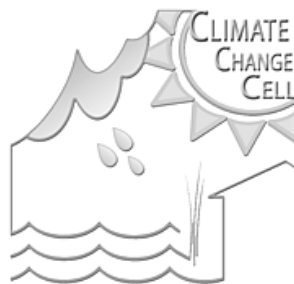


CLIMATE RESILIENT DEVELOPMENT

COUNTRY FRAMEWORK TO MAINSTREAM CLIMATE RISK MANAGEMENT AND ADAPTATION

WORKING PAPER

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Preface

No other issue threatens our planet in such a dramatic manner with far reaching impacts, and no other issue is so clearly a world wide problem as the case of climate change. The adverse impact of increasing trend of energy consumption, pressure on environment and the climate change presents one of the foremost threats-economically, socially and environmentally. At the same time, many of the most promising solutions to global warming, local initiatives that can be managed, are yet to be mobilized fully.

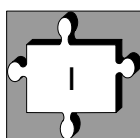
Achieving GHG reduction, enhanced sustainable environment and protection of climate requires action by government, civil society, business, and individuals. At this critical point of time, even all efforts to mitigate cannot reduce the potential threat from climate impacts and extreme events in the near future. However, immediate hope rests with identifying priorities and options for adaptation to climate change. Stakeholders need to be sensitized and encouraged to join in taking action on both personal and policy level.

Considering the adverse scenario, adaptation has been so far inadequately addressed in the global arena, adoption of appropriate policy and programme and mainstream adaptation strategies are still emerging and will continue to do so for some time. Impacts of the changed climate regime is now putting further pressure on the stressed and over burdened natural production system. As resource harvesting was never equitable and modern production systems are fossil fuel based technology driven, the poorer are deprived on one hand and subject to more vulnerability to extreme events on the other.

We have screened available literatures on the topic (not exhaustive). There are several write ups introducing the issues and concerns with different degree of emphasis on the impact prediction, vulnerabilities, responses, institutions, networking, etc. There are number of frameworks in this regard that throws light on various aspects of risk defining, response measures and implementation from a higher perspective. We were looking for an operational tool to address climate matters in national development persuasion to structure climate resilient development and guide through step to step actions to mainstream the issue in a holistic approach. We have drawn heavily from existing resources and devised the framework. Developing Countries and LDCs who are vulnerable to climate risks and already suffering could also benefit from such an operational tool. This broad based flexible tool, designed to pursue sustainable development considering the climatic factors that has bearing on the development process. Its purpose is making development sustainable, climate resilient and socially just.

The country framework for climate risk management and adaptation as presented in this working paper is generic in nature, broad based and flexible to accommodate and appreciate country specificity and user friendly response accordingly. Developing countries and least developed countries in particular shall be benefited from this framework in structuring their development in a climate resilient fashion. This frame shall allow pursuing sustainable development accommodating climate risk concerns, sound environment by large and socially acceptable development. Interventions proposed in the frame are 'no regret interventions' and in line with all the global declarations (MDG, PRSP, CSD, CBD, UNFCCC, etc).

To address the situation, the climate system has to be stabilized by limiting GHG emissions through mitigation, while human society and natural ecosystem need to adapt to the already exerting pressure of the changed climate. Adaptation to climate change and hence reduction of development risk is a major concern, ways to address and manage these should be a top priority. This Country Framework hopes to contribute by describing a pathway of 'things to do' to enable our national development processes to become climate resilient.



Acknowledgement

We express gratitude to the collective wisdom of all experts, professionals and practitioners dedicated to the service of development, particularly in enabling climate risk reduction and adaptation. Many of them have authored publications in this respect from which this working paper has drawn and benefited substantially.

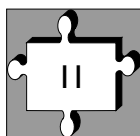
Acknowledgement is due to DFID and its partner UNDP for their continued support to the Climate Change Cell in its effort to facilitate national development that is climate resilient.

We are grateful to the Climate Change Cell for accepting this working paper for publication. In this respect, the Department of Environment, Bangladesh and particularly Khandaker Rashedul Haque, PhD, its Director General, supported us throughout this initiative and provided much needed understanding of the need for a country framework tool to operationalize the process.

We thank the proponents as well as promoters of the various principles, approaches, tools and practices that we have applied in describing the country framework. Specific mention should go to the widely recognized, adapted and applied Sustainable Livelihoods Framework (SLF) approach and the Participatory Action Plan Development (PAPD) process. The Disaster Management Framework of CDMP which integrates climate risks and disaster reduction provided useful insight of national level implementation as did the experience of the development of the Integrated Coastal Zone Management Programme (ICZMP) process in Bangladesh.

Rob Koudstaal provided valuable insight and wisdom, urging to probe deeper, deserves special mention.

Dr. Shamim Ara Begum from the Climate Change Cell devoted attention and time in the literature review and compiling the abbreviation.



**Climate Resilient Development
Country Framework to Mainstream Climate Risk Management and Adaptation
Working Paper**

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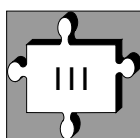
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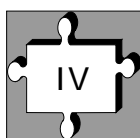
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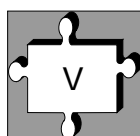
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Annexure Definitions and Terms used

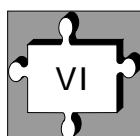


Acronyms

ADB – Asian Development Bank
AFP – Agency-based Focal Points
CBA – Community Based Adaptation
CBD – Convention on Biological Diversity
CBOs – Community Based Organizations
CDM – Clean Development Mechanism
CER – Certified Emission Reduction
CIDA- Canadian International Development Agency
CRA – Climate Risk Assessment
CRM – Climate Risk Management
CRMFP – Climate Risk Management Focal Point
CRRAPs – Climate Risk Reduction Action Plans
CSD – Commission for Sustainable Development
DCFP – Designated Country Focal Point
DCs – Developing Countries
DFID – Department for International Development
EC – European Commission
ET – Emissions Trading
EU –European Union
FA – Framework for Adaptation
FDI – Foreign Direct Investment
FPs – Focal Points
GCM – Global Circulation Model
GDP – Gross Domestic Product
GEF – Global Environmental Facility
GTZ – Deutsche Gesellschaft für Technische Zusammenarbeit
ICSU – International Council for Science
IGBP – International Geosphere – Biosphere Program
IHDP – International Human Dimensions Program
IPCC – Intergovernmental Panel on Climate Change
ISDR – International Strategies for Disaster Reduction
IUCN – The World Conservation Union
LCA – Livelihood Capital Assets
LDCF – Least Developed Countries Fund
LDCs – Least Developed Countries



LGI – Local Government Institutions
MDG – Millennium Development Goal
MEA – Multi-national Environmental Agreements
MIT – Massachusetts Institute of Technology
NAG – National Advisory Group
NAPA – National Adaptation Programmes of Action
NCAR – National Country Assessment Report
NGOs – Non Government Organizations
ODA – Overseas Development Assistance
OECD – Organization for Economic Cooperation and Development
PAPD – Participatory Action Plan Development
PRSP – Poverty Reduction Strategy Paper
PVA – Participatory Vulnerability Assessment
RCM – Regional Circulation Model
RRAP – Risk Reduction Action Plan
RVCC – Reducing Vulnerability to Climate Change
SBI - Subsidiary Body for Implementation
SBSTA – Subsidiary Body on Scientific and Technological Advice
SCCF – Special Climate Change Fund
SDC – Swiss Development Cooperation
SDRC – Sustainable Development Resource Center
SIDA – Swedish International Development Agency
SIDS – Small Island Developing States
SLF – Sustainable Livelihoods Framework
TAG – Technical Advisory Group
UN – United Nations
UNDP – United Nations Development Program
UNEP – United Nations Environment Program
UNFCCC –United Nations Framework Convention on Climate Change
USAID – United States Agencies International Development
WCDR – World Campaign for Disaster Reduction



Executive Summary

Our climate is changing. Global warming induced changes in precipitation and temperature is already happening in different geographical regions. Untimely rain, flood, dry periods, storms, cyclones, are occurring more frequently in greater intensities. Changes in the climate are likely to take place more rapidly over the next few decades, as different model generated predictions describe.

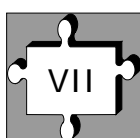
Responses to climate change is a necessity for all countries prone to climatic hazards and are likely to face more severe and intense climatic hazards occurring more frequently. The climate change impacts are exerting pressure on the development process, putting the interventions to risk on one hand and threatening the production system on the other. As climate change impacts development, it has to be dealt while pursuing development through national development planning. The goal and objective of the country framework has been set to achieve this.

The overarching goal of this country framework is to operationalize climate risk management and adaptation mainstreaming in development. This would ensure national development to proceed in a manner that quality of life of all citizens of each country improves and their livelihoods assured.

The objective of the country framework is establishing a mechanism that facilitates national development planning and implementation to integrate adaptation to climate change and climate risk management systematically and over time.

To achieve this, a participatory approach is necessary. Principles governing the country framework should strive for climate resilient development by integrating climate concerns in planning activities and maintaining synergies both within and between national, regional and international institutional architecture and policy instruments.

The basic approach the Country Framework follows is to coordinate in a partnership mode, integrate of climate risk management, ensure participation of all stakeholders and devise location-specific climate resilient development plans.



Defining risk environment includes current and future climate risks, accommodating peoples' perceptions and using climate modeling facility to enable one to pinpoint risks over time and space. To do so, characterizing the natural conditions, socioeconomic conditions, and institutional environment must be adequately characterized.

Responding to the climate risks involves formulation of micro level risk reduction action plan (RRAP), identification of climate related sectoral development plans, social communication, knowledge management, capacity building, demonstration of good practice, implementation of the action plans (piloting), monitoring, evaluation and feedback mechanism and scaling and implementation.

Institutional facilitation for adaptation includes creating enabling policy environment, mainstreaming and coordination, partnership building, institutional arrangements and Governance (continuity, transparency, handling political interferences, financing, and enabling implementation.

The country framework on one hand supports pursuing disaster risk reduction through identifying current and future climatic induced hazards, while on the other supports climate resilient development. The Country Framework provides a much necessary platform for implementing NAPAs in LDCs and serves as an example of climate resilient development persuasion.



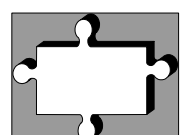
1. INTRODUCTION

This introduction sets out the need, rationale, objective, scope of the Country Framework to operationalize climate risk management and adaptation mainstreaming in the development process at a national level.

Its content, audience and purpose are outlined. A summary on the concern for people and the planet with regard to climate change and its consequences is provided, as a setting to the paper's main sections. This includes recent and emerging evidence, observations, and predictions on our collective concern and welfare. The impacts of Climate change on growth and development is showcased.

Climate change is happening and will continue charging head on with a world already stressed to limits. Special concerns of different country groups are also placed, highlighting the circumstances of Developing Country, Least Developed Country and Small Island Developing States.

Global responses are reviewed, in the broader context of development needs and priorities – and in relation to the more specific climate change negotiations process at the inter-governmental level. Viewpoints and approaches on national responses to mainstream or integrate adaptation and climate risk management identifies barriers, gaps and factors some of which are exogenous to climate change and adaptation management but endogenous to the development practitioner's domain. The Country Framework provides guidance in tackling the barriers and filling in gaps systematically, holistically, and in a continuing process. All the LDCs engaged in the National Adaptation Programmes of Action (NAPA) preparation processes and those who already have completed their NAPAs will find this tool useful, practical, flexible and acceptable for the wide range of stakeholders, actors, institutions that are required to be brought into play to coordinate and implement the mainstreaming process.



1.1 Climate Challenges Development

"The poorest developing countries will be hit earliest and hardest by climate change, even though they have contributed little to causing the problem. Their low incomes make it difficult to finance adaptation. The international community has an obligation to support them in adapting to climate change. Without such support there is a serious risk that development progress will be undermined." (Stern, 2006)

Climate risks and impacts challenge the overall development of a country, its society, environment, and economy. Therefore every country needs to approach this complex and cross cutting concern systematically and holistically.

Climate impacts will affect everyone. Each of us must know what we confront, if we are to prepare and address them. The need to recognize the challenges of the changing climate in context of its development aspirations becomes an important pre-requisite for any society in their pursuit for sustainable development. The systematic recognition across sectors and stakeholder groups further ensures each to identify and assess risks, and scope risk management and adaptation options.

1.1.1 Climate Change –Everyone Needs to Prepare and Act

Nations all over the world are beginning to realize that climate is changing rapidly and in an unpredictable manner. The adverse impacts of this change are already challenging the efforts of many countries in their pursuit to achieve improved well-being of its people. The Review Report of Nicholas Stern, Chief Economist to the UK Government prepared for Prime Minister Tony Blair and Chancellor Gordon Brown of UK, clearly confirm how climate change will affect us, individually, nationally, regionally and globally in the coming decades. The report goes on to say the benefits of determined worldwide steps to tackle climate change would greatly outweigh the costs.

Box -1 Impacts of Climate Change on Growth and Development

Climate change will affect people's lives, the environment and the prospects for growth and development in different parts of the world. All three dimensions are fundamental to understanding how climate change will affect our future.

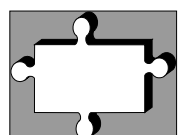
These effects will not be felt evenly across the globe. Although some parts of the world would benefit from modest rises in temperature, at higher temperature increases, most countries will suffer heavily and global growth will be affected adversely. For some of the poorest countries there is a real risk of being pushed into a downwards spiral of increasing vulnerability and poverty.

Average global temperature increases of only 1-2°C (above pre-industrial levels) could commit 15-40 percent of species to extinction. As temperatures rise above 2-3°C, as will very probably happen in the latter part of this century, so the risk of abrupt and large-scale damage increases, and the costs associated with climate change – across the three dimensions of mortality, ecosystems and income – are likely to rise more steeply. In mathematical terms, the global damage function is convex.

No region would be left untouched by changes of this magnitude, though developing countries would be affected especially adversely. This applies particularly to the poorest people within the large populations of both sub-Saharan Africa, and South Asia. By 2100, in South Asia and Sub Saharan Africa, up to 145 - 220 million additional people could fall below the \$2-a-day poverty line, and every year an additional 165,000 - 250,000 children could die compared with a world without climate change.

Modelling work undertaken by the Review suggests that the risks and costs of climate change over the next two centuries could be equivalent to an average reduction in global per capita consumption of at least 5%, now and forever. The estimated damages would be much higher if non-market impacts, the possibility of greater climate sensitivity, and distributional issues were taken into account.

Source: Stern Review, *The Economics of Climate Change: Part II – Impacts of Climate Change on Growth and Development*; page 55; Released October 30, 2006,



1.1.2 Emergent Findings

The Third Assessment Report of the Inter Governmental Panel on Climate Change (IPCC), published in 2001, concludes

- Recent Regional Climate Changes, particularly temperature Increases, have already affected many Physical and Biological Systems
- There are preliminary indications that some human systems have been affected by recent increases in floods and droughts
- Natural systems are vulnerable to climate change, and some will be irreversibly damaged
- Many human systems are sensitive to climate change, and some are vulnerable
- Projected changes in climate extremes could have major consequences
- The potential for large scale and possibly irreversible impacts poses risks that have yet to be reliably quantified
- Adaptation is a necessary strategy at all scale to complement climate change mitigation effort
- Those with the least resources have the least capacity to adapt and are the most vulnerable
- Adaptation, sustainable development, and enhancement of equity can be mutually reinforcing

1.1.3 Worries and concerns

The complexity of the climate system means predictions vary widely, but even the minimum changes forecast could mean frequently flooded coastlines, disruptions to food and water supplies, and the extinction of many species.

Box – 2 Consequences of global warming already apparent

Extra-strength weather

- The trend toward more powerful storms and hotter, longer dry periods is predicted by computer models and reflects common sense. Warmer temperatures mean greater evaporation, and a warmer atmosphere is able to hold more moisture -- hence there is more water aloft that can fall as precipitation. Similarly, **dry regions are apt to lose still more moisture if the weather is hotter**; this exacerbates droughts and desertification.
- More frequent and powerful cyclones and hurricanes, more frequent and intense floods and droughts -- **a recent increase in "extreme weather events" has been too pronounced to explain away as random**. Scientists say it's an indication that climate change already has begun. One climate variation appears to be an increase in variation itself: there are wider swings in what is "normal" weather.
- In Africa's large catchment basins of Niger, Lake Chad, and Senegal, total available water has decreased by 40 to 60 per cent, and desertification has been worsened by lower average annual rainfall, runoff, and soil moisture, especially in southern, northern, and western Africa. The Rhine floods of 1996 and 1997, the Chinese floods of 1998, the East European floods of 1998 and 2002, the Mozambique and European floods of 2000, and the monsoon-based flooding of 2004 in Bangladesh (which left 60 per cent of the country under water), are an indication that storms indeed are growing more powerful.

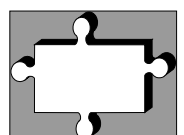
The decline of winter

- **Arctic air temperatures increased by about 5 degrees C** during the 20th century -- ten times faster than the global-mean surface temperature. In the Russian Arctic, buildings are collapsing because permafrost under their foundations has melted. Snow cover has declined by some 10 per cent in the mid- and high latitudes of the Northern Hemisphere since the late 1960s. The annual duration of lake and river ice cover apparently shortened by about two weeks during the 20th century. Almost all mountain glaciers in non-polar regions retreated during the 20th century. The overall volume of glaciers in Switzerland has decreased by two-thirds.

