation. This requires flexibility of approach because the time horizon that should be considered for the integration of climate change projections in risk management strategies will vary by sector and activity. Adaptation to climate change is more subtle than simply extending current disaster prevention. For example, planting practices can change from season to season, but shifts in crop cultivation also require appropriate market access and change in human behaviour, which require longer-term preparations and a consideration of changing risks. The long life-time of infrastructure also implies a greater consideration of possible changes in the next 20, 30 or 50 years that may increase the risk to the structure.

▶ *Climate modelling: Enhance climate modelling capacity, with emphasis on investment in regional initiatives*

Greater support could be directed to building capacity in and between developing countries to model long-term changes in hazards, including support for development of regional climate models and downscaling from global climate models. In this regard it may be advisable to promote greater regional coordination and partnership between countries on climate modelling to maximise efficiency in use of limited resources rather than solely focus on in-country capacity, such as IGAD in East Africa has promoted.

▶ *Risk assessment tools: Support greater application of user/sector-specific risk assessment tools*

The studies suggest there is a strong potential role for greater development and application of user-specific and sector-specific (and thereby more utilizable) risk assessment tools that can work over different timescales. These may be targeted at or used to identify key sectors for risk such as the water sector in drought-affected areas. The tools that work best tend to be demand-driven, and shaped by user needs.

- ▶ *Land-use planning: Use risk information to apply land-use planning as a tool for adaptive disaster risk reduction*

In both the case studies in Mexico and Vietnam the need to jointly consider land development, structural hazard mitigation measures and climate change risks was highlighted, with a need to strengthen the mechanisms for land use planning as an adaptation tool. Provision and enforcement of spatial planning can be difficult in circumstances where resources for regulation are low and informal settlement is commonplace but it should at least be applied to the location of critical infrastructure.

- ▶ *Continuous monitoring of risk: Ensure continuous monitoring and updating of risk information to enhance flexibility*

A continuous monitoring process supports the identification of gaps and allow for adjustments as risk exposure and vulnerabilities change, e.g. by tracking monetary and non-monetary assets in conjunction with information on hazard exposure. An inherent flexibility may already lie within risk assessment and planning procedures toward ongoing changes in risk. In Mexico, the dynamic hazard mapping work of CENAPRED and the annually-updated hurricane preparedness planning process within civil protection structures are predicated on the principle that hazards and vulnerability are in a process of flux. Flexibility in these and other aspects of disaster risk management should be promoted as a key component of adaptation under conditions of uncertainty.

- ▶ *Science-Policy intermediaries: invest in personnel with the skills to act as ‘translators’ of science*

It is important to strengthen services that can package and translate scientific data into information that guides practical measures. Emphasis could be placed on training professionals to function as ‘translators’, relating scientific information on risk, vulnerability and adaptation options in a form that is accessible and meaningful to decision-makers especially in key sectors such as health and water. Budget provision could be directed toward training in-house staff or toward building the services of institutions that already have expertise to filter hazard data and turn it into useful information.

Incorporating livelihood resilience

- ▶ *Local capacity: Strengthen local level capacity to initiate and implement adaptive measures*

To large extent, project work linking climate change adaptation and disaster risk management tends to remain donor-driven, and work is needed to build the capacity of both local authorities and communities to initiate and implement adaptive measures (through for example forums for shared learning) and to develop lasting mechanisms to work in partnership with one another. Greater community participation in projects by sharing knowledge and skills, identifying priorities and deciding on outcomes, will help strengthen the sustainability of projects that tackle long-term goals and avoid exclusion of the needs and priorities of marginal groups.

- ▶ *Traditional coping mechanisms: Critically assess the potential role of traditional practices in managing disaster risk*

As the case studies in Mexico and Kenya suggest, there may be potential to learn from long-standing coping mechanisms, such as reinstatement of traditional hurricane coping strategies of the Maya in Yucatan or traditional drought-resistant crop varieties in Kitui. However, it is important

to critically evaluate their applicability in the context both of development aspirations and long-term changes in hazard intensity (for example in terms of conflict over resources at all scales).