Shifts in the natural world

- Scientists have observed climate-induced changes in at least 420 physical processes and biological species or communities.
- In the Alps, some plant species have been migrating upward by one to four meters per decade, and some plants previously found only on mountaintops have disappeared. In Europe, mating and egg-laying of some bird species has occurred earlier in the season -- in the United Kingdom, for example, egg-laying by 20 of 65 species, including long-distance migrants, advanced by an average of eight days between 1971 and 1995. Across Europe, the growing season in controlled, mixed-species gardens lengthened by 10.8 days from 1959 to 1993. Butterflies. dragonflies. moths. beetles. and

Source: www.unfccc.int/essential_background/



The above worries and concerns are further complicated by the state of human society, where over 1.2 billion people live in abject poverty and deprivation— victims of social, economic, political and other forms of injustice and inequity in our race toward progress and prosperity. The already poor and marginalized will suffer most from the impacts of adverse climate. Countries where the majority of them live and struggle will confront a more compelling and unequal burden – a burden likely to grow very rapidly in a world already stressed.

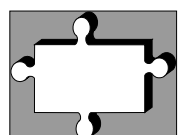
Box – 4 A World Stressed

Environmental damage -- such as overgrazed rangeland, deforested mountainsides, and denuded agricultural soils -- means that **nature will be more vulnerable than previously to changes in climate**. In any case, when climate shifts occurred thousands and tens of thousands of years ago, they generally took place more gradually. Natural systems had both more space and more time to adapt.

Similarly, **the world's vast human population, much of it poor, is vulnerable to climate stress**. Millions live in dangerous places -- on floodplains or in shantytowns on exposed hillsides around the enormous cities of the developing world. Often there is nowhere else for them to go. In the distant past, man and his ancestors migrated in response to changes in habitat. There will be much less room for migration this time around.

Global warming **is and almost certainly will be unfair**. The industrialized countries of North America and Western Europe, along with a few other states, such as Japan, are responsible for the vast bulk of past and current greenhouse-gas emissions. These emissions are a debt unwittingly incurred for the high standards of living enjoyed by a minority of the world's population. Yet those to suffer most from climate change will be in the developing world. They have fewer resources for coping with storms, with floods, with droughts, with disease outbreaks, and with disruptions to food and water supplies. They are eager for economic development themselves, but may find that this already difficult process has become more difficult because of climate change. The poorer nations of the world have done almost nothing to cause global warming yet are most exposed to its effects.

Source: www.unfccc.int/essential_background/



1.1.4 Major Concerns on Climate Vulnerability, Impacts and Adaptation

The above evidence and conclusions establish that climate change impacts will be different for regions, diverse, localized in some conditions. Also, the magnitude, extent and frequency of climatic extreme events is rising sharply. Record breaking flood events continue to rise. Long onset impacts such as sea level rise and drought conditions loom over small islands, and much of impoverished Africa. Countries in South America and Asia are devastated by storm surges, cyclone and typhoons.

Box - How Climate Change Will Affect People Around The World - Key Messages

Climate change threatens the basic elements of life for people around the world – access to water, food, health, and use of land and the environment. On current trends, average global temperatures could rise by 2 - 3°C within the next fifty years or so,¹ leading to many severe impacts, often mediated by water, including more frequent droughts and floods (Table 3.1).

Melting glaciers will increase flood risk during the wet season and strongly reduce dry-season water supplies to one-sixth of the world's population, predominantly in the Indian sub-continent, parts of China, and the Andes in South America.

Declining crop yields, especially in Africa, are likely to leave hundreds of millions without the ability to produce or purchase sufficient food - particularly if the carbon fertilisation effect is weaker than previously thought, as some recent studies suggest. At mid to high latitudes, crop yields may increase for moderate temperature rises (2 - 3°C), but then decline with greater amounts of warming.

Ocean acidification, a direct result of rising carbon dioxide levels, will have major effects on marine ecosystems, with possible adverse consequences on fish stocks.

Rising sea levels will result in tens to hundreds of millions more people flooded each year with a warming of 3 or 4°C. There will be serious risks and increasing pressures for coastal protection in South East Asia (Bangladesh and Vietnam), small islands in the Caribbean and the Pacific, and large coastal cities, such as Tokyo, Shanghai, Hong Kong, Mumbai, Calcutta, Karachi, Buenos Aires, St Petersburg, New York, Miami and London.

Climate change will increase worldwide deaths from **malnutrition and heat stress**. Vector-borne diseases such as malaria and dengue fever could become more widespread if effective control measures are not in place. In higher latitudes, cold-related deaths will decrease.

By the middle of the century, 200 million more people may become **permanently displaced** due to rising sea levels, heavier floods, and more intense droughts, according to one estimate.

Ecosystems will be particularly vulnerable to climate change, with one study estimating that around 15 - 40% of species face extinction with 2°C of warming. Strong drying over the Amazon, as predicted by some climate models, would result in dieback of the forest with the highest biodiversity on the planet.

The consequences of climate change will become disproportionately more damaging with increased warming. Higher temperatures will increase the chance of triggering abrupt and large-scale changes that lead to regional disruption, migration and conflict.

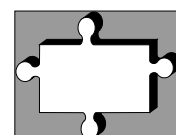
Warming may induce **sudden shifts in regional weather patterns** like the monsoons or the El Niño. Such changes would have severe consequences for water availability and flooding in tropical regions and threaten the livelihoods of billions.

Melting or collapse of ice sheets would raise sea levels and eventually threaten at least 4 million Km² of land, which today is home to 5% of the world's population.

Source: Stern Review, The Economics of Climate Change: Part II – Impacts of Climate Change on Growth and Development; page 55; Released October 30, 2006

Africa

Since 2001, consecutive dry spells in Southern Africa have led to serious food shortages. According to UN Office for Coordination of Humanitarian Affairs, the drought of 2002-03 resulted in a food deficit of 3.3 million tonnes, with an estimated 14.4 million people in need of assistance. The US based National Centre for Atmospheric Research (NCAR), by 2050, the February-to-April wet season there could suffer a 10 to 20 percent drying compared to the average for the previous 50 years. As one Oxford-based academic puts it, "When the rains fail, people die".



Along Africa's coast, the environmental problems already experienced (coastal erosion, flooding, and subsidence) combined with exploitation of coastal resources, development and population pressures are likely to intensify due to climate change. IPCC predicts, "Climate Change will exacerbate existing physical, ecological/biological, and socio-economic stresses on the African coastal zone.

- "14 countries in Africa are subject to low water stress or water scarcity" and a further 11 countries will join them in the next 25 years". Between 1970 and 1995, Africa experienced a 2.8 times decrease in water availability.
- Land areas may warm by as much as 1.6 degree C over the Sahara and semi-arid regions of Southern Africa by 2050.
- In southern Africa and parts of the Horn, rainfall is projected to decline by about 10 percent by 2050.
- Sea level is projected to rise around 25cm by 2050

The west coast of Africa is currently affected by storm surges and is at risk from extreme storm events, erosion and inundation. With climate change, tidal waves and storm surges may increase and inundation could become a major concern. East Africa's coastal zone will also be affected: climatic variation and sea level rise may decrease coral patch and reefs along the continental shelf, reducing their buffer effects and increasing the likelihood of east coast erosion. (Africa Up in Smoke, 2005a)

Latin America and the Caribbean

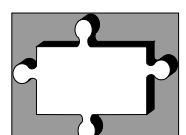
A recent comprehensive assessment of the likely impacts of climate change on the region, funded by the World Bank's Global Environmental Facility (GEF), concludes that, "Increased ocean temperatures are a common feature of all the models used to predict global warming and its effects on the *El Nino* may be made both more frequent and severe by global warming. As a sign of things to come, the 1997-98 El Nino led to severe drought in Brazil, worsening major forest fires. The harvest of fish fell by 53 percent. The phenomenon also triggered severe bleaching and subsequent death of a significant percentage of corals along then MesoAmerican reef (MAR) system. It was also responsible for the collapse of a critical lagoon reef community in Belize.

Hurricanes and tropical storms are likely to increase in intensity. With 6 tropical storms and 14 hurricanes, the 005 hurricane season is rated one of the most active and destructive in history. In Central America, the most destructive hurricane was Stan, the eighteenth cyclone of the season.⁹ Although it reached only Category 1, it left a trail of death and destruction in its wake. The storm caused flooding and mudslides in Belize, Costa Rica, El Salvador, Guatemala, Haiti, Honduras, Mexico, and Nicaragua. The entire Central American isthmus suffered its effects.

Sea-level rise is likely to hit coastal areas, particularly in vulnerable parts of the Caribbean, Central America, Venezuela, and Uruguay, leading to loss of coastal land, infrastructure, and biodiversity, as well as the intrusion of soil-contaminating saltwater. Sixty of Latin America's seventy-seven largest cities are located on the coast.

Snow and rainfall patterns are changing, creating extra stress on already limited freshwater availability in Peru, Bolivia, Colombia, Chile, and western Argentina. In subtropical South America, east of the Andes, rainfall has been increasing since about 1970 accompanied by more destructive, sudden deluges. More northern areas of South America are expected to experience greater warming than southern areas of the continent. Climate models predict more rainfall in eastern South America and less in central and southern Chile. Both the positive and the negative rainfall trends on either side of the Andes are predicted to continue for decades. Yet, indicating the likelihood of greater and opposite extremes, the 005 drought in the Amazon Basin was probably the worst since records began. At its height, river levels in parts of the Amazon were at their lowest for 5–60 years.

Warming in high mountain regions melts glaciers, snow and ice, affecting farming and the availability of water to coastal cities and tourist activities. Glacial lake outbursts also pose a threat to lives and livelihoods. Glaciers are currently disappearing fastest in the Venezuelan, Colombian and Peruvian Andes.



Impacts on the poorest

“Poorer people are more susceptible to the destruction caused by hurricanes and flooding for a variety of reasons. The poor typically live in substandard housing that is more susceptible to damage from winds, heavy rain and floodwaters. Substandard or non-existent sewage facilities and lack of potable water in poor neighborhoods can result in greater exposure to water-borne diseases after flooding. Areas that are historically prone to flooding or mudslides are often inhabited by the poor.”

The climate in Latin America and the Caribbean is changing and will continue to do so. What emerges most strongly from this report is that the impacts of climate change are hugely magnified by abuse of the natural environment – the destruction or inappropriate use and management of natural resources. This abuse is rarely due to the activities of poor communities, who have little say in, or are themselves victims of infamous ‘mega projects’ built in the name of development, illegal logging and deforestation, over-fishing, mining, and governmental neglect. But because of this environmental damage it is much more difficult for poor communities to cope with climate change. Women suffer most because they are the main providers of food, fuel and water for the household. The difficulties faced by communities in coping or adapting are greatly increased by the neglect of the needs and capacities of women. (Up in Smoke, 2005b)

Concerns of Developing Countries, Least Developed Countries, Small Island Development States

Vulnerability of developing countries to climate change

The majority of developing countries are in tropical and sub-tropical regions, areas predicted to be seriously affected by the impacts of climate change: Africa, Asia, Latin America and the Small Island States (for example Mauritius) have all been identified as regions of concern. This is compounded by the fact that developing countries are often less able to cope with adverse climate impacts:

- **Poverty exacerbates, and is exacerbated by, the impacts of environmental change:** Between 1990 and 1998, 97% of all natural disaster-related deaths occurred in developing countries. 90% of all natural disasters are climate, weather and water related.
- **Livelihoods are highly dependent on climate-sensitive resources:** agriculture in Sub-Saharan Africa, of which up to 90% is rain-fed, accounts for 70% of regional employment and 35% of gross national product.
- **Low adaptive capacity:** the poorest inhabitants of developing countries, especially those in the Least Developed Countries (LDCs), already struggle to cope with current extreme weather events and climate variability. In 2004 severe flooding in Bangladesh, caused by excessive rains of the annual Asian Summer Monsoon, killed over 600 people and displaced over 20 million. The greater frequency and severity of climate shocks is repeatedly eroding coping capacity. The most vulnerable sectors of society include:
- **Those dependent on natural resources:** especially subsistence farmers dependent on rain-fed crops.
- **Shanty town dwellers:** living on unsuitable land, often unstable and/or flood prone and lacking infrastructure.
- **Those living in extreme poverty:** the UN estimate that 1.3 billion people live on less than \$1 per day.

Climate change has the potential to undermine poverty reduction efforts and could compromise the Millennium Development Goals (MDGs)³, such as the eradication of extreme poverty and hunger by 2015. The OECD⁴ and the World Bank estimate that 40% of overseas development aid may be climate sensitive. Additionally, funding for humanitarian response to disasters (73% of which are climate related), which now cost donors US\$6 billion per year, may result in the reallocation of funding from on-going development activities. This can set back the development process for decades.

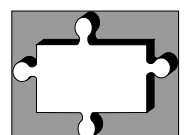


Table: Climate change impacts in developing countries

Environmental Impacts	Socio-economic resources and sectors affected
<ul style="list-style-type: none"> • Changes in rainfall patterns • Increased frequency and severity of: <ul style="list-style-type: none"> Floods Droughts Storms Heat waves • Changes in growing seasons and regions • Changes in water quality and quantity • Sea level rise • Glacial melt 	<ul style="list-style-type: none"> • Water resources • Agriculture and forestry • Food security • Human health • Infrastructure (e.g. transport) • Settlements: displacement of inhabitants and loss of livelihood • Coastal management • Industry and energy • Disaster response and recovery plans

Source: Postnote, 2006

Least Developed Countries Concerns

LDCs represent the poorest and the weakest group of the international community. They are also among the most vulnerable to the adverse impacts of climate change in future. It is therefore essential for these countries to prepare themselves for coping with, or, one can say, 'adapting' to such impacts. To ensure that such adaptation measures and policies are built-in to their existing and sectoral development activities.

The LDCs have contributed least to the emission of greenhouse gases but are the most vulnerable to the adverse impacts of climate change, because of their locations in some of the most vulnerable regions of the world (areas prone to droughts, floods, etc.) and their low capacity to adapt to and cope with such events.

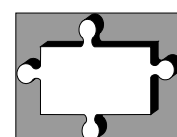
Small Island Developing State Concerns

Small Island Developing States (SIDS) include low-lying coastal countries that share similar sustainable development challenges, including small population, limited resources, remoteness, susceptibility to natural disasters, vulnerability to external shocks, and excessive dependence on international trade. Their growth and development is often further stymied by high transportation and communication costs, disproportionately expensive public administration and infrastructure due to their small size, and little to no opportunity to create economies of scale.

Currently, fifty-one small island developing States and territories are included in the list used by the United Nations Department of Economic and Social Affairs in monitoring the sustainable development of SIDS. These countries are often categorized by their three regions; the Caribbean, the Pacific, and the AIMS (Africa, Indian Ocean, Mediterranean and South China Sea). These States and territories often work together in the United Nations through the Alliance of Small Island States (AOSIS).

It is cruel and ironic that while SIDS contribute the least to global emissions of greenhouse gases, they are the most vulnerable to climate change and least able to protect themselves from its adverse impacts.

The adverse effects of climate change, climate variability, sea-level rise and associated phenomena such as the increase in the intensity and frequency of hurricanes and other extreme weather events continue to threaten the sustainable development, livelihoods and very existence of SIDS. For example in 2004, over 3000 persons were killed in Haiti as a result of Tropical Storm Jeanne. That same year Hurricane Ivan destroyed or damaged over 90% of the houses in Grenada and caused over US \$815 million in damages or twice the GDP of that country. For SIDS the adverse impacts of climate change are real, immediate and devastating.



Despite recognition of the vulnerability of SIDS, it is believed that there is not a sense of urgency attached to addressing concerns. It should be a matter of urgent priority for the international community to support SIDS in the development and implementation of national climate change action plans and strategies. The GEF, the financing mechanism of the UNFCCC must simplify its rules of access and disbursement to take into account the special peculiarities and circumstances of SIDS. As the Third Overall Performance Study of the GEF confirmed the GEF's co-financing requirements are difficult if not impossible for many SIDS to meet, and that more attention must be given to support for the implementation of projects in SIDS that have been identified through years of enabling activities.

National Concerns

Each country must prepare for climate change and act to reduce climate risks and adapt to the reality within their respective country settings: physical characteristics, geographical locations, natural ecosystems, economic, social and political institutions.

1.1.5 Global responses – how adequate?

The environmental and socio-economic impacts of climate change pose a serious threat to development and poverty reduction in developing countries. Tackling the causes of climate change (mitigation) and minimizing the consequences (adaptation) are inherently linked processes and are both essential.

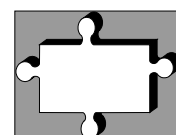
Building adaptive capacity to climate change may be achieved through the mainstreaming of climate risk into sustainable development strategies, however to do this successfully it is necessary to have awareness and understanding of climate change issues.

Specific adaptation actions take place at community or individual level. These actions should build on existing coping methods. Communication between communities will allow coping strategies to be shared.

International response to enable countries to cope with climate challenges are manifested in the inter-governmental climate change negotiations, development assistance framework of developed countries and communities, and the developing countries, particularly the Least Developed Countries (LDCs) and Small Island Developing States (SIDS) through enabling policies, institutions and processes to address climate risks and adaptation priorities.

Climate change impacts can sabotage the efforts to achieve the goals of sustainable development, including in particular by augmenting poverty in developing countries especially the Least Developed Countries and the Small Island Developing States. Furthermore, development paths and production and consumption patterns have various impacts on the climate system. Increasingly climate change is being considered in the broader context of sustainable development, for instance through the integration of climate policies into national development planning and national sustainable development strategies. The UN Commission on Sustainable Development (CSD), in its multi-year Programme of Work, put the theme of climate change along with such issues as energy, atmosphere/air pollution and industrial development on the agenda of CSD-14/15.

The UN Framework Convention on Climate Change (UNFCCC) is the most significant development to address climate change concerns at the global level. There are currently ten agenda items in the Climate Change Convention that address vulnerability and adaptation in the context of climate change negotiations, with particular attention having been given to issues relating to Article 4.8 and 4.9, and to scientific and technical aspects under the relevant SBSTA agenda item on adaptation. Other aspects have been treated elsewhere on the SBI and SBSTA agendas. For example, adaptation is addressed under topics such as non-Annex I national communications, methodologies, technology transfer, Article 6 (education, training and public awareness), and research and systematic observation. In the future, adaptation may be an important element of work under the Kyoto Protocol, for example, with financing from the clean development mechanism (CDM) and the provision of guidance to the GEF on the operation of the Adaptation Fund.



The activities under the agenda items mentioned above address the following:

- Collecting, compiling, synthesizing and disseminating information on impacts, vulnerability and adaptation, including on methodologies, technologies and activities reported in national communications and NAPAs;
- Facilitating support for capacity building and enabling activities;
- Developing mechanisms, facilitating dissemination of information and increasing public awareness – including clearinghouses, information systems and organizing workshops;
- Facilitating the exchange of information and sharing experiences and views among Parties on practical opportunities and solutions to facilitate the implementation of the Convention in relation to adaptation;
- Liaising/cooperating with the United Nations and other international organizations on adaptation issues.

National Adaptation Programmes of Action (NAPA)

Rationale for NAPAs

NAPAs (national adaptation programmes of action) provide a process for Least Developed Countries (LDCs) to identify priority activities that respond to their urgent and immediate needs with regard to adaptation to climate change. The rationale for NAPAs rests on the limited ability of LDCs to adapt to the adverse effects of climate change. In order to address the urgent adaptation needs of LDCs, a new approach was needed that would focus on enhancing adaptive capacity to climate variability, which itself would help address the adverse effects of climate change. The NAPA takes into account existing coping strategies at the grassroots level, and builds upon that to identify priority activities, rather than focusing on scenario-based modeling to assess future vulnerability and long-term policy at state level. In the NAPA process, prominence is given to community-level input as an important source of information, recognizing that grassroots communities are the main stakeholders.

Chronological evolution of concept of NAPAs

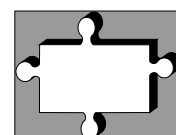
Article 4.9 of the United Nations Framework Convention on Climate Change (UNFCCC) recognizes the specific needs and special situations of the LDCs. Decision 5/CP.7 of the 7th Conference of the Parties (COP) also acknowledged the specific situations of LDCs, in that they do not have the means to deal with problems associated with adaptation to climate change, and established an LDC work programme including NAPAs as well as other supporting activities. Decision 28/CP.7 set the guidelines for NAPAs. Also related to the NAPA process, Decision 29/CP.7 set up an LDC Expert Group (LEG) to provide guidance and advice on the preparation and implementation strategy for NAPAs.

Focus of NAPAs

The NAPAs focus on urgent and immediate needs – those for which further delay could increase vulnerability or lead to increased costs at a later stage. NAPAs should use existing information; no new research is needed. They must be action-oriented and country-driven and be flexible and based on national circumstances. Finally, in order to effectively address urgent and immediate adaptation needs, NAPA documents should be presented in a simple format, easily understood both by policy-level decision-makers and by the public.

The NAPA process

The steps for the preparation of the NAPAs include synthesis of available information, participatory assessment of vulnerability to current climate variability and extreme events and of areas where risks would increase due to climate change, identification of key adaptation measures as well as criteria for prioritizing activities, and selection of a prioritized short list of activities. The development of a NAPA also includes short profiles of projects and/or activities intended to address urgent and immediate adaptation needs of LDC Parties.



1.2 Why a Country Framework to mainstream climate risk and adaptation concerns?

Mainstreaming has become a buzzword in the adaptation to climate change discourse for some years now. Further, researchers and institutions have embarked on describing and detailing out rationale, approaches, policies, processes, tools and techniques to enable mainstreaming climate concerns in development assistance and cooperation as well as in national development planning.

Some countries and regions are already taking initiatives to mainstream climate change, and efforts to mainstream at organizational level are also being planned, or already underway.

A wealth of resource is currently available that addresses raising the profile and concern among policymakers and development practitioners, where suggestions and recommendations to mainstream climate concerns in overall development process are made. All these contribute significantly toward developing an enabling environment to achieve the desired purpose.

However, there still remains much room to contribute to the emerging response to the climate concerns. A country framework to operationalize mainstreaming climate risk management and adaptation activities and processes is one such area that could fill in a wide gap. This framework should have potential and promise that are easy to interpret to those who actually implements the mainstreaming processes and activities. Side by side, to ensure ownership of relevant actors and institutions that ultimately manifests in the mainstreaming of climate concerns, the country framework must ensure adequate mechanisms to promote coordination and cooperation across different sectors, at different levels. The most significant contribution such a framework can aim to achieve is to provide a basis for learning, to promote and motivate countries and communities to explore options to operationalize mainstreaming climate concerns in their country settings.

1.3 A snapshot review- Mainstreaming Climate Risk and Adaptation in Development Process

Mainstreaming adaptation to climate change is an emerging and growing area of interest among a wide range of development actors and institutions, including UNDP, UNEP, UNFCCC Secretariat.

The European Commission, OECD, World Bank, USAID, DFID, GTZ, CIDA, SIDA, SDC, Norad among many others have policy directives with regard to adaptation to climate change and the need to mainstream climate change concerns into their portfolio.

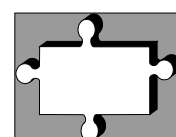
A number of excellent contributions describing the different aspects of mainstreaming Climate Change concerns into the overall development processes, policies and institutions are available now. Some of these address methods and results of screening ODA (Klein, Richard J. T., 2006).

Others provide overview of mainstreaming adaptation in the context of sustainable development. Their major focus is outlined below:

Mainstreaming climate change adaptation through integrated risk reduction approach has also been piloted with selected programs and sectors in the Pacific, along with preparation of national guidelines for mainstreaming adaptation to climate change (ADB, TA 6064-REG)

In Uganda, efforts have been initiated to mainstream adaptation to climate change in the development process. (Orindi A. Victor and Eriksen, S, 2005)

Sir Michael Stern, in his recent Review: *Economics of Climate Change* notes that Governments have a role in providing policy framework to guide effective adaptation by individuals and firms in the medium and longer term. Four areas are identified for action. These are high quality climate information and tools for risk management, land use planning and performance standards, long term policies for climate sensitive public goods, and a financial safety net for the poorest in the society. (Stern, M., 2006)



Mainstreaming Adaptation to climate Change into Official Development Assistance: Promoting Synergies or Diverting Money?

Klein et al. (2006) assesses the screening activities to date, focusing on both the results and the methods applied by the six development agencies (Norad, OECD, DFID, WB, GTZ, SDC). They found that different approaches towards screening consider different types of challenges for the mainstreaming of adaptation to climate change. A concerted research effort is needed to answer questions concerning the efficiency and effectiveness of mainstreaming, barriers to and opportunities for mainstreaming, the accountability of industrialized countries with respect to their commitments under the UNFCCC and ultimately, the practical desirability of mainstreaming adaptation into ODA. (Klein, Richard J. T., 2006)

Adaptation to Climate Change in the context of Sustainable Development: Background Paper

This paper seeks to explore the nexus between adaptation to climate change and sustainable development and discusses ways of mainstreaming adaptation considerations into sustainable development efforts. The paper discusses vulnerability and adaptation; vulnerability and adaptation assessments; integration of adaptation concerns into the sustainable development process; and funding adaptation. (Teri, Undated)

Technical Assistance Completion Report Division: PAHQ. TA 6064-REG: Climate Change Adaptation Program for the Pacific

This report discusses climate change adaptation mainstreaming through integrated risk reduction (CCAIRR), on a pilot basis, in development planning and management in selected PDMCs and ADB operations. The report covers several major outputs including mainstreaming climate change adaptation into ADB programs and projects to better respond to country needs; and at the country level, i.e. mainstreaming climate change adaptation at the national development planning, program, and project levels through case studies in the Cook Islands and FSM (Federated States of Micronesia). The TA also produced "National Guidelines for Mainstreaming Adaptation to Climate Change". (TA 6064 –REG)

Mainstreaming Adaptation to Climate Change in the Development Process in Uganda

This report contributes to the identification of ways through which communities, especially vulnerable groups, may be enabled to adapt to climate change. The potential impacts of climate change on Uganda and illustrated possible adaptation measures are outlined, taking into consideration social, economic and environmental trends and sources of vulnerability. The development of new dam sites and modernization of agriculture, are focused on climatic rather than socio – economic constraints to livelihoods. As a result, many of the suggested measures focus on technological solutions to particular changes in specific climate parameters and require high technological and capital investments. (Orindi A. Victor and Eriksen, S, 2005)

Risk and Vulnerability Program

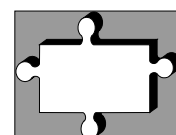
Risk and Vulnerability program are fourfold: to advance the conceptual and methodological development to risk and vulnerability research; to carry out selected risk and vulnerability assessments; to carry out integrative stakeholder-led case studies; and to develop interactive tools that can provide training on vulnerability and adaptation. In support of these strategic goals, seven projects are planned for 2006.

- Cross –cutting conceptual and Methodological Research Project
- Assessing Risk, Vulnerability and Adaptive Capacity Project
- Vulnerability and Adaptation to Weather Extremes in Europe project
- Assessing Social and Economic vulnerability of Disasters in Megacities Project
- Integrative Case Studies of vulnerability and Governance Project
- Assessing and Reducing Vulnerability in China's Dongting River Basin Project
- Case studies on Developing Adaptive River Management Regimes Project

(Bayer, J. Linnerooth, Undated)

Disaster Risk Management in a Changing Climate

The paper discusses inter-linkages and differences between disaster risk management and adaptation to climate change, and outlines opportunities and barriers for collaboration (Sperling, F. and Szekely, F., 2005)



Portfolio Screening for Mainstreaming Adaptation to Climate Change

This paper attempt to bring together experiences from recent efforts to screen development policies, projects and programmes with regard to climate change, focusing on scope, results and methods applied. Based on the lessons emerging from these screenings, the paper presents an outline for a portfolio – screening tool to promote mainstreaming of climate change in development co-operation. The screenings of development agencies projects and programmes have shown, first, that climate change is almost absent from the agencies activities

(Eriksen, Siri E.H., Naess, L. O., Klein, R.J.T., Hammill, A., Robledo C., Brien, 2005).

Towards Consensus and Cooperation for Mainstreaming Disaster Reduction into Development: A Case Study from the Caribbean

The Comprehensive Disaster Management (CDM) Strategy was successful in providing an avenue for involving critical actors in disaster risk reduction – including the adaptation to climate change community – in a mechanism, in which their participation before was at best marginal. The collaboration between CDERA, UNDP and ACCC on a programme for mainstreaming of climate change in disaster management in the region is testimony to the benefits of shared strategic objectives.

(UNDP, 2004)

Adaptation to Climate Change: A paper for the International Climate Change Taskforce

This paper focuses on include: funding for adaptation policies; research and capacity building; insurance; and linkages between adaptation and development issues. It also explores how this issue might be tackled in future climate change and development negotiations, while making use of the UK's presidencies of the EU and G8 in 2005, which present a major opportunity to give new momentum to this issue.

The issue of adaptation to climate change for developing countries in particular is closely tied to their own development in at least two important respects:

- Mainstreaming adaptation into development related sectors such as water management, agriculture, poverty reduction disaster management, coastal zone management, etc.
- Climate proofing official development assistance.

(Huq, S., 2005)

Tools and Methodologies for Mainstreaming Vulnerability and Adaptation to Climate Change into Sustainable Development Planning

This paper describes the principles of mainstreaming as it applies to climate change vulnerability and adaptation, particularly for sustainable development planning. It draws on international experience, and applies this to the case of southern and eastern Africa. The necessity of mainstreaming is increasingly recognized among scholars and practitioners in the field. Several of the projects in the GEF –AIACC program are directed at incorporating actions to deal with climate change risks into resource management and development programs. A key feature of effective mainstreaming is to ensure that initiatives can fit within the relevant policy or decision structures.

(Smith, B., and Benhin J., 2004).

Putting Climate Change Adaptation in the Development Mainstream. Policy Brief

This Policy Brief looks at ways to improve the “mainstreaming” of adaptation to climate change and what are the barriers to mainstreaming adaptation to climate change in development planning. Lack of awareness of climate change within the development community and limitations on resources for implementation are the most frequently cited reasons for difficulties in mainstreaming adaptation to climate change within development activity. Like

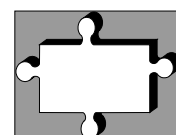
- Barriers within governments and donor agencies.
- Insufficient relevance of available climate information to development-related decisions

(OECD, 2006)

Bridge over troubled waters: linking climate change and development

Several findings have emerged from this work which reinforce the need for, and the challenges faced in, taking climate change into account in development planning and activities. Why mainstreaming climate change is so difficult to implement – within development activity? Following is a more complex web of reasons.

- Segmentation and other barriers within governments and donor agencies limit mainstreaming.



- Available climate information's often not directly relevant for development – related decisions.
- Sometimes there are trade-offs between climate and development objectives.
(OECD, 2005)

Managing Climate Risk

Climate change directly affects the World Bank Group's mission of eradicating poverty. Key development sectors directly affected by climate change, such as- human health, water supply and sanitation, energy, transport, industry, mining, and construction, trade and tourism, agriculture, forestry, and fisheries, environmental protection, and disaster management. Worrying, the rising risks of climate change and their implications for development are seldom explicitly addressed in World Bank Group operations. Climate risks facing development investments are:

- Direct threats to investments (e.g., effect of extreme weather events on infrastructure)
- Underperformance of investments (e.g., irrigation investments that fail to pay off when rainfall decreases)
- Maladaptation, as when economic development triggers settlement in vulnerable areas or taxes the resilience of natural resources.

In addition, there is the risk of forgoing opportunities that may arise from climate change and could be captured if factored into plans and projects.

The World Bank Group's work on climate change adaptation rests on some pillars, which are closely related:

- Integration of climate risk management into the country dialogue.
- Integration of climate risk management into projects.

Mainstreaming climate risk management: The Kiribati Adaptation Program is one example of the international community's efforts to help island countries adapt to climate change (World Bank, 2006).

GEF supported Mainstreaming Adaptation to Climate Change (MACC)

Build Capacity to Assess Vulnerability and Risks Associated with Climate Change (modelling); to Reduce Vulnerability to Climate Change (training); to Effectively Access & Utilize Resources to Reduce Vulnerability to Climate Change; Public Education and Outreach; identify "no regrets" adaptation measures; country and regional level multi-sectoral adaptation strategies (GEF, Undated).

Mainstreaming Adaptation

This presentation covers definition of mainstreaming adaptation, background to mainstreaming adaptation, current mainstreaming efforts and Key topics for discussion (Tellam, I., 2006).

Mainstreaming Adaptation to Climate Change in Least Developed Countries (LDCs)

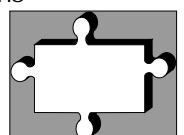
The experience cited in this report on two LDC countries, namely Bangladesh in Asia and Mali in Africa, shows that although much has been achieved in terms of describing and analyzing vulnerability to climate change and identifying potential adaptation options, there remains much more to be done in terms of mainstreaming adaptation to climate change within the national policy making processes in those countries.

Mainstreaming Adaptation are summarized, somewhat subjectively, as coastal Resource Management, Fresh Water Resource Management, Agriculture, Human Health, Ecosystems and Biodiversity, Cross-Cutting Issues and Research; High Level Policy Makers. (Huq, S., Rahman, A., Konate, M., Sokona, Y., and Reid, Hannah, 2003).