- ▶ *Timescales for action: Ensure local solutions to current disaster risks take climate change into account*

At the local level, climate risks are experienced as a product of climate variability. Climate change introduces a trend that is superimposed on this natural variability, leading to changes in average climatic conditions and exposure to extreme events over time. Given that climate risks interact with other environmental and socioeconomic risk factors, it appears crucial that efforts at the local level focus on addressing the current adaptation deficit to climate variability as well as climatic trends that are already having an impact. In this context, it has to be carefully considered when climate change should be introduced as an additional or separate issue at the local scale. The challenge for overarching government policy interventions and planning processes lies in helping communities and households to address current climate risks, while avoiding solutions that become maladaptive in the medium to long-run.

- ▶ *Social vulnerability and livelihoods: Tackle underlying vulnerability and livelihood resilience as an adaptive measure*

In most cases, attention to climate change risks in practical projects on the ground cannot take too narrow an approach if it is to lead to actions that are truly sustainable in a development context. Greater attention could be paid to identifying and devising practical interventions that can simultaneously strengthen income and protect assets such as crops, livestock, housing and infrastructure, as a critical means or progressing adaptation at the local level. Underpinning this view is the belief that directly addressing underlying vulnerability and promoting livelihood resilience will be a fundamental advance toward adaptation for low-income populations.

3.2. ASSESSMENT OF STRONG CURRENT INSTITUTIONAL LINKAGES AND CAPACITY TO STRENGTHEN IMPLEMENTATION OF ENHANCED INTEGRATION

Coordination

- ▶ *Coordination networks: Build and strengthen coordination networks/institutions at different scales*

While solutions will differ by country and cultural setting, it is important that institutional arrangements are put in place that enable networks addressing disaster and climate risks to work together. There is a need to strengthen and develop multi-sectoral structures and networks which improve awareness on disaster risk and climate change and facilitate the integration of policies and measures. In this context, country participants stressed the importance of building on existing institutions and networks to the extent possible, rather than seeking to create new ones. Also seen as critical is the development of coordinating structures at provincial and/or district level too. Coordination and integration should extend between scales to ensure feedback processes between national and local activities. And, at an international scale, the strengthening of involvement in regional partnerships can also enhance momentum for national coordination.

- ▶ *National coordination framework: provide a single coordinating body at national level*

Ideas to strengthen coordination emerging from the studies include provision of a single coordinating framework at national level, perhaps through strengthening the role, authority and mem-

bership of the existing joint bodies: e.g. the Inter-Ministerial Commission for Climate Change in Mexico, the Inter-Ministerial Committee for Climate Change in Kenya and the Thematic Ad-hoc Working Group on climate change adaptation in Vietnam. These coordinating structures should be mandated to provide long-term planning oversight that considers changes in risk exposure over time. Other options may include extending the coordinating role of national disaster agencies or integrating responsibility within a single sectoral agency.

- ▶ *Political prioritization: Promote political leadership to build lasting political momentum toward integration*

The studies underline that progress at a strategic level requires a strengthening of incentive systems for integrating risk management perspectives into economic planning and development policies. Mechanisms for promoting mainstreaming of adaptation and disaster risk reduction across policy in the long-term will vary according to political/institutional context. At the national level, it may be important to identify a clear leader on disaster and climate risk management efforts with influence on budgeting and planning processes to increase emphasis on a more continuous approach to vulnerability reduction. It may also be possible to build on phases of raised awareness and attention to disaster risk to develop and/or strengthen institutions. The development of National Platforms may help to facilitate this process; however it is important that Ministries responsible for budgetary allocation are involved in the process of mainstreaming (such as in Kenya).

- ▶ *Integration via themed projects: Develop mechanisms for coordination and integration that target specific development themes*

Linkage of climate change adaptation, disaster risk management and poverty reduction may be most effectively put into practice in initiatives that target a specific poverty issue, or development goal. Cross-cutting themes on issues such as water resources and climate change that bring a range of different stakeholders and institutions together can play an important role. In Kenya, potential for facilitating coordination across both scales and sectors lies with the 'special projects' approach whereby government, scientists, NGOs and communities are brought together for a clear and targeted purpose, under the National Disaster Management Authority within the Office of the President.