Climate Change and Poverty: Making development resilient to climate change

Key sheets emphasized integration of climate change adaptation into development, addressing:

- Climate change deepens poverty and challenges poverty reduction strategies
- The impact of climate change on pro-poor growth; vulnerability and health of the poor
- Responding to the risks of climate change: Are different approaches to poverty eradication necessary?
- Adaptation to climate change: Making development disaster-proof. Climate change increases the urgency of integrating risk management into development interventions



- Adaptation to climate change: The right information and insurance reduce the vulnerability of the poor?
- Taking initial steps towards adaptation
- Climate change in Asia (DFID, 2004)

Adaptation Policy Frameworks for Climate Change: Developing Strategies, Policies and Measures

This guide book designed primarily for the technical analysts, climate project coordinators and developers and climate change policy makers and stakeholders for sustainable development. Adaptation policy framework provides details on; scoping and designing on adaptation projects, assessing current vulnerability, future climate risks, adaptation strategy (priority adaptation option), continuing adaptation process, engaging adaptation stakeholders, Assessing and enhancing adaptation capacity. The guide book provides details on each of the component mentioned (UNDP, 2005).

How will global warming affect my world? A simplified guide to the IPCC's "Climate Change 2001: Impacts, Adaptation and Vulnerability"

This booklet summarized the most recent assessment of this growing knowledge by the Intergovernmental Panel on Climate Change (IPCC). The recent assessments; The polar regions will warm fastest, New rainfall patterns will threaten water supplies, wildlife and ecosystems will face additional stress, The sea level will rise as ocean waters warm, New environmental conditions could affect food security, Environmental changes will harm human health, Settlements and infrastructure will need to adapt, Extreme weather events will boost costs, Lastly, Conclusion: get ready to adapt. (UNEP, 2003).

Guidelines for the preparation of national adaptation programmes of action

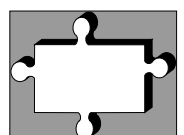
This guidelines structured by Introduction; Objective of NAPAs; Characteristics of NAPAs; Guiding elements; Process; Structure of NAPA document. The NAPA team will be responsible for preparing the NAPA and coordinating the implementation of NAPA activities. This team will synthesize available information on adverse effects of climate change and coping strategies, which would be collated and reviewed, including the national strategies for sustainable development, the Programme of Action for the LDCs, the United Nations development assistance frameworks, and poverty reduction strategy papers, if available in the countries. And to assess where climate change is causing increases in associated risks. Structure of NAPA will cover current characteristics, key environmental stresses, and how climate change and climate variability adversely affect biophysical processes and key sectors. Framework for adaptation section will also provide an overview of climate variability and observed and projected climate change and associated actual and potential adverse effects of climate change. This overview will be based on existing and ongoing studies and research, and /or empirical and historical information as well as traditional knowledge. A set of locally –driven criteria will be used to select priority adaptation activities. For each of the selected priority activities a set of profiles will be developed for inclusion in the NAPA document (UNFCCC, 2002).

National Adaptation Programmes of Action

NAPAs have been prepared considering Mainstreaming adaptation to climate change into policies and programmes in different sectors (focusing on disaster management, water, agriculture, health and industry). NAPA have been prepared by seven countries, and the remaining LDCs are in preparation process. The countries with completed NAPAs are Islamic Republic of Mauritania, Republic of Malawi, Bhutan, Republic of Niger, Samoa and Djibouti. These seven NAPAs have been structured as: Introduction and Setting, Framework for Adaptation, Identification of key Adaptation Needs, Criteria for Selecting Priority Activities, Identification of Priority and Urgent Needs for Adaptation, NAPA preparation process and concluding remarks and Way Forward.

National Approaches to Adaptation: Some Lessons Learnt from recent OECD and UNFCCC Workshops

This paper provides a brief summary of the national approaches presented at the OECD and UNFCCC workshops. The OECD workshop, for instance, was an opportunity for a dialogue between climate and development experts. The UNFCCC workshop brought together different experts, including those of the disaster management community. Two international meetings took place around adaptation issues, which were; the OECD Global Forum on Sustainable Development: Development and Climate Change, on 11-12 November 2004; and the In-Session Workshop on adaptation, as part of the SBSTA meetings, on 8 December 2004.



Participants did not always represent their government's positions, so presentations did not necessarily reflect exactly or exhaustively what occurs in each country regarding adaptation. In particular, presentations involved a mix of impact and vulnerability assessments, case studies, as well as local, sectoral or national adaptation strategies. About half of presentations discussed specific strategies for adaptation, which include efforts to mainstream adaptation in relevant policy areas, including through specific legal instruments. Four presentations particularly emphasized processes existing in their country to raise awareness of the need to adapt, to consult stakeholders in developing adaptation strategies and / or develop capacity for stakeholders to adapt to climate change. The two workshops give some indication of the different kinds of assessments that are needed in order to take action.

- Adaptation is a process with multiple components, such as impact and vulnerability assessments, awareness-raising, capacity building, stakeholder participation and mainstreaming.
- Within these elements, awareness-raising and participation are seen as particularly important, as well as cooperation between different decision levels: national and local governments, the research community, the private sector, local communities, individuals, and/or the international community.
- As far as assessments are concerned, particular emphasis is placed on an appropriate combination of top-down and bottom-up assessments, which are issue- and /or location – specific.
- The role of adaptation assessments is to come up with priorities for adaptation. In this context, adaptation to current impacts of climate variability and /or change is a priority, but attention also needs to focus on future impacts, in particular as regards infrastructure, which has a long lifetime.
- As far as mainstreaming is concerned, the most critical challenge is the implementation of adaptation strategies, which requires the right institutions, the right incentives, as well as the right instruments.
- Countries are different, but they can share knowledge, technologies and tools on adaptation.

Finally, several aspects of national adaptation strategies have received less attention at both workshops, and may provide interesting topics for future reflection:

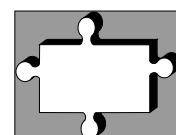
- National adaptation research is an important element of adaptation strategies.
- A closer look may be warranted on how sectoral policies, such as agriculture, urban or land- use planning, natural resources management, may be altered in practice to take into account adaptation to climate change.
- As noted in the Chair's Summary of the OECD Forum, there is a clear need to place climate change considerations within a broader economic risk management framework. (March 2005)

Adapting to climate change: challenges and opportunities for the development community

This discussion paper is aimed at improving understanding about adaptation to climate change within development agencies, their partners and other institutions/individuals working in the development community. In particular, it is designed to stimulate broader engagement and debate on key issues around development and climate change adaptation, which have been mostly restricted to the 'climate change community'. (Tearfund, 2006)

Overcoming the barriers: mainstreaming climate change adaptation in developing countries

This report reviews what progress has been made by developing country governments and donor agencies in mainstreaming climate adaptation into development planning. It examines barriers to further progress and provides recommendations on how these barriers can be overcome. It intends to promote discussion on opportunities for further research and on strategies for increasing awareness and information. (Tearfund, 2006)



Some contributions on climate change adaptation and mainstreaming

Continuing the Adaptation Process, ROSA T. PEREZ AND GARY YOHE; Contributing Authors *Bo Lim, Erika Spanger-Siegfried, David Howlett, and Kamal Kishore*; in *APF*; pp 207-223

Adapting to climate change: a checklist for development Guidance on designing developments in a changing climate; **Published by** Greater London Authority, London Climate Change Partnership; United Kingdom, November 2005

Action on Climate Change: Considerations for an Effective International Approach Discussion Paper for the Preparatory Meeting of Ministers for Montreal 2005: United Nations Climate Change Conference; Government of Canada, 2005

An Operational Framework For Mainstreaming Disaster Risk Reduction; Thomas Mitchell; Benfield Hazard Research Centre; Disaster Studies Working Paper 8; November 2003

A Climate Risk Management Approach to Disaster Reduction and Adaptation to Climate Change; UNDP Expert Group Meeting Integrating Disaster Reduction with Adaptation to Climate Change; Havana, June 19-21, 2002

Linking Climate Change Adaptation And Disaster Risk Management For Sustainable Poverty Reduction; Draft for Discussion; Informal Background Paper; VARG Workshop; Geneva, October 2-4, 2006

Climate Change and Development Links; Saleemul Huq, Hannah Reid, and LaureIA.Murray, Gatekeeper Series 123, IIED, 2006

Danish Development Cooperation and Climate Change; in Danish Climate and Development Assistance Programme; Chapter 5 of 11; <http://www.netpublikationer.dk/um5736/index.htm>

Summary of NORAD/GECHS workshop on climate change and development; Kirsten Ulsrud and Siri Eriksen; Oslo; January 9-10, 2006

Addressing technical assistance needs for adaptation to climate change in vulnerable Commonwealth countries; SCC Data Paper 1; 26th Commonwealth Parliamentary Conference of Members from Small Countries; Abuja, Nigeria; 3-4 September 2006

Finland's National Adaptation Strategy; Ministry of Agriculture and Forestry; Government of Finland; <http://www.mmm.fi/sopeutumisstrategia>

Mainstreaming Adaptation to Climate Change in Coastal Bangladesh by building Civil Society Alliances; Frank Thomalla, Terry Cannon, Saleemul Huq, Richard J.T. Klein, ND Claudia Schearer

United Nations; **United Nations Framework Convention On Climate Change**; 1992

UNDP; **Adaptation Policy Frameworks for Climate Change, Developing Strategies, Policies and Measures**; Bo Lim and Erika Spanger-Siegfried Ed, 2005

Stern, Michael. **Stern Review, The Economics of Climate Change**; United Kingdom; Released October 30, 2006

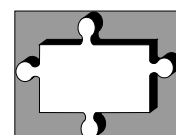
UNEP, WMO **Third Assessment Report**, Inter Governmental Panel on Climate Change (IPCC), 2001

Adaptation under the UN Framework Convention on Climate Change: The Legal Framework, M. J. Mace, Foundation for International Environmental Law and Development FIELD, August 2003

Climate Change and Adaptation, Jo-Ellen Parry, Anne Hammill and John Drexhage, IISD, August 2005

Tearfund, **Adapting to climate change: challenges and opportunities for the development community**, 2006

Tearfund, **Overcoming the barriers: mainstreaming climate change adaptation in developing countries**, 2006



1.5 Goal and Objectives of the Country Framework

The overarching *goal* of this working paper and the Country Framework tool is ***to ensure national development is resilient to climate change and its impacts in such a way that the lives, livelihood and well being of its people is assured.***

The *objective* of the country framework is ***to facilitate addressing climate risk management and adaptation holistically, practically and systematically in a country setting, thereby enabling development to take into account climate related risks and their management.***

1.6 What the Country Framework is about, for whom, and purpose served

This paper offers a road map to address current and future adverse impacts of climate change and climate variability at country level by systematically integrating climate risk management and adaptation in its development process.

The paper targets decision makers, practitioners, actors and institutions worldwide. Climate Change is already a recognized concern that challenges development and human progress of every nation. Countries are already mobilizing their political, legal, and institutional structures and mechanisms to respond and tackle adaptation needs and priorities.

The Country Framework to implement mainstreaming climate risk management and adaptation serves a wide range of needs. It provides a way for every country to integrate climate risk and adaptation practically. It enables each country to assess and determine the scope and level of adaptation and risk management across different sectors on a continued basis, and over time, at each level of operation. This allows each country and its development process to address climate challenges holistically in its mainstream – a shift from ad-hoc, and segmented interventions. Donors and multilateral development institutions should mainstream and support adaptation across their assistance to developing countries.

Actors, agencies and nations can adapt the Country Framework to suit specific needs and circumstances.

1.7 What the Country Framework is/is not about

Systematic and elaborate toolkits to address climate risks and vulnerability assessment, analysis and synthesis of needs and priorities for adaptation, mainstreaming issues, concerns, potential and practice are part of an emerging and already rich discourse, what we refer here as addressing the *what* of mainstreaming. The proposed country framework is not aimed to offer any alternative, or to undermine their utility or need. Rather, it services the emerging concern to mainstream climate risks and adaptation offering *how to* do it. This significant departure establishes the domain of concern which the proposed framework has taken as its own, drawing on the fact that every country must start to prepare for climate change through mainstreaming climate risk management and adaptation within development plans and processes.

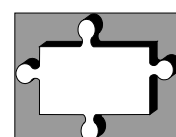
The country framework describe a process whereby different stakeholder groups, actors and institutions are drawn within their respective scope in mainstream development activities to engage in recognizing climate concerns, and chart out ways and means to make their development pursuits climate-proof or climate resilient.

In doing so, the framework offers a generic approach to operationalize mainstreaming activities.

Each country, unique in many aspects, will need to evaluate the utility of such a framework within specific contexts and prevailing operational structures. An important consideration is to promote and support the will to operationalize mainstreaming climate risk management and adaptation not as an isolated concern but that of respective development goals and aspirations.

1.8 Who can use the Country Framework and how?

The primary audience and user for the country framework are countries and their governments. Delegation of Parties to the climate negotiations as well as other relevant platforms including UN-CSD could reflect on the process and approach to identify what could work and what may not in their respective contexts.



This paper targets the development assistance community as an important stakeholder. The rationale to provide support for development that integrates climate risks and concern is much more understood and enabling using this operational framework at country level compared to evaluating incremental cost-benefit options to address climate risks and challenges through isolated adaptation projects and programs that don't "embed systematically in the country's overall development process.

Governments, NGOs, researchers, civil society groups and activists, development practitioners, and people at risk all carry responsibilities in preparing for climate change. Their ownership and importance in operationalizing and sustaining mainstreaming efforts has been the driving principle in the development of this country framework.

1.9 Is the Country Framework consistent with NAPAs?

The Country Framework complements and supports both NAPA preparation and implementation. In fact, it may well be contemplated as one of the important means to address and overcome the barriers to mainstreaming identified in each country as they progress in their development pursuit.

The National Adaptation Programmes of Action (NAPA) process has been initiated to facilitate Least Developed Countries (LDCs) to identify priority needs for adaptation is underway, with seven countries already having completed and submitted their NAPAs with the UNFCCC Secretariat. For an LDC, addressing climate vulnerabilities and risks at a significant scale rests on effective and timely implementation of their country NAPA.

Following established guidelines, each country prioritizes a number of adaptive actions, suggesting capacity building, knowledge management, social communication, institutional arrangements, etc. along with characterizing respective country settings.

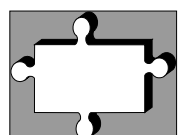
The Country Framework will serve as a guide and assist professionals, practitioners and policy makers of a country by providing the 'How to' for mainstreaming, i.e., how to structure, design and develop these soft wares (Knowledge Management, Social Communication, Institutional Framework, etc.), defining risk environments, and responding to the same as identified in the NAPA.

The funds established through the Convention (LDC Fund, Special Climate Change Fund) and the Kyoto Protocol (Adaptation Fund) all could be drawn on and utilized to match funds and resource required to operationalize the Country Framework toward mainstreaming climate risk and adaptation into development plans and processes.

Over a mid to long term horizon, countries significantly progressing in their mainstreaming activities will be in a better position to identify and determine climate risks and adaptation measures within the scope of development plans and processes.

1.10 Definitions and terms used

This paper and the country framework have used several terms and concepts which might have different or wider connotation or interpretation. These are presented in annexure -xx



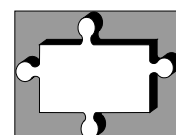
2. PRINCIPLES AND APPROACH

The proposed Country Framework to Mainstream Climate Risk Management and Adaptation is based on the following general principles:

1. Continue to strive for development which is inherently resilient to climate perturbations (including extremes, shocks, and changed average values) of today (i.e., of reference year) and also of those likely to occur in future (any given time frame in future);
2. Integrate climate-related concerns in planning activities, by accommodating responses to climate perturbations mentioned above;
3. Identify synergies between national (even regional) and international institutional architecture and policy instruments.

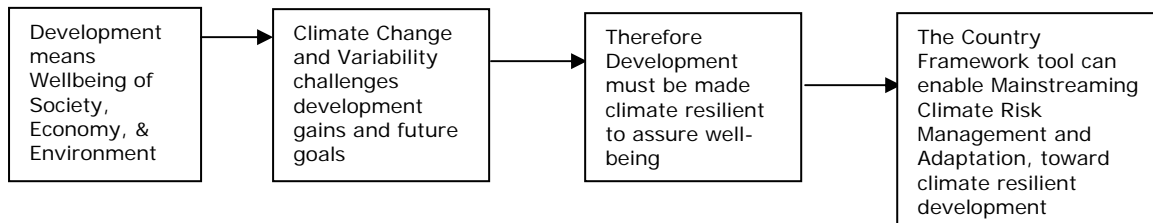
It is envisaged that such principles will help achieve the objective mentioned above by following a number of approaches, which include the following:

- The basic approach for continuing with development programs and activities should emphasize on (i) coordination across institutions and tiers; (ii) partnership among all stakeholders, including partnerships between agencies in charge of implementing development programs and local beneficiary groups; and (iii) integration of local plans into meso-scale plans, of meso-scale plans into macro-level plans, and of macro-level sectoral plans into national development plans.
- Consider whether climate change would (a) put investment for development activities at additional risk; (b) could aggravate vulnerability directly or indirectly; (c) could pose a threat to local level resilience in any perceived way etc. A development plan should highlight alternatives in order to avoid perceived risks from climate perturbations. It is to be borne in mind that development activities need not be abandoned in view of risks from climate perturbations, it should rather be made robust against climate related risks by incorporating measures, which either increase resilience or decrease vulnerability.
- Devise location-specific plans and integrate with plans which have been developed with a vision to address (meso-scale) regional problems.
- Ensure stakeholders' buy-in by integrating concerns of local people (i.e., participatory planning) and respecting local indigenous knowledge.
- Blend local (indigenous) knowledge with technologies to ensure optimal benefits.
- Resolve inter-tier conflicts as much as possible and avoid potential mal-adaptations.
- Engage stakeholders in a two-way communication.
- Continue to outreach and disseminate information for maintaining transparency.
- Continue learning by doing (maintaining a healthy loop of piloting, interim/periodic assessments, and feedback)
- Synergies among international and national institutional architecture, including policies and processes could be intimately followed in order to maintain the pace of development and simultaneous capacity building towards enhanced resilience and increased adaptation. The multi-national environmental agreements (MEA), the Millennium Development Goals (MDG) and related activities, Protocols (viz. Kyoto Protocol), norms (i.e., environmental conservation, polluters' pay principle etc.), institutions (viz. the Global Environmental Facility – GEF etc.) are examples of global-scale institutions. National sectoral development plans, Poverty Reduction Strategy Papers (PRSP) for DCs and LDCs, multiple year medium term development plans and programs etc are examples of national-scale institutional and policy regime, which collectively define the development paradigm of a country.