Financing

- ▶ *Valuing adaptation: Build a financial/business case for adaptation in national budgets and ensure that Planning and Finance Ministries are involved in the process*

Prioritization of adaptation needs is dependent also on taking into account the cost of their implementation. Arguably, demonstration of the cost effectiveness of adaptation is a prerequisite for concerted action and investment. Improvement is therefore needed in the tools for evaluation and the ability to direct funds available in national budgets for preventive and adaptive aspects of disaster risk management. Application of tools such as cost-benefit analysis for evaluating activities with long-term and complex social benefits is, however, problematic because it is difficult to cost cultural benefits that may increase inherent adaptive capacity in the future (there are limits to economic analysis) and further pilot studies are needed to test the applicability of these and related methodologies.

▶ *Access to donor funds: Promote access to external funding sources for disaster risk reduction and adaptation*

There are a variety of public financing sources for adaptation to climate change, including the funds of the UNFCCC and trust funds of donor agencies. In addition there is an increasing emphasis on financial incentives for disaster risk reduction as a complement to emergency relief. This includes in-country activities as well as multilateral resources. Efforts could be made to strengthen awareness in countries of existing funding mechanisms for disaster prevention and adaptation to climate change and improve their accessibility, e.g. by strengthening capacities to develop project proposals and by streamlining processes of application. For example, the National Institute of Ecology in Mexico increased awareness through a number of government meetings and a public information website. Disaster risk management agencies should be encouraged to apply to funding opportunities on climate change adaptation as well as sources targeted toward current risk.

▶ *Private sector involvement: Promote private sector adaptation mechanisms*

In general, it has to be recognized that public sector financing will not suffice to reduce vulnerability to disaster and climate risks. Foreign direct investments often dwarf official development assistance and it is important to explore how the private sector can engage in adaptation mechanisms. It is important that governments develop policies to promote private sector investment in adaptive projects and influence development practices through improved awareness, incentives and regulation.

▶ *Financial sector: Promote financial mechanisms such as insurance and credit schemes*

A key advance is engagement of the financial sector in disaster and climate risk management, by considering the role of risk transfer and credit schemes in buffering against climate risks. In this context, insurance products, especially weather index insurance systems (e.g. providing payments during drought), can play a viable role if tied to efforts aimed at vulnerability reduction. Donors can play a role in helping governments think beyond aid by capacity building within Ministries. Governments will need to consider new financial instruments such as weather derivatives, weather market capacity securitisation or reinsurance. The private sector could usefully engage with government at different scales to achieve provide advice and support.

Creating an enabling environment

▶ *Entry points for adaptation: Demonstrate the benefits of taking action by finding entry points for adaptation projects*

A key step is to demonstrate through operational work that disaster risk reduction addressing climate change is possible and beneficial. In this respect it is important to find potential 'entry points' that can showcase both how action is feasible, building on current capacity, and how benefits can be linked to current vulnerabilities and to high-level policy goals such as poverty reduction strategy targets and the Millennium Development Goals (MDGs).

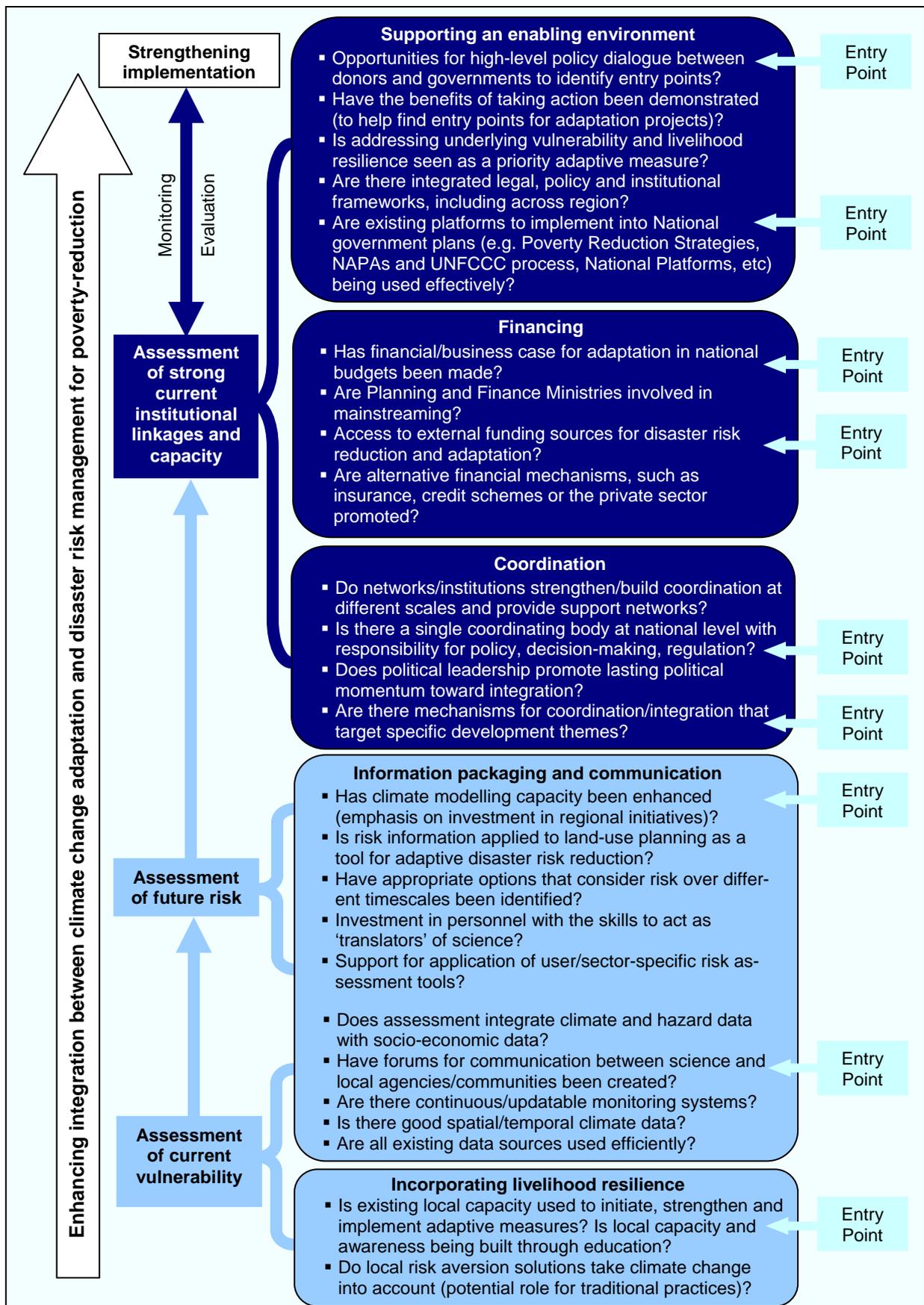
▶ *High-level dialogue: Develop high-level policy dialogue on integration between donors and governments*

Given that development assistance is increasingly channelled through programme budgets rather than individual projects, the role of donor agencies in the dialogue on climate risk management has to be considered. High-level policy dialogue can complement bottom-up approaches within countries, giving greater visibility to in-country expertise. External support can also be directed toward

strengthening integration at the institutional level through e.g. capacity-building and awareness-raising. Use existing policy mechanisms to facilitate policy windows and forums for discussion (e.g. national government plans (and reforms) such as Poverty Reduction Strategies, NAPAs, the UNFCCC process, or National Platforms).

Specific action points for the case studies are provided in Appendix 1. The following figure presents a framework based upon the case study findings and workshop discussions. Figure 1 draws together commonalities in themed questions. These questions highlight areas that need to be addressed more fully in order to more efficiently facilitate enabling factors for the implementation of an integrated approach at all levels. Therefore although all areas highlighted require more attention, there are some particular areas that could serve as entry points for donor agencies, which may have a cumulative effect on government capacity and new mechanisms to support the private sector, NGOs and local communities. These are marked on the diagram.