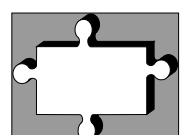
3. AN OVERVIEW OF THE COUNTRY FRAMEWORK

Development implies the well-being of people, and progress of the society. For a country, sustainable development rests on the improvement of welfare of its economy, environment and society over time. Efforts to address sustainable development goals in every country already are, and will be challenged more and more by climate variability and change. This calls for development efforts to integrate climate risk management such that development becomes resilient to climate changes. Thus mainstreaming climate risk management and adaptation into development planning and processes is critical and paramount.



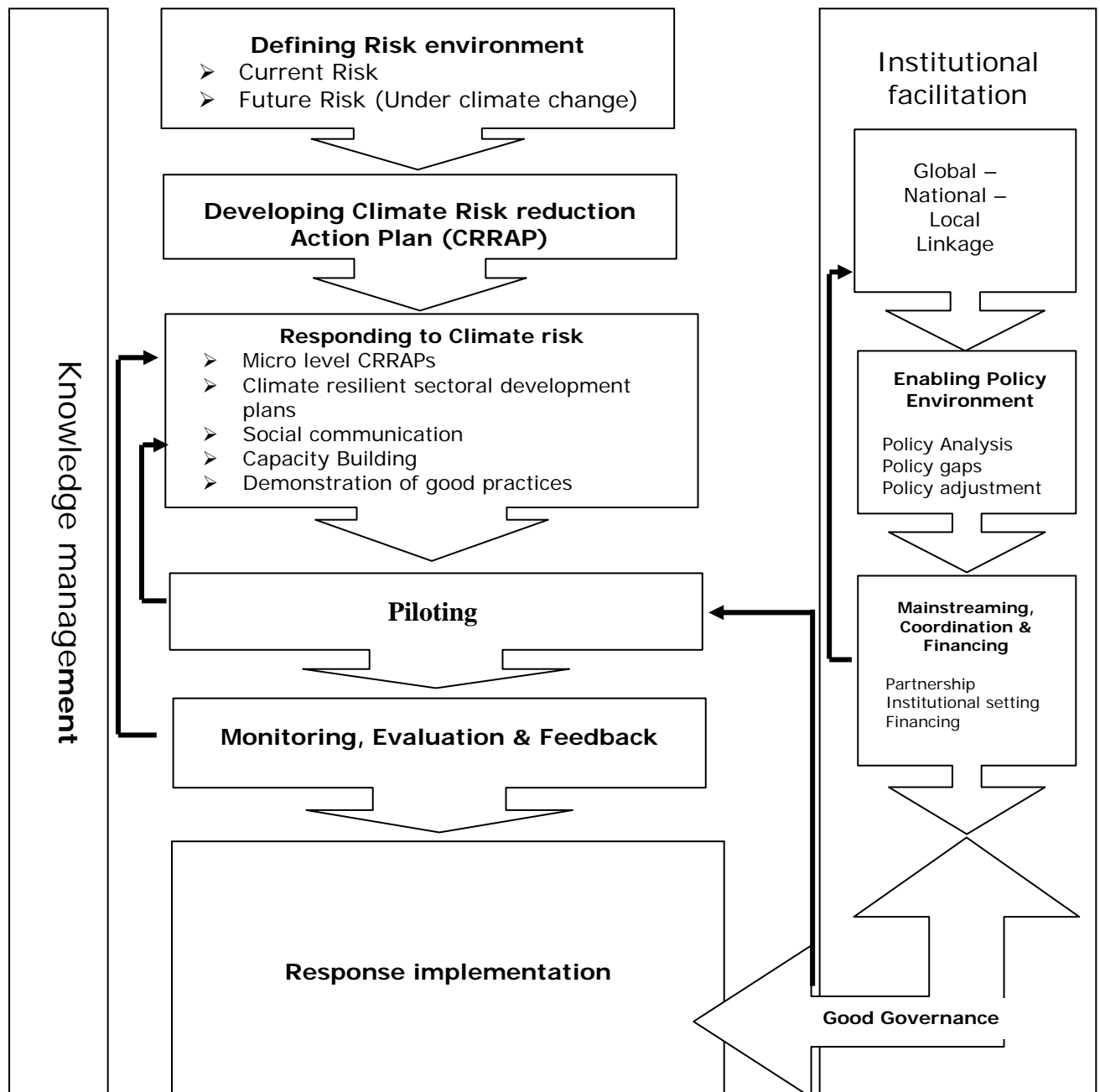
The Country Framework to mainstream climate risk management and adaptation (also referred as Adaptation Framework in some parts of this paper) offers a tool to operationalize processes within development activities at all spheres and levels. The Framework initiates a set of activities in a systematic process, that lead to draw in relevant actors and agencies as the implementation unfold.

As a start, Climate Risk Assessments (CRA) triggers mainstreaming at the ground level. The Local Level Risk Reduction Action Plans (LRRAP) which eventually evolves as a result of the CRAs eventually is reflected in the local level plans. Once integrated in the bottom tier of development planning and interventions, the flow toward district and national level is somewhat established through prevailing in-country mechanisms. Eventually, this will lead to a culture within development practice that demonstrates climate resilience.



The following diagram captures the series of activities and their flow in a nutshell.

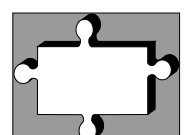
Figure -1 Framework to operationalize mainstreaming climate risk and adaptation



Defining risk environment

The country framework to operationalize mainstreaming climate risk and adaptation following the principles and approaches mentioned in previous chapter begins function defining risk environment and determining risks both for now and future following climate change and change in the variability taking following aspects in to consideration:

- Natural conditions (endowment, availability and quality of natural resource base; geo-physical characteristics; climate-induced primary phenomena etc.);
- Status of physical infrastructure including their concentration, placement, quality, relevance and how these infrastructures behaving to the natural capital flowing pattern;
- Socioeconomic condition of the population in the defined area; and
- Institutional environment including policy regime and support services;



On the other hand sector based approach are prevailing in most of the countries and as such the worries and concerns characterizing the risk environment and pin pointed risks has to be interpreted in terms of sectors and specific response and action plans are to be developed. A prismatic analysis suggested in the next chapter shall assist in understanding and acting accordingly.

Climate change and change in the variability is a reality now and certainly remain a concern in future. As such future risks under climate change has to be defined. The future risks will be a function of changed conditions in all four of the above mentioned aspects: natural condition, status of physical infrastructure, socioeconomic condition, and institutional setting. Any or all four of these aspects might exhibit significant changes, which need to be flagged based on trends, projections, and expert judgments.

A combination of perceived (and plausible) changed conditions and imposing scenarios of climate change and change in the climate variability shall identify future risk.

People perceive climate risks in their own area differently than those living outside the area. It is of value to understand the perception of the local community regarding climate characteristics and trends in their neighborhood for various different time scales covering the past, the present and the future projection year(s). On the other hand modeling exercises are being practiced worldwide to predict impacts of climate change and climate variability. Down scaling the global/regional climate models at a user level describing impacts on the ground shall be used along with the people's perception to develop scenarios of climate change taking changed conditions (natural, socioeconomic, physical and institutional) in to consideration

Responding to climate risks: enabling processes and actions

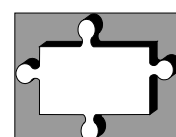
The second important building block of the Adaptation Framework is responding to various needs as deemed necessary to reduce climate change induced adverse impacts and risks. The first step at this stage is to prepare response plans towards reduction of risks identified. The climate driven risks are treated, within the purview of the respective Government's policy regime, as part of the national development programmes and activities. Responses do not necessarily depend on 'specific planning' and 'firm actions', but also on enhancing human and institutional capacity; preparing communities through social communication of risks and responses; demonstration and propagation of 'good practices' etc. The following deserve special mention.

Formulation of Micro-level Risk Reduction Action Plans following the participatory processes which have been carried out for identification of risk environment would eventually lead to development of Climate Risk Reduction Action Plans (CRRAP), which should ideally be formulated at community levels (i.e., 'local' levels or at the smallest/bottom-most tier of local government system in the country in question). It should be based on the principle of participation as well as of integration across sectors and scales.

Climate-related Risks has to be identified in (Sectoral) Development Plans mostly applicable at meso- and regional-scales. However, each of the micro-level CRRAPs needs to be tied to these sector-specific RRAPs in order to ensure synergy and integration. On a national scale, integration of RRAPs with national level sectoral programmes is considered to be a major step towards ensuring 'climate resilient' development.

In order to create general awareness among general stakeholders and allow everyone in a community to respond in their own way, it appears extremely important to inform every member of a community in a vulnerable area.

A wide array of stakeholders, representing grassroots people through to national level policy makers, need to be involved in responding to climate risks. Information alone would not build capacity of people to respond to climate risks. Depending on the level of knowledge and information, capacity building might be necessary at various tiers and across sectors. Capacity building may be of different types which include raising awareness through information; providing orientation, formal or informal training, continued education etc.



Evaluation of successes of practiced adaptive responses within a given overall vulnerability context shall lead to identification of models of good practice for adaptation which then could be replicated at other places of the country having similar settings. It is therefore necessary to investigate current and past adaptive responses and coping strategies of various vulnerable groups to climate-related risks and initiate demonstration of good practices for wider acceptance and replication.

Locally developed plans are expected to be owned by the local stakeholders and should be put into practice. The stewardship committee should facilitate implementation of the RRAPs subject to availability of financial resources, having political blessings, and adequate human and institutional capacity to implement CRRAPs. It is expected that 'trained professionals', with the facilitation of 'aware local stakeholders', will be able to take the responsibility to respond to challenges of climate risks.

It is necessary to check CRRAPs in a holistic manner and try to identify potential issues of future conflicts. Integration of community level CRRAPs into meso-scale CRRAPs and subsequent meso-scale CRRAPs integrated into macro-scale national development plans by sectors (sectoral risk reduction action plan) and implementation programmes are vital elements for effective adaptive response measures. Such integrations will remove inconsistencies and help mainstream adaptive responses in development programmes and activities.

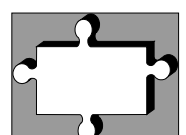
Adaptive response measures identified through the CRM processes should be piloted, monitored, adjusted and then replicated. Scaling up of adaptive response to national scale should be done after having a thorough screening and piloting which would lead to the development of an integrated and holistic development plan, which in totality can be implemented at the central level and in part may be implemented under regional development plans.

Institutional facilitation for adaptation

Adaptation measures, after thorough processes of participatory analysis and subsequent identification can be implemented within an appropriate institutional enabling environment. Since global warming and climate change are global scale problems, their response mechanisms should have linkage with the global partners. Therefore, institutional architecture should encompass both local through to national scale institutions as well as national to global scale institutions. In this context global response to adaptation has to be taken in to consideration and benefit from the global response in terms of policy guideline, technology, knowledge and information and all other instruments developed so far to support adaptation.

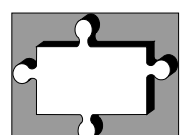
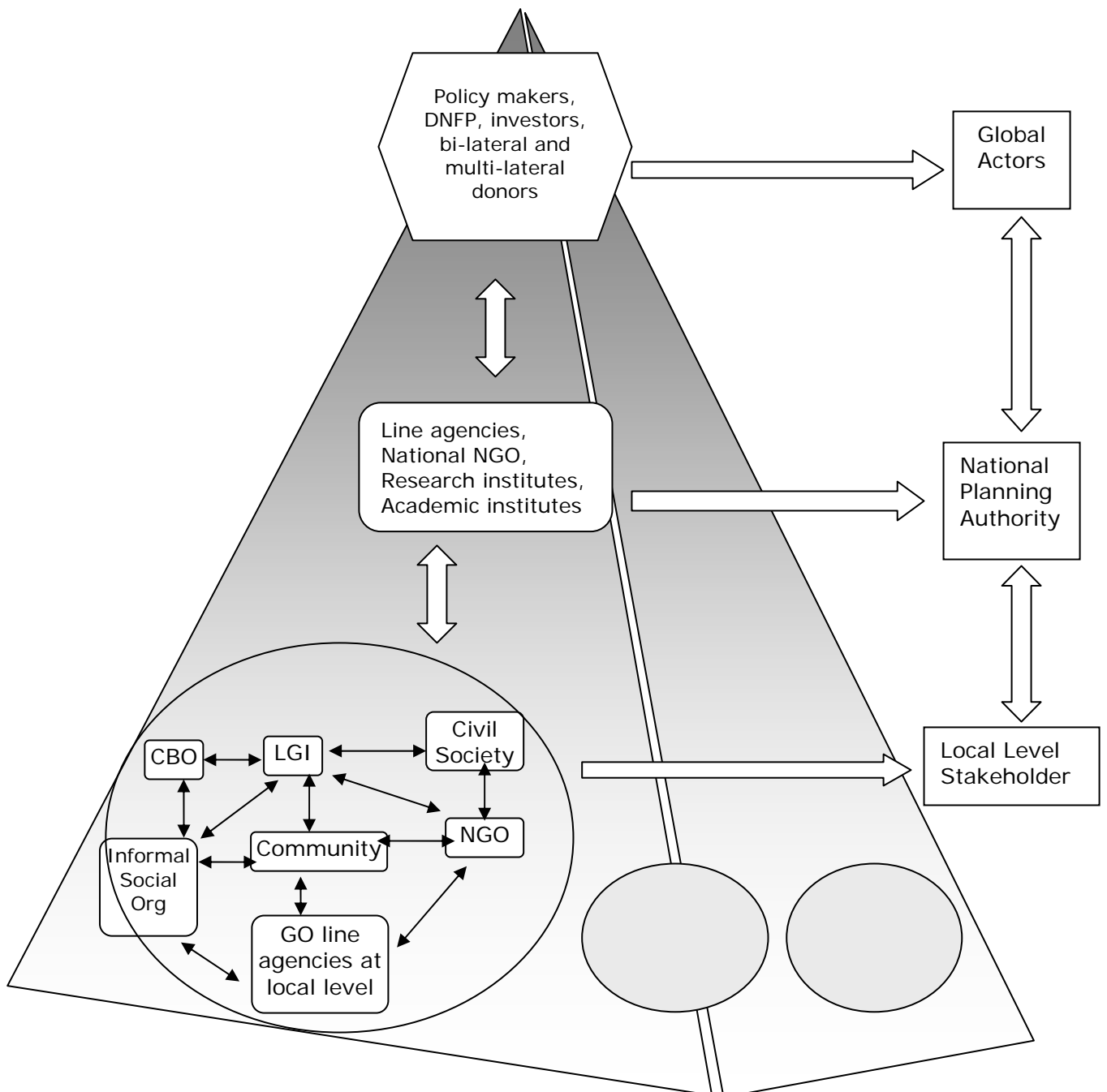
In absence of an effective global institutional architecture for adaptation, each country party should focus on creating its own enabling policy environment to advance adaptation. Recognizing the fact that adaptation measures should be complementary to development strategies of the country (or location within a country), each adaptation strategy and option should ideally be previewed within development-oriented policy regime prevailing over the country. One may contemplate three aspects in the process of creating enabling policy regime: (i) policy analysis, (ii) identification of policy gaps, and (iii) policy adjustment.

Mainstreaming adaptation through climate risk management focuses on *a set of activities that promote a better understanding of the needs of climate risk management through building partnership among stakeholders and stimulate and support climate resilient development process in the country.* Mainstreaming also emphasizes on involvement of local as well as national institutions taking part in the CRRAP planning efforts at local, regional (sub national) and national levels with a primary focus on serving national development agenda, integrating adaptation measures, and addressing cross-cutting national issues (e.g. women's empowerment and advancement, ecological conservation and sustenance, integrated coastal zone management, safer islands etc.).



The Local level Risk Reduction Action Plans evolving from the Climate Risk Assessments will bring into play the government line agencies providing development service at the local level, NGOs, CBOs, informal social organizations, civil society, local government institutes, etc., with the community and its needs and priorities at its center. The interaction within and between these entities ensure ownership or buy-in with regard to climate risk management within their respective scope of work. On a horizontal scale, aggregation of such efforts at sub-tiers provides successive tiers above development plans that incorporate climate risks and adaptation needs. The national planning authority draws on sector-specific planning and programming as well as those of the local government. National NGOs, Research and Academic Institutes also contribute their input in the development planning and its implementation. The needs and requirements of the climate resilient national plans is eventually shared, by national policy makers, designated national focal points, investors, bilateral and multilateral institutions.

Figure 2: Climate Risk Management and Adaptation Mainstreaming: Institutional Arrangement



The Designated country focal point (DCFP) should facilitate the entire process envisaged under the Country Framework (or adaptation framework). However, it should prioritize its activities according to the necessity of the country and proceed in step-wise fashion. At the outset, the DCFP should attempt to build partnership among various agencies and institutions (including public, private and civil society solidarities) and lay down the institutional arrangements.

Following institutions at different levels shall be instrumental in operationalizing climate risk management and adaptation with respective roles:

- Government institutes at the local level
- *Community-based Organizations (CBO)* working at the grassroots,
- National Government officials at sub-district, District, and Provincial (Divisional) levels representing line-ministries (e.g., Agriculture Officer, Education Officer etc
- Agency Focal Points; operational contact points representing different agencies
- National Advisory Group (NAG) representing national level experts contributing to the scientific community of the globe
- Task Force: to deal specific issues or subject matters (for example mangrove forest or crop adaptability)
- The financial mechanism for implementation could be National revenue funds, Development assistance and International convention fund including GEF trust fund, LDCF, SCCF, CBA, Adaptation Fund (Kyoto protocol), CER, CDM, Joint implementation, ET, *Disaster risk reduction: Insurance and pooling, Foreign direct investment:*

Good governance is essential including blessings of the politicians, strengthening the bottom-up planning processes and simultaneous integration at each hierarchical level should be ensured.

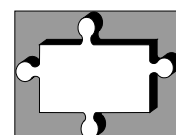
Well structured monitoring and feed back processes shall ensure efficacy of the actions. In this context media should be brought in to conduct joint monitoring and dissemination of monitoring results in public. There should be advocacy groups who should take up responsibility to act as pressure groups and engage in dialogues with relevant agencies and focal points on unresolved issues of high importance.

Climate risk management requires knowledge at different resolutions and by various stakeholders. In the context of climate change (and variability), the purpose of knowledge management and social communication is to:

- Gather, assimilate, improve, update and make available data, information and knowledge necessary to device knowledge based climate risk management for all stakeholders;
- Through a co-operative approach, engage organizations and projects involved in climate risk management in collecting, collating knowledge and constructing and maintaining a dynamic and sustainable knowledge system;
- Integration of indigenous (local) knowledge and expert's knowledge to generate decision making parameters
- Serve as a specific means for social communication of knowledge both horizontally and vertically among many stakeholders (multidirectional communication) and for raising awareness and to informing and influencing to initiate climate risk management process; and
- Identification of knowledge gaps and filling through research

4. BASIC COMPONENTS OF THE COUNTRY FRAMEWORK

The proposed Country Framework is a tool, which is generic in nature, and can be applied in order to achieve the above mentioned development objective. It is primarily designed to serve the purposes of the Developing Countries (DC), specifically for the Least Developing Countries (LDC), those of which have been struggling to sustain their development processes under a complex and multi-faceted risk environment, where climate change is likely to add another risk element threatening the entire development objective. By virtue of its generic nature, it will have adequate flexibility to accommodate country-specific situations: be it in the complexity of physical-environmental domain, be it in unique socio-economic aspects, or in the processes which would necessitate country-specific route maps of enabling activities and coordination. A few key elements of the proposed Country Framework include the following.



- Defining risk environment
- Responding to climate risks: enabling processes and actions
- Institutional facilitation

These key elements are separately treated in details in the three following sections.

5. DEFINING RISK ENVIRONMENT

5.1 Country-specificity

Geo-physical risks associated to climate variability and change are often location-specific, while vulnerability of people living there is generally a function of geo-physical elements of vulnerability and the contexts of vulnerability – the latter are often determined by interactions among people's well-being, access to various forms of assets and livelihoods (DfID, 2000; Carney, 1998). Since the needs for the management of risks associated with climate change should ideally be fulfilled by a state, the perception of risks at different tiers of the state is an important element towards defining vulnerability and it is generally country-specific. Regarding an assessment of vulnerability, the global scientific community on relevant field reached to a consensus that “vulnerability, by definition, is always area specific” (Davis *et al.*, 2004).

People living in a country (or locations within) are the ultimate sufferers to climate-related hazards. The degree of impacts of climate change is directly related to the resilience of the population. People exposed to adverse effect of climate change undertake certain adaptation measures depending on the degree of their access to livelihood assets (Cannon *et al.*, 2003; Carney, 1998). Empirical studies reveal that both climatic conditions and anthropogenic factors are likely to contribute towards increasing vulnerability of life and livelihoods of the people (IUCN *et al.*, 2003; RVCC, 2003; Elasha *et al.*, 2005). Climatic factors are capable of creating vulnerability contexts but due to lack of anthropogenic capabilities (and the access to various forms of assets) livelihoods can become increasingly vulnerable, even leading to human tragedies and disasters (Bohle *et al.*, 1994; Eakin, 2002).

Country-specific geophysical settings identify the degree of impacts of climate change on geophysical systems in a given time frame (Burton *et al.*, 2005). However, to determine extents of vulnerability to human (social as well as economic) systems, it is essential to characterize social and economic realities of the country (or location within) (Wehbe *et al.*, 2005), the financial and institutional setting including policies and regulatory regimes (Eakin, 2002) which determine access of people to various forms of assets (DFID assets: DFID, 2000) and the development processes (both planned and autonomous) of the country (Burton *et al.*, 2005;) which might have potential to either reduce people's vulnerability to climate change or increase/enhance resilience of both geophysical and human systems to better cope with changed realities in a given time frame.

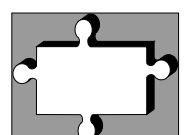
5.2 Various Aspects of Current Risk Environment

The risk environment in the context involves risk associated with:

- Natural conditions (endowment, availability and quality of natural resource base; geo-physical characteristics; climate-induced primary phenomena etc.);
- Status of physical infrastructure including their concentration, placement, quality, relevance and how these infrastructures behaving to the natural capital flowing pattern;
- Socioeconomic condition of the population in the defined area; and
- Institutional environment including policy regime and support services;

Following are some of the elaborations of the above mentioned risk environment:

Natural condition: Since climate change will interact with ‘agents of change’ which in turn would cause change in natural conditions (endowment, availability and quality of natural resource base; geo-physical characteristics; climate-induced primary phenomena etc.), it is necessary to characterize these and identify how climate change induced effects would modify conditions/state of each of these elements of nature. A thorough knowledge-based characterization of natural



condition/setting enable people to understand the dynamics of the impacts of climate change over time and help identify appropriate measures to manage climate risks (McCarthy *et al.*, 2001).

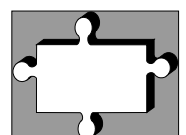
There may be a large number of elements which help define natural condition. The following are most common indicators that describe natural conditions: physiology, proximity to the sea, landscape and terrain, watersheds, land type characteristics, land elevations, land cover, land use, state of land degradation; soil quality, major crops and cropping patterns, forest cover, ecosystems and ecosystem health, river network and flow regime, tidal dynamics, erosion and accretion (morphological) processes, drainage congestion, cyclone and storm surge characteristics, salinity intrusion, drought and dry periods, (seasonal) soil moisture, humidity, temperature regime, ground water (availability and quality), precipitation pattern, availability of safe drinking water etc.

Status of physical infrastructure: Physical infrastructure can play dual roles: it may either help reduce vulnerability (a public infrastructure transformed into a shelter during a hazard: MSCP, 1994) or may also increase risks by aggravating certain types of problems (road network aggravating floods by creating obstacles in drainage systems: World Bank, 2000). Mapping and characterizing physical infrastructure are necessary to understand the exposure to climate induced phenomena, performance capability under changed conditions, and overall risks of these infrastructures to climatic hazards. Overlaying likelihoods of occurrence of hazards shall enable one to determine likely adverse impacts on these infrastructures and enable to devise and implement protective measures for existing infrastructure in one hand and decide on safe design for future infrastructure development (Nicholls and Leatherman, 1995).

Examples of physical infrastructure include roads and highways, health care centres (hospitals/clinics/dispensaries etc.), urban centers, village growth centers, industries and factories, school buildings, ports (inland and sea-bound), disaster rehabilitation centres (shelters such as multi-purpose cyclone shelters), settlement infrastructures, utility and communication infrastructures, embankments and polders, flood management and irrigation infrastructure and other infrastructures that support livelihood activities. Likelihood of occurrence of hazards such as flood, riverbank erosion, drought, salinity intrusion, cyclone, storm surges, winds, erratic fluctuations in precipitation and temperature, drainage congestions/water logging and their magnitudes and extents generally determine the degree of impacts on the physical infrastructure.

Socioeconomic condition: In the discourse of livelihoods at risk, the five categories of livelihoods capital assets (human, social, natural, physical and financial) play decisive roles in determining one's contexts of vulnerability (DFID, 2000). Socioeconomic conditions of an individual, a household, a community, and a society (or even the whole country) determine how the contexts of vulnerability will change underlying risks (of the subject) due to change in exposure of any hazard. It is generally perceived that people living in abject poverty would have lesser means to enhance resilience and reduce risks from exposures to climate driven livelihood hazards (IUCN *et al.*, 2003; Yohe and Tol, 2002; Folke *et al.*, 2002). To better understand human and economic conditions one has to analyze a number of vulnerability contexts that characterize a few aspects that include livelihoods; status of gender equity; social capital; networking and kinship; status of nutrition; population growth rates; infant mortality rate; fertility rate; access to productive resources; labor and wage conditions; the proportion of functional landless; seasonal migration dynamics; demographic dependency ratio; level of service provision and density of growth centers; literacy rate and primary school densities; primary school enrollment rate; per capita GDP; the share of the industrial sector in GDP; household coverage by credit servicing agencies including NGOs; development of private sectors etc.

A number of the above mentioned indicators are applicable for the entire society, whereas a few of them are particularly important to identify and characterize socio-economic conditions of major livelihood groups. It is important to develop socio-economic profiles for the major livelihood groups in an area to establish links between livelihood activities and climate-related risks. Application of Sustainable Livelihoods Framework (SLF) can be of great help to this end (DfID, 2004). Once the interaction between Livelihood Capital Assets (LCA) and agents of change under altered climate conditions are superimposed, the effect of climate change on livelihood strategies and livelihood outcomes may easily be identified, as indicated in the SLF. There are a number of tools which may be employed for such a participatory process. The use of SLF, involving a series of Focus Group Discussions and Key Informants' Interviews (DfID, 1999; Farrington *et al.*, 1999), or the much elaborated Participatory Vulnerability Assessment (PVA) technique of Action Aid International (AAI,



2002) may be utilized for these purposes. A good number of early applications have already shown the strengths of such methodologies (Ahmed and Schaerer, 2004).

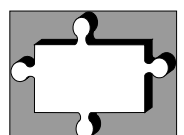
Institutional setting: Not only institutions, including the current policy regime, help identify part of the social and financial strengths of a vulnerable society (community/households/ individual), their interaction with LCAs and climate driven vulnerability contexts provide information on livelihood outcomes of the society. Presence of credit institutions and the local poor having access to such institutions hugely influence livelihood outcomes following a major hazard. Current policy regime may have number of elements which might become useful for reducing risks of climate induced hazards. A detailed analysis of institutional setting, a clear understanding on the institutional gaps, and an assessment of policy needs to tackle climate change can be of great help.

A typical information base on institutional setting should encompass the following:

- A mapping of national institutions with defined respective mandates and service delivery mechanisms;
- The processes of inter-agency and intra-agency collaboration and cooperation, with special references to climate induced slow-onset as well as rapid-onset hazards;
- Local through to national level support organizations including voluntary agencies, NGOs, networks, and efforts; their respective roles and capabilities;
- Linkages among public, private, and voluntary agencies towards delivering certain necessary services, those are necessitated due to climate driven events and extremes;
- Identifying gaps between intended/anticipated service requirements and actual service capabilities;
- Analysis of the needs for new organizations/institutions;
- Assessment of current policy and regulatory regime; existing gaps in policy regime;
- Identification of specific needs for new/alternative policies to offer better services those are necessitated due to climate driven events and extremes etc.

The same analytical approach may be repeated in every tier of governance system. Certain public institutions may not have necessary capacity at each tier to serve the vulnerable. It is to be noted here that despite having very strong institutional guidelines and policy statements on paper, the chronic problem to many of the LDCs is their poor capability to actually offer institutional supports when in need. Many of such inadequacies in institutional strengths stem in poor governance, lack of transparency, weak administrative monitoring, and inadequate budgetary provisions to offer such services – the latter being a function of economic performance and allocation. The description of institutional setting should highlight these aspects and properly map inherent weaknesses where proper institutional reform might be necessary.

Influence of the climate change on the life and livelihood of the population depends on the natural condition; socioeconomic condition of the population, physical infrastructure, institutional environment and hazard context has been discussed above. Following prismatic analysis shows the impacts/risks of the climate change on the sectors, generic response and actions (broad based and not exhaustive).



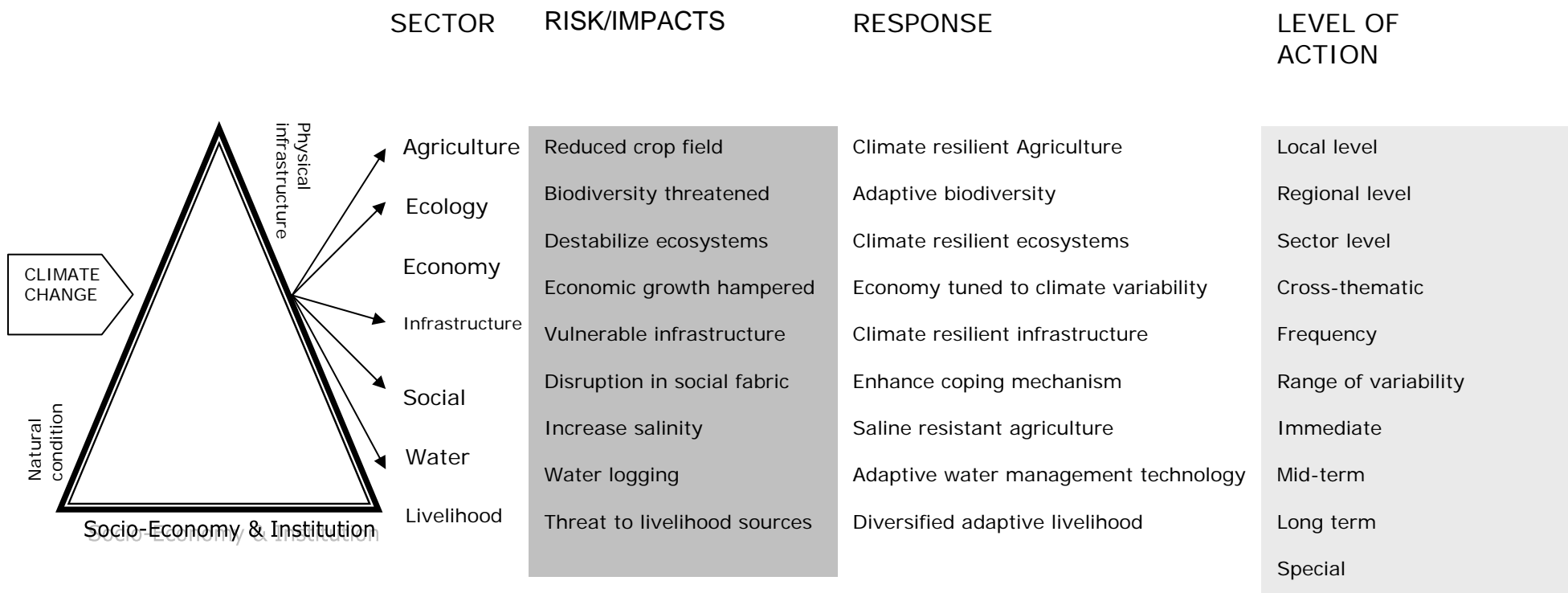


Figure 3: Climate Risk Management Framework - A Prismatic Analysis

5.3 Defining Future Risks Under Climate Change

The definition of risk environment is only complete when the present day (reference, base year) risk elements are overlaid on climate perturbations in any point in future, which, by definition, would portray future risks under climate change. It is necessary to bear in mind that the future risks will be a function of changed conditions in all four of the above mentioned aspects: natural condition, status of physical infrastructure, socioeconomic condition, and institutional setting. Any or all four of these aspects might exhibit significant changes, which need to be flagged based on trends, projections, and expert judgments. Of course, the development programmes and implementation of specific development activities would largely determine the changed conditions in natural, infrastructural, and socio-economic domains, whereas the policy regime (including governance aspects) would play significant role in defining predominantly the future institutional conditions and to a lesser extent, the socio-economic conditions.