Figure 1. Framework lessons from case studies and workshop: Commonalities in enabling factors in the implementation of integrated disaster risk management, climate change adaptation and poverty-reduction



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Synthesis Report - Annexes

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APPENDIX 1 – COUNTRY SUMMARY TABLES

Table 3. Mexico - Summary of key points

ISSUES	RECOMMENDATIONS	ACTIVITIES
<ul style="list-style-type: none"> > Inadequate data provision for forecasting > Need for downscaling of existing climate change and hazard information that can be used for agenda setting > Limited consideration of social science perspectives in hazard analysis 	<p>Support technical advances in identification and evaluation of risk</p>	<ul style="list-style-type: none"> > Invest in user specific models and application products > Improve meteorological networks and ground-truthing (Meteorological Service to generate official position climate change) > Improve climate model calibration and resolution > Build on forums for data integration and exchange (e.g. existing centres, National Communication preparation, creation of meta-scenarios)
<ul style="list-style-type: none"> > Weak communication channels between research community and decision makers > Limited engagement and understanding of the implications of climate change at grassroots 	<p>Build bridges to increase communication between scientists, decision makers, NGOs and communities</p>	<ul style="list-style-type: none"> > INE mandate to increase awareness (invest in SEMARNAT) > Role of Inter-Ministerial CICC and regional links > Build on existing forums and centres to bring together expertise (e.g. as workshops, training forums, invest in 'translators', working manuals) > Engage grassroots to build on existing coping/adaptation responses (applied science)
<ul style="list-style-type: none"> > Institutional fragmentation (structural/human capacity) > Limited cross-sectoral coordination, especially at State level > Piecemeal cooperation with donors and regional partners 	<p>Provide a coordinating framework to facilitate oversight and national ownership</p>	<ul style="list-style-type: none"> > Role of CICC to generate culture of mainstreaming risk and adaptation/coordinate funding (include Ministry of Interior) > Cross-sectoral liaison by integrating existing disaster and hazard structures (e.g. CENAPRED, Civil Protection) and Ministries (Environment, Agriculture, Energy, Finance etc) > Create incentives for compliance in international commitments
<ul style="list-style-type: none"> > Limited political coordination, leadership or formalisation of policy within proscribed windows 	<p>Develop structures that facilitate continuity of policy</p>	<ul style="list-style-type: none"> > Invest in implementing structures with clear responsibility and applied science, points of contact > Build partnerships with local communities
<ul style="list-style-type: none"> > Urgency in dealing with increased risk from drought and hurricanes as result of climate change > Poverty and high vulnerability 	<p>Mainstream DRR and adaptation (brings multiple benefits and politically attractive)</p>	<ul style="list-style-type: none"> > Tackle underlying vulnerability/poverty > Invest in 'climate-proofing' development agenda and increase awareness of DRR in projects > Support projects that protect livelihood assets and invest in local capacity
<ul style="list-style-type: none"> > Difficulty in managing weather-related disaster impacts on diverse contexts (multi-layering of risk) > Uncertainty in future impact 	<p>Promote flexibility of approach where possible</p>	<ul style="list-style-type: none"> > Allow risk plans and information provision to be updated regularly (e.g. risk mapping, civil protection guidelines, environmental and housing regulations in risk-prone areas, etc)
<ul style="list-style-type: none"> > Short-term funding horizons, with inadequate spending on prevention 	<p>Increase funding priority, regional partnerships and coordinate financial tools</p>	<ul style="list-style-type: none"> > Coordinate FONDEN and FOPREDEN to increase spending on prevention > Reduce variability in Disaster Trust Funds by incorporating risk transfer mechanisms and donor partnerships > Increase collaboration between farmers, producer associations and private sector > Invest in institutional capacity building, collaborative projects and networks (to increase awareness of international funding)