A combination of perceived (and plausible) changed conditions involving a host of indicators would give rise to a scenario for future and a number of scenarios might arise from different combinations of indicators involved (IPCC, 2001; Raskin, 2005). The analysis seeking to reveal future risks under climate change might require a series of analysis involving each of these narrative (and/or model based) scenarios.

It is expected that climate perturbations will exacerbate livelihood risks (IUCN *et al.*, 2003). Based on the baseline livelihood conditions, one may try to define such additional risks to livelihoods for any major livelihood group in any society. However, it is recommended that such efforts will truly be participatory, as highlighted in the approach of the proposed FA. Only the vulnerable themselves know how differently their risk perception will change under a defined change in climate system (Ahmed, 2004). People should be consulted and engaged towards defining their climate related vulnerability.

People perceive climate risks in their own area differently than those living outside the area (Sjoberg, 2000). It is of value to understand the perception of the local community regarding climate characteristics and trends in their neighborhood for various different time scales covering the past, the present and the future projection year(s). Participatory appraisal processes need to be applied at the grassroots in order to collate people's perception regarding any observed and/or anticipated change in climate system. Perception based information may not be scientifically precise, however it might provide broad-based relationships between climate driven causes and physical and human effects of those changes. The same PRA approach may be employed to assess how changed climate related conditions would shape up future contexts of vulnerability and affect each of the Livelihood Capital Assets (LCA). Overall, such a process would lead to a complete assessment of future risks of climate change on livelihoods.

Of course, grassroots people can comment on geophysical vulnerability in the future. However, such perception based information and cause-effect relationships are often indicative and should not be taken as it is. In most cases, extent of locally anticipated changes in geophysical system are often over and/or underestimated, whereas complexities due to interplay of two or more parameters are often ignored or oversimplified (Kasperson *et al.*, 1988). Therefore, it is recommended that the assessment of changes in risks due to geophysical vulnerability should be based primarily on technical assessments and to a lesser extent, on indigenous knowledge.

To assess impacts and risks due to climate change in any point of time in future, some key questions need to be answered. One may find the following few key questions (not an exhaustive list):

- Will the climate induced hazards (listed earlier, based on local conditions) become more frequent and intense?
- What would be the level of sensitivity?
- How the exposure level and frequency would change in a given time frame?
- Which locations are the most vulnerable in a geographical setting?
- When will hazards occur?
- What are the possibilities of increasing extent of hazards linearly over time?
- What shall be the possible impacts?

For example: A farmer would like to know likely precipitation patterns while planning his crop calendar, preparing his land, sowing, harvesting, etc. Obviously the development practitioners, professionals and policy makers need to gather this knowledge to provide extension and other

services to the primary stakeholders. Worldwide, modeling provides useful prediction of impacts of climate change in seeking answers to the questions above.

A major part of technical assessment of future geophysical risks due to climate perturbations deals with ascertaining the extent of climate change. Modeling exercises are being practiced worldwide to predict impacts of climate change and climate variability. IPCC prepares 'Assessment Reports' from time to time, which include latest modeling results in climate change and climate variability primarily at a global scale and also at regional scales. There are some 23 global circulation/climate models (GCM), around 7-8 regional models (RCM) and a numerous country specific models currently in operation (McGregor, 1996).

Two things need to be taken into consideration to provide the relevant actors and institutions, stakeholder groups with the predictions of the impacts of climate change and climate variability at a country and local levels. One is down scaling the global/regional climate models at a user level and the other is interfacing climate (precipitations and temperature) model outputs to application models. In recent times, however, there are groups of scientists working together on integrated modeling so that the users find modeling results from one point (Schneider, 1997; Prinn *et al.*, 1999).

A composite hazard map, comprising of socio-economic risk information and geophysical hazard map, provides a better understanding regarding the overall vulnerability of a group of people under climate change in a given location. A number of similar mapping can therefore be completed for different time slices in future to provide a dynamic understanding of people's vulnerability of that area. Since these are based on both present conditions and future simulations, such processes can pinpoint how and for which aspect a certain section of the population in question would be more vulnerable.

Composite risk maps can be attempted at various levels: from the grassroots level to meso-level, even at regional and national level. Such mapping exercises can also be approached for any sector as deemed necessary. For Southern African countries, water availability is a vital issue and therefore, risk assessment for water sector might be a priority activity (Hewit, 2002). Similarly, water-related issues are highly important for South Asian countries and therefore, an in-depth understanding of water sector is vital towards determining any response to climate change (Mirza and Ahmed, 2003). Composite risk assessment can also be attempted for any special area, i.e., an area designated for export-oriented industries; an ecologically sensitive area; an area where a highly sensitive (socially/culturally/ economically/ environmentally) ecosystem is located etc.

Once these exercises are completed step-wise, one can identify what needs to be done in order to reduce people's vulnerability and which specific context of vulnerability needs to be addressed on a priority basis in order to approach towards adaptation. Of course, needs assessment and subsequent prioritization may be cross checked with the people's priorities, as obtained in the participatory processes. This would help resolve decision dilemmas and also influence community buy-in of the adaptation responses thus emerged.

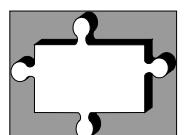
6. RESPONDING TO CLIMATE RISKS: ENABLING PROCESSES AND ACTIONS

The second important building block of the FA is responding to various needs as deemed necessary to reduce climate change induced adverse impacts and risks. The first step at this stage is to prepare response plans towards reduction of risks identified. The climate driven risks are treated, within the purview of the respective Government's policy regime, as part of the national development programmes and activities. Responses do not necessarily depend on 'specific planning' and 'firm actions', but also on enhancing human and institutional capacity; preparing communities through social communication of risks and responses; demonstration and propagation of 'good practices' etc. The following deserve special mention.

6.1 Responding to Climate Risks

6.1.1 Formulation of Micro-level Risk Reduction Action Plans

The participatory processes which have been carried out for identification of risk environment would eventually lead to development of Climate Risk Reduction Action Plans (CRRAP), which



should ideally be formulated at community levels (i.e., 'local' levels or at the smallest/bottom-most tier of local government system in the country in question). Once again, it should be based on the principle of participation as well as of integration across sectors and scales.

Participatory formulation of climate risk reduction action plan at local level is expected to initiate local level actions. This process shall involve community, civil society, local government representative, functional organizations at local level such as water management committees, disaster management committees, community based organizations, national Government agencies at local level and NGOs providing various types of services. Area specific exercise involving all major stakeholders is expected to identify specific coordinated actions that may be implemented by the community itself being organized and under the leadership of local government institutions and a few other actions, which may supplement the community-led actions at a relatively higher administrative tier (say, meso-scale and regional scale), to be implemented simultaneously and/or subsequently by the respective line agencies. Such actions are specific responses (i.e., adaptation actions) with a view to reduce risks assessed by the stakeholders representing the community. Since all such adaptation actions (responses) are integral part of the CRRAP of a locality, each of these actions needs to be implemented within a specific time-frame. Since these responses are designed within the development programmes and activities, the sectoral development authority should make the budgetary allocation for their implementation. By design, therefore, the adaptation activities will become integral part of development practices.

6.1.2 Identification of Climate-related Risks in Development Plans

There is a general apprehension throughout the developing world that many of the development activities will not be able to perform up to their potential under climate change, because climate driven issues would greatly reduce effectiveness of such development activities (Davidson *et al.*, 2003). To many, sustaining development measures and maintaining accrual of development benefits under climate change would be a major development challenge (Yamin and Kenber, 2004; Newell, 2004). It would therefore be necessary to identify climate related risks in sectoral development plans, mostly applicable at meso- and regional-scales. However, each of the micro-level CRRAPs needs to be tied to these sector-specific RRAPs in order to ensure synergy and integration. On a national scale, integration of RRAPs with national level sectoral programmes is considered to be a major step towards ensuring 'climate resilient' development.

6.1.3 Social Communication of Micro-level Climate Risks

It is needless to mention that participatory climate risk reduction planning at the grassroots cannot ensure participation of all stakeholders. Rather, only a representative body of the major stakeholder groups can at best be integrated into the processes leading up to a CRRAP. In order to create general awareness among general stakeholders and allow everyone in a community to respond in her/his own way, it appears extremely important to inform every member of a community in a vulnerable area. Social communication of risks is considered to be a necessary step in this pursuit.

The objective of social communication for climate risk management is to establish a mechanism that ensures appropriate information flow across the wide array of stakeholders. Social communication for adaptive response should be multidirectional where messages transmitted through various media and mechanisms involving a wide variety of audiences, all individually and collectively participating to sharing, receiving, and responding to those messages.

Responding to climate risk involves a wide array of stakeholders' right from the primary stakeholders such as farmers or fishers and in general common people who are and will remain exposed to risks associated with climate change. 'Know'ing risks shall eventually lead to 'no risk' (SDRC, 2005; ISDR, 2005). A strategic approach of spreading risk-related information may be deemed useful. Such a strategy involves identifying specific recipients of various relevant information; identifying appropriate media; selection and adequacy of messages etc. It might be even useful to initiate a knowledge network, where the actors would find country- and/or region-specific information on climate risks, and spread such information according to the needs of its stakeholder groups/audience.

6.1.4 Capacity Building

A wide array of stakeholders, representing grassroots people through to national level policy makers, need to be involved in responding to climate risks. Information alone would not build

capacity of people to respond to climate risks. Depending on the level of knowledge and information, capacity building might be necessary at various tiers and across sectors. Capacity building may be of different types which include raising awareness through information; providing orientation, formal or informal training, continued education etc. It is expected that a society (or a community) will respond to climate risks better if capacity of its stakeholders are much improved. Enhancing capacity is therefore considered to be a fundamental element in responding to climate change and adaptation (Olsson, 2003).

Awareness: Although the science of climate change is well established since nineteenth century, its implication on various systems on earth is indeed a fairly new phenomenon. The level of awareness on climate change issues is rather low, especially in developing countries. However, awareness on the climate change related matters is a prerequisite for considering any meaningful adaptation. Stakeholders at different levels including communities need to know about climate variability, change, impacts and risks related to such issues in a bid to prepare for the inevitable changes. Actors, especially those living in the grassroots, sometimes might not even know what information do they need in order to respond to specific problems. Awareness in this instance shall generate understanding of the need and thus people will become knowledgeable of what they might need to respond better.

Orientation: Stakeholders at various levels with different responsibilities and mandates may not be properly oriented to conceptual and multi-faceted issues such as sustainable development, CRM, globalization, gender etc. However, without having proper orientation, it might not be possible for them to analyze risks and challenges associated with development processes in relation to above mentioned issues. It is therefore necessary to provide orientation training for the professionals, especially those designing and carrying out development activities at the grassroots, particularly in the developing countries and LDCs. It is expected that, such orientation courses/training sessions would cover complex issues such as CRA and CRM and contribute to the capacity building of those professionals.

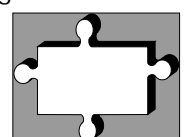
Training: Skill development training should be mandatory for key professionals, especially those designing small to large-scale development projects and developing plans on behalf of their respective Ministries/Divisions/Directorates/Departments. The planning people at the local through to central levels of the relevant government agencies need to be oriented and trained on climate risk management. Having proper training, it is expected that the professionals will be able to appreciate and conduct participatory climate risk assessments with communities at all levels and develop risk reduction action plans as necessary. Capacity enhancing training involves hands on sessions on participatory planning, sustainable development, and interpretation of climatic risk reduction into concrete enabling activities.

Although in most of the developing world, planning and implementation development activities are managed by public servants and government professionals. However, there has been growing partnership between government agencies and a host of non-government actors including NGO activists, Community-based Organizations (CBO), private sector operators and representatives of formal and informal institutions at local level, who share the responsibility along with their respective government counterparts in undertaking development activities and rendering various services for the grassroots people. Since development activities can no longer be initiated without recognizing such partnerships, it is recommended that the representatives of such partner agencies should also be provided with training similar to those provided to the government officials.

Education: For overall leveraging of needed knowledge, continued education has to be introduced in the routine curriculum of academic institutions. Climate related issues need to be included in the education system of any country. However, the extent of material and information to be incorporated into the curricula should ideally depend on the urgency of the country in question. It is expected that continued education on relevant aspects would help prepare a pool of national level experts, who in turn would provide critical services in future years to come.

6.1.5 Demonstration of Good Practices

Since climate is expected to change gradually, vulnerable societies practically have a few decades to prepare themselves for responding well to climate change. Many of these gradual changes will be observed in the form of changes in extent and frequency of known extreme climate-related events (McCarthy *et al.*, 2001; Smith *et al.*, 2000). Vulnerable communities often have indigenous



knowledge, accumulated over millennia, to cope with such known events (WCDR, 2005; Stigter *et al.*, 2005). Adaptive responses could be of

- a) traditional responses (e.g. dis-saving following an extreme event, relocation in the neighbouring hazard-free areas, pond excavation/rain water harvest for retention of water in water scarce areas; building houses on stilts under flooded/marooned conditions in floodplains etc.) (Morduch, 1995; Karami and Hayati, 2005; Ahmed, 2003);
- b) state supported responses (e.g. state run irrigation schemes, land use zoning, flood protection measures, highways built above flood danger levels etc.) (Few, 2003; Mitchell, 1995)
- c) market driven responses (e.g., operation of credit markets even in remotest of villages)
- d) alternative responses at community and household level (e.g. changing crop calendar, alternative livestock and poultry rearing etc.).

State and market operate throughout a region or a country, irrespective of geographic preference. However, because of many social drawbacks, there can be different adaptive measures/practices in different parts of a country. Many of such adaptive measures/practices could be replicated elsewhere within the country, even outside the country where similar vulnerability exists.

Evaluation of successes of practiced adaptive responses within a given overall vulnerability context shall lead to identification of models of good practice for adaptation which then could be replicated at other places of the country having similar settings. It is therefore necessary to investigate current and past adaptive responses and coping strategies of various vulnerable groups to climate-related risks and initiate demonstration of good practices for wider acceptance and replication.

6.1.6 Implementing Adaptive Responses

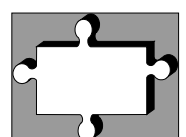
Subject to availability of financial resources, having political blessings, and adequate human and institutional capacity to implement CRRAPs, locally developed plans need to be put into practice. It is expected that 'trained professionals', with the facilitation of 'aware local stakeholders', will be able to take the responsibility to respond to challenges of climate risks.

6.2 Scaling Up

Scaling up the local responses to climate risks can become a major hurdle due to fact that it demands both horizontal and vertical integration of all: perceived actions, actors, institutions and policies, inter- as well as intra-regional politics etc. Horizontal integration is an issue of institutional arrangement (dealt in Section 7) and coordination. In addition to having inter-policy conflicts and inconsistencies, there are many non-institutional barriers and hindrances which reduce potential scaling up of good responses throughout the country. Practical aspects of a few major problems/issues are discussed below.

6.2.1 Scaling Up of Local Vulnerabilities Through to Regional and National Levels

The major obstacle for scaling up local vulnerability in the meso-scale (regional) and macro-scale (national) vulnerability contexts lies with integrating vulnerability contexts across tiers. Sometimes upstream-downstream inconsistency between CRRAPs creates additional barriers, which impede development processes. For example, an embankment in a floodplain might reduce flood vulnerability of the poor people within the embankment area, however it can also increase flood vulnerability in the immediate downstream areas. Such inconsistency can give rise to conflicts and reduce effectiveness of implementation of response measures. It is therefore necessary to check CRRAPs in a holistic manner and try to identify potential issues of future conflicts. Integration of community level CRRAPs into meso-scale CRRAPs and subsequent meso-scale CRRAPs integrated into macro-scale national development plans by sectors (sectoral risk reduction action plan) and implementation programmes are vital elements for effective adaptive response measures (**Refs**). Such integrations will remove inconsistencies and help mainstream adaptive responses in development programmes and activities.



6.2.2 Identify Climate-related Risks in Development Plans

Even after the above mentioned screening and evaluation, there might be elements of risk in development plans at any scale which might substantially reduce effectiveness of a particular adaptive response measure. For example, building a coastal polder might aggravate in-stream sedimentation processes which would have devastating implications under sea level rise. The latter, in turn, might decrease efficacy of the polder itself to protect the land from saline inundation. Moreover, it might even increase an element of risk to the investment itself by reducing the life of the infrastructure. In the CRM process, it is of great value to identify climate-related risks in sectoral development plans. If not properly flagged in time, such mistakes are generally multiplied if a faulty adaptive measure is scaled up at local through to national scale.

Piloting: Adaptive response measures identified through the CRM processes should be piloted, monitored, adjusted and then replicated. To initiate and conduct field testing of an identified action, it is suggested to prioritize

- Special areas (e.g. coastal zone, coastal islands, drought prone zone, erosion prone areas, water logged areas, environmentally sensitive areas, flash flood prone areas etc.)
- Selected livelihood/sector (e.g. agriculture, water etc.)
- Most vulnerable groups (e.g. women, marginal farmers, fisher etc.).

Wide scale replication should only be initiated once the effectiveness of each of the identified adaptive response measures are adequately field tested (piloted), their technical feasibility is justified, their economic efficiency is optimized, their social acceptance is found high and those are synergistic with the institutional and policy regime of the country in question.