Table 4. Vietnam - Summary of key points

ISSUES	RECOMMENDATIONS	ACTIVITIES
> Real time (satellite) information for operational forecasting needs improvement	Improve modelling and forecasting applications	> Stimulate capabilities, access to data and joint research efforts, with support from research budgets of MONRE, MARD and the Ministry of Science and Technology, and donors
> Vulnerability and adaptation assessments have been mostly qualitative > Social and economic impacts have not been studied adequately	Invest in studies on climate change impacts and adaptation	> The Working Group on Adaptation as well as MONRE and MARD should take up the integrated assessment of adaptation options > Economic and social dimensions of impacts and adaptation measures should be considered
> Need for improvement of integration between poverty alleviation/ rural development & DRM domains > Need for improvement of integration between environmental and DRM domains	Improve integration of policies by strengthening coordinating institutions	> MARD should take up coordination of the integration of climate change adaptation into disaster risk management > The Natural Disaster Mitigation Partnership should aim to integrate rural development and risk reduction concerns
> DRM focus remains on emergency response and reconstruction rather than prevention and adaptation	Promote a shift away from responsive measures and towards pro-active disaster risk reduction	> Evaluate alternative protective measures for coastal protection > Make mangrove replantation the task of DDMFSC > Promote alternative livelihoods that are less susceptible to typhoon, flood and drought damage > Strengthen use of building codes and land-use planning legislation
> Linking DRM and climate adaptation at the local level is mainly donor driven	Build adaptive capacity at local level and policy advocacy	> Local vulnerability assessment mechanisms should be developed to consider long-term risk and adaptation needs (e.g. CACC project by CECI) > Build adaptive capacity at local level within the CFSC system > Increase attention to strengthening livelihood resilience and other non-structural means to reduce risk
> Inadequate financial resources to meet present DRM needs > Little internal financing for risk reduction and adaptation efforts	Support state budgets for structural and non-structural risk reduction measures	> An integrated programme of investment is required in dyke strengthening and flood prevention, climate forecasting, emergency response and evacuation, recovery funds, and adaptive measures > Where the cost-benefit case is clear, direct funding to coast protection

Table 5. Kenya - Summary of key points

ISSUES	RECOMMENDATIONS	ACTIVITIES
<ul style="list-style-type: none"> > Inadequate data provision for risk assessments over different timescales 	<p>Improve application of advanced technology and identification and evaluation of risk</p>	<ul style="list-style-type: none"> > Invest in user specific models and application products > Invest in services that will have to take a lead e.g. KMD/ICPAC > Improve meteorological networks and ground-truthing (aggregate other types of accurate data from monitoring for integrated EWS) > Improve downscaling of climate models > Build on forums for data integration and exchange (extensive regional networks, National Communication preparation)
<ul style="list-style-type: none"> > Need for improved networks for information exchange and capacity building at local level to provide accurate information for risk assessment. > Lack of trust in science by users, both at community level and by policy makers, partly resulting from poor communication and need for awareness raising 	<p>Increase communication between scientists, decision makers, NGOs and communities</p>	<ul style="list-style-type: none"> > Build on existing structures to raise awareness (e.g. within NEMA, climate change department and Inter-Ministerial Committee for Climate Change) > Build on existing forums and centres to bring together expertise (e.g. UN-ISDR hosted workshops, ICPAC training forums, invest in 'translators', working manuals, media, technical committees) and regional links > Engage grassroots to build on existing coping/adaptation responses (applied science by Ministries of Agriculture, Livestock and Water and NGOs)
<ul style="list-style-type: none"> > Institutional fragmentation, limited cross-sector political coordination > Piecemeal cooperation with donors and regional partners > Agency-centred DRR 	<p>Provide a coordinating framework to facilitate oversight and national ownership</p>	<ul style="list-style-type: none"> > Implement the National Disaster Policy with a National Disaster Management Authority to coordinate different stakeholders and initiatives operating at different scales > Build on cross-sectoral liaison within existing disaster and hazard structures (e.g. EWS of KFSS, ALRMP, NDOC) > Monitor research and NGO outputs to encourage collaboration rather than duplication > Create incentives for compliance in international commitments
<ul style="list-style-type: none"> > Shorter term funding horizons and difficult political dynamics, including lack of leadership and formalisation of policy with proscribed windows 	<p>Develop structures that facilitate continuity of policy</p>	<ul style="list-style-type: none"> > Invest in implementing structures with clear responsibility and applied science, points of contact > Build partnerships with local communities > Provide a role for national leadership in international policy dialogue (e.g. for National Platform) > The coordinating authority NEMA to use the 2nd National Communication to raise awareness of the need to have a government point of contact/consistency in Ministerial representation

ISSUES	RECOMMENDATIONS	ACTIVITIES
<ul style="list-style-type: none"> > Urgency in dealing with increased risk, particularly from drought and intense rainfall events as result of climate change > Poverty, poor infrastructure and high vulnerability 	<p>Mainstream DRR and adaptation (brings multiple benefits and politically attractive e.g. poverty reduction and empowerment of marginal communities)</p>	<ul style="list-style-type: none"> > Tackle underlying vulnerability/poverty as detailed by the National Economic Recovery Strategy (especially important for slow-onset disasters) > Role of Inter-Ministerial Committee for Climate Change to generate culture of mainstreaming risk and adaptation by capacity building within government > Use the development of a National Platform and NAPA as a tool to mainstream climate change adaptation, initiate systematic development programmes and enhance national partnership with UN agencies > Invest in ‘climate-proofing’ development agenda and increase awareness of DRR in projects > Invest in projects that protect livelihood assets and invest in local capacity (e.g. Special Projects in arid lands and water management could facilitate cross-sectoral and multi-scale coordination)
<ul style="list-style-type: none"> > Failure by policy makers to create flexibility in disaster planning tools, multi-layering of risk > Uncertainty in future impact 	<p>Promote flexibility of approach where possible</p>	<ul style="list-style-type: none"> > Allow risk plans and information provision to be updated regularly (e.g. in EWS, District level coordination through DSGs, Technical Committees within KFSS, etc) > Decentralise responsibilities and skills > Ensure community participation (skill sharing forums e.g. initiatives by Ministry of Agriculture)
<ul style="list-style-type: none"> > Short-term funding horizons, with inadequate spending on prevention because frequent disasters divert resources to emergency relief 	<p>Increase funding priority, regional partnerships and coordinate financial tools</p>	<ul style="list-style-type: none"> > Use National Disaster Policy to facilitate introduction of Disaster Trust Funds, risk transfer mechanisms and formal donor partnerships > Build on regional partnerships to share costs and expertise and pool resources at the District level with engagement of NGOs and private sector within government Special Projects (if necessary through regulation) > Invest in institutional capacity building, collaborative projects and networks (to increase awareness of international funding) and strengthen links to development banks and donor agencies. > Use international funding opportunities (e.g. GEF) and improve options for detailed NAPA priorities.

APPENDIX 2 - WORKING TERMINOLOGY

For the purposes of this project we have adopted and used the following definitions, based primarily on UNISDR terminology (see <http://www.unisdr.org/eng/library/lib-terminology-eng%20home.htm>):

Risk	The probability of harmful consequences, or expected losses (deaths, injuries, property, livelihoods, economic activity disrupted or environment damaged) resulting from interactions between natural or human-induced hazards and vulnerable conditions.
Hazard	A potentially damaging physical event, phenomenon or human activity that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation.
Vulnerability	The conditions determined by physical, social, economic, and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards.
Coping capacity	The means by which people or organisations use available resources and abilities to face adverse consequences that could lead to a disaster.
Adaptation	Adjustments in response to actual or expected climate change or its effects ('anticipatory' or 'proactive' adaptation is adaptation that takes place before impacts of climate change are observed)
Disaster	A serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources.
Disaster risk management	The systematic process of using administrative decisions, organisation, operational skills and capacities to implement policies, strategies and coping capacities of the society and communities to lessen the impacts of natural hazards and related environmental and technological disasters. This comprises all forms of activities, including structural and non-structural measures to avoid (prevention) or to limit (mitigation and preparedness) adverse effects of hazards.
Mitigation	Structural and non-structural measures undertaken to limit the adverse impact of natural hazards, environmental degradation and technological hazards. NB In terms of climate change 'mitigation' has a distinct meaning: it refers to human efforts to reduce the sources of (or enhance the sinks for) greenhouse gases.
Preparedness	Activities and measures taken in advance to ensure effective response to the impact of hazards, including the issuance of timely and effective early warnings and the temporary evacuation of people and property from threatened locations.
Relief / response	The provision of assistance or intervention during or immediately after a disaster to meet the life preservation and basic subsistence needs of those people affected. It can be of an immediate, short-term, or protracted duration.

- Recovery** Decisions and actions taken after a disaster with a view to restoring or improving the pre-disaster living conditions of the stricken community, while encouraging and facilitating necessary adjustments to reduce disaster risk.
- Disaster risk reduction (disaster reduction)** The conceptual framework of elements considered with the possibilities to minimise vulnerabilities and disaster risks throughout a society, to avoid (prevention) or to limit (mitigation and preparedness) the adverse impacts of hazards, within the broad context of sustainable development.
- Capacity building** Efforts aimed to develop human skills or societal infrastructures within a community or organisation needed to reduce the level of risk.