6.2.3 Integrated (holistic) Development Planning and Implementation

As indicated in sections 6.2.1 & 6.2.2, scaling up any adaptive response strategy to national scale is only advised when each of the measures are well understood in terms of their coherence, their potential to be integrated into larger plans and programmes, and the few criteria mentioned above (technical feasibility, economic efficiency, social acceptance, results of piloting, replicability etc.). It is interesting to note here that such a process of examining, screening and piloting would automatically lead to the development of an integrated and holistic development plan, which in totality can be implemented at the central level and in part may be implemented under regional development plans.

6.3 The Cyclic Loop: Monitoring, Updating, and Accommodating Feedback

Developing and implementing CRRAPs should not be considered to be an end in itself. These processes and actions cannot be considered as a one-step process, there should rather be enough room to accommodate innovations towards managing the dynamic nature of climate-related impacts in future. It is to be reminded that the impacts of climate change will be increasingly adverse on a given area as we march along into the future. Therefore, the Adaptation Framework should have flexibility to embrace an iterative process where the local to national level CRAAPs are continuously monitored, updated as necessary, and feedbacks from the society with changing scenarios can be accommodated to improve the efficiency of adaptive responses on the ground. In each of the cyclic loop, the FA should attempt to integrate CRRAPs both horizontally and vertically and mainstream itself in development processes so that the benefits are equitably shared among the stakeholders.

7. INSTITUTIONAL FACILITATION OF ADAPTATION

Adaptation measures, even after thorough processes of participatory analysis and subsequent identification, cannot be implemented if an appropriate institutional framework and enabling environment is not put in place. There has been a host of literature to highlight the needs of creating such institutional enabling environment to guide the processes of both sustainable development and adaptation to climate change. Since global warming and climate change are global scale problems, their response mechanisms should not be advanced by individual countries.

Therefore, institutional architecture should encompass both local through to national scale institutions as well as national to global scale institutions.

7.1 Global Response to Adaptation

Since signing of the UNFCCC by country parties, the framework conventions has become the cornerstone of an ever evolving institutional architecture on climate change issues. Two options i.e., mitigation (reduction of emission of greenhouse gases) and adaptation have been tossed in the UNFCCC as the primary generic measures to deal with climate change (UNFCCC, 1992). A number of international process and initiatives have been evolving to highlight concerns and to address climate related issues that include IPCC, Kyoto Protocol, Marrakech accords (rules), SBSTA, SBI, GEF, UNEP etc. It is often argued that, successful mitigation efforts under the '*... common but differentiated responsibility*' would greatly reduce the needs for adaptation in many of the countries, although there has been growing concerns that the major global mechanism for doing so, the Kyoto Protocol and the flexible mechanisms under it, might not be adequate to stop 'dangerous climate change' and a deeper emission cut with respect to that in the Kyoto Protocol might be necessary to achieve the later mentioned goal. No wonder, the developing country parties (non-Annex-1 Country Parties to the UNFCCC) have been placing increasing emphasis on adaptation mechanisms in recent deliberations.

Although the need for adaptation is increasing, especially in the developing countries and LDCs, the enabling institutional architecture to advance adaptation in various countries is yet to be developed. The current guidelines are too vague at the moment to guide DCs and LDCs to secure investment for adaptation. However, GEF and other multi-lateral institutions are now given increasing roles in providing financial mechanisms, albeit too small to be effective and meaningful, for the promotion and implementation of adaptation measures in various countries.

7.2 Creating In-country Enabling Policy Environment

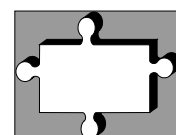
In absence of an effective global institutional architecture for adaptation, each country party should focus on creating its own enabling policy environment to advance adaptation. Recognizing the fact that adaptation measures should be complementary to development strategies of the country (or location within a country), each adaptation strategy and option should ideally be previewed within development-oriented policy regime prevailing over the country. One may contemplate three aspects in the process of creating enabling policy regime: (i) policy analysis, (ii) identification of policy gaps, and (iii) policy adjustment. These issues are discussed below.

7.2.1 Policy Analysis

The complementarity of current policy regime in relation to adapting to climate change should be analyzed in order to define which aspects of adaptation are already in place which would not only advance national (also regional and local) development processes, but also would reduce vulnerability of people to climate change. The work load in this respect might be significantly reduced if there is a separate national adaptation policy. However, in most of the developing countries, a separate adaptation policy does not exist. In its absence, it is practical to check how various policy elements in current policy regime might promote adaptation to climate change and contribute to increased societal resilience.

7.2.2 Identification of Policy Gaps

One of the outcomes of a policy analysis might be the identification of gaps in policy regime. There might be major gaps in the current policy regime which might either delay the initiation of an adaptation activity, or even negate and/or reduce effectiveness of an adaptation strategy. It is recognized that the future implications of climate change are not yet fully understood and therefore, it is expected that the current policy regime might not be adequate to deal with every aspects of climate change. Lacunas within the policy regime therefore need to be highlighted carefully.



7.2.3 Policy Adjustment

Once policy gaps are identified, the next practical step should be filling in the gap by considering appropriate rectification measures. Main stream development process of a country is being pursued through sectoral agencies. Sectoral policies guide the development processes. It might be necessary to adjust relevant policies to accommodate climate risk management. Since climate change would affect the poor the most, adjusting poverty alleviation policies and programmes to accommodate the increasing needs of adaptation in the LDCs could immensely help the cause. Similarly, in many countries there are policies to deal with hazards and disasters. A slight adjustment of those policies to accommodate the concerns of climate-induced hazards and disasters could enhance the effectiveness of the policy and ensure development for a long period in future. It might also be necessary to adjust/fine tune/create legal supports for certain functions of current institutional arrangements and administrative procedures. To address the dynamic nature of climate related problems, periodic policy analysis and subsequent adjustment is highly recommended for successful implementation of adaptation.

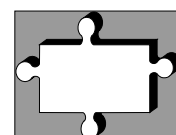
7.3 Institutional Architecture: Mainstreaming, Coordination, and Financing

There have been numerous examples from the developing countries, especially from the LDCs, that in spite of having conducive policy elements development practices often tend to ignore those policies/directives and 'business-as-usual development practices' take place on the ground. Mainstreaming adaptation becomes a difficult proposition when policy elements are either ignored or not translated into actions. Mainstreaming adaptation through climate risk management focuses on *a set of activities that promote a better understanding of the needs of climate risk management through building partnership among stakeholders and stimulate and support climate resilient development process in the country.* Mainstreaming also emphasizes on involvement of local as well as national institutions taking part in the CRRAP planning efforts at local, regional (sub national) and national levels with a primary focus on serving national development agenda, integrating adaptation measures, and addressing cross-cutting national issues (e.g. women's empowerment and advancement, ecological conservation and sustenance, integrated coastal zone management, safer islands etc.).

A coordinated and synergistic development approach is also needed, as highlighted in the principles of this adaptation framework. Lack of coordination among developing agencies and stakeholders often counteract adaptation processes and leads to unnecessary tension between institutions and actors. The needs for coordination are generally felt at all levels. Both horizontal and vertical coordination need to be ensured among institutions and actors (even groups) working at various levels and tiers.

The most intriguing question at this point is, who would mainstream climate risk management (in all development sectors and agencies) and which organization should be given the responsibility to coordinate all the activities and practices involving both development and adaptation (climate risk reduction)? There is of course no direct answer to such a question, because selection of institution is primarily the job of a government and it does so while pronouncing its policy regime. Since there is no separate climate change policy in a country and all matters related to development are shared by sectoral agencies (institutions), there appears to be a void in deciding which agency should take the lead in this respect. However, both the responsibilities of mainstreaming and coordination may temporarily be placed on the shoulder of 'climate change Designated Country Focal Point' (DCFP) in each of the countries, unless it is already decided and/or new institutional home is decided by the respective country.

The DCFP should facilitate the entire process envisaged under the FA, however it should prioritize its activities according to the necessity of the country and proceed in step-wise fashion. At the outset, the DCFP should attempt to build partnership among various agencies and institutions (including public, private and civil society solidarities) and lay down the institutional arrangements.



7.3.1 Partnerships Among Solidarities

Partnership development involving a host of stakeholders and solidarities in itself is a process. Integration of adaptation into development practices would not be achieved unless all the development partners value the common consideration that climate change indeed would counteract development processes. Common long-term views on climate change may not be developed unless people at all levels including the top politicians are provided with adequate information and made aware of adverse impacts of climate change. This is particularly valid for DCs and LDCs where there are immediate & urgent needs to be fulfilled and long-term issues with a high degree of uncertainty are generally ignored in decision making processes.

Towards building partnership among various institutions, it might be quite useful to establish Agency-based Focal Points (AFP), who would ideally coordinate on behalf of her/his agency and liaise with respective AFPs and the DCFP. Once an institutional caucus thus formed, having adequate exposure and continued training on relevant issues, they become an ideal wing for the national planning agency to examine programmes and projects and ensure that climate change concerns are integrated into development processes and activities. It is expected that such a caucus body would evaluate strengths, weaknesses, opportunities and challenges faced by various agencies towards delivering development services and keep each of the institutions involved in the process to continuously upgrade their performance to achieve national and regional development goals.

The partnership should also include NGOs, private sectors, research institutes, CBOs etc., along with local government institutions (LGI). An important mechanism of forging partnership process is through sharing data, information and knowledge. Mainstreaming Climate risk Management should involve awareness raising, capacity building, relationship management, collective process evaluation and advocacy at various levels across various tiers. A number of networks may emerge to foster such partnership processes.

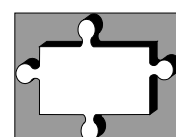
7.3.2 Institutional Arrangements: Envisaged Roles

Institutional arrangements proposed in the Country Framework provide the basis for respective actors and institutions to assume and ensure envisaged roles and responsibility with regard to climate resilient development, at all levels. It starts and rests on participation. Starting with participatory climate risk reduction action plans, all agencies and stakeholders have role and responsibilities to perform and undertake. At local level, this would interpret as a list of action or do-ables that addresses or incorporates climate risks, within the scope of respective overall development plans. Those actions that fall under the purview of Line Agencies (for example agriculture, water, etc.) will eventually, through intermediate tiers, reflect in sector development plans, at different time intervals. Others which are more community led, as well as community driven, and are considered as micro-level adaptation and risk management should be implemented by the community, with the leadership and support of Local Government Institutions.

The envisaged roles of various key institutions involved in the processes outlined above are provided below.

Local Government Institutions (LGI): Government institutes at the local level are generally recognized as the lowest administrative institutional structure. Since LGIs are instrumental in preparing micro-level development plans and subsequent implementation, such institutions should be facilitated to integrate climate change issues in their state of affairs. In most cases, LGIs are served by local leadership, involvement of whom may become a critical issue in ensuring community-buy-in of all adaptation related activities. Moreover, LGIs should also be instrumental in liaising with government hierarchy and sharing/demonstrating good practices with neighboring communities

Community-based Organizations (CBO): CBOs are local agencies working at the grassroots, who primarily act as watchdogs and ensure that nothing is going on in the neighbourhood which might cause harm to the society (their stakeholders). Organized community at the local level shall create the opportunity to realize economic growth through sustainable development ensuring sound environment and social equity. It is recommended that CRA processes and development of CRRAP should involve both the LGIs and CBOs, where local NGOs can play a facilitating role.



Sub-district, District, and Province-level Liaison Points: Officials deployed at sub-district, District, and Provincial (Divisional) levels representing line-ministries (sector-specific, e.g., Executive Engineer of Water Board/Commission, Agriculture Officer, Education Officer, Officer of Local Government Engineering Department, Disaster Management Officer etc.) play key roles in preparing tier-specific development plans. These officials, along with Officials running the administration, should be made liaison points for ensuring continued communicating across tiers. Each of these officials should be given responsibility to take active part towards preparing CRRAP at respective level (tier) and to make sure that the principles and approach described in section 2 are followed by the officials under her/his supervision. S/he should also be responsible to keep her/his line ministry informed regarding any new 'adaptation needs' in response to a sudden change in state of vulnerability of the area concerned.

Agency Focal Points: Focal points have to be established at all relevant Government agencies (centrally located). Agency Focal Points are operational contact points representing the lead agency (sector-specific Ministry). They are "experts having appropriate position in their parent departments/ organizations and having an overview of objectives, authorities, role, duties and responsibilities of their own departments/organizations".

Pro-active support and interaction of Agency Focal Points are crucial in operationalization of the mainstreaming approaches. Following may be considered as their duties and responsibilities:

- As a group, AFPs are responsible for implementation of policy guidelines/directives developed to mainstream climate risk management
- Individually, on behalf of the agencies/organizations, AFPs are responsible for proper coordination and harmonization of agencies/organizations activities which lead to integration of climate change concerns in development planning and implementation;
- Act as contact and resource person for their organization;
- Receive communications from the officials serving under the parent Ministry and (help) prepare development programmes of the Ministry by integrating issues concerning climate change risk reduction;
- Disseminate climate change related issues within their Ministry and associated organizations/agencies;
- Liaise with National Focal Point;
- Prepare position papers, as and when needed, on different issues concerning climate change and initiated by the National Focal Point.

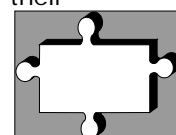
National Advisory Group (NAG): A National Advisory Group (NAG), representing national level experts contributing to the scientific community of the globe (i.e., IPCC, UNFCCC Expert Committee, ICSU, IGBP, IHDP etc.), may be formed. The NAG members shall provide expert advice in areas such as climate change science, impacts, vulnerability, adaptation needs, risk assessment, preparedness and risk reduction, adaptation research, gender issues, sector-specific issues, communications. Such a group may be formed directly under the National Focal Point, whereas each of the line Ministries may also seek advice from an issue-based NAG (for example, the Agency Focal Point for Water Resources Management sharing experience and seeking guidance of a Water Resources NAG).

Task Force: In order to deal specific issues or subject matters (for example mangrove forest or crop adaptability) specific Task Forces could be formed with experts of the field in the country.

7.3.3 Financing

Implementation of the identified actions, options and measures should need financing. Adaptation measures can be financed in many ways. The financial mechanism for implementation could be National revenue funds, Bilateral donor funds, Multilateral donor funds and International convention fund including GEF trust fund, LDCF, SCCF, CBA, Adaptation Fund (Kyoto protocol), CER, CDM, Joint Implementation, ET. Current and potential future sources of funding for climate change adaptation include:

Domestic Resource Mobilization: Climate change and variability impacts greatly on development. Development has to be climate resilient. Most of the coping and adaptation to climate change at household and micro-level are addressed from own resources and capacity. However, in future, the risks as well as impacts are most likely to increase. This will overburden the people and their



communities. As such national governments should support community initiatives to enhance their coping capacity with relevant technology and resources, primarily from domestic sources. This interprets identification and addressing climate risks as part and parcel to development. Implementation of local development plans, as stated under the institutional arrangement, should follow the following approach in allocating resources: Respective line/sector agencies will demand and draw on their sector plans and budgets, based on the local risk reduction action plan and implementation process. Community micro-adaptation will demand and draw on local government development plan and budgets.

Special Climate Change Fund: This fund aims in particular to support adaptation, energy, forestry, industry, technology transfers, transport, waste management and activities to assist developing country parties in diversifying their economies. With regard to adaptation, it supports developing countries in preparing their (initial) National Communications to the UNFCCC (Stage I activities and in strengthening implementation of adaptation activities related to the National Communications or in-depth national studies (Stage II). Moreover, support is provided for various activities relating to information networks, development and implementation of climate-related institutions and of prioritized projects identified in the National Communications, awareness raising and building (institutional) capacity to implement preventive measures, planning, disaster preparedness and fortifying or establishing early warning systems for extreme weather events. It could also fund implementation of adaptation measures. Funding criteria are that projects are country-driven, based on national priorities and geared toward sustainable development.

Least Developed Countries Fund: The Least Developed Countries Fund, implemented through the GEF, supports least developed countries in preparing and implementing National Adaptation Programmes of Action (NAPAs).

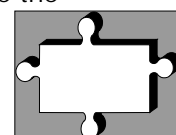
Adaptation Fund: This trust fund under the GEF will finance implementation of concrete adaptation projects in non-Annex I countries, including activities aimed at avoiding forest degradation and combating land degradation and desertification.

Global Environment Facility: Currently, the GEF funds six focal areas, including biodiversity, climate change and land degradation. It has approximately USD 200 million per year to spend on climate change, complemented by some additional funding, such as ODA and loans. The GEF is meeting the full costs of capacity-building and research in relation to adaptation under Stage I activities, using resources from the Special Climate Change Fund. The GEF intends to expand its range of activities, including capacity-building and adaptation, in accordance with the provisions of the Marrakech Accords. The GEF also aims to integrate adaptation into the other focal areas, most notably by looking into topics like biodiversity and integrated resource management (GEF, 2003). Under the SPA, which became operational on 1 July 2004, approximately USD 50 million is available for adaptation pilots ('piloting an operational approach to adaptation'), meaning actual implementation (Stage III) (GEF, 2004). Depending on the size of the project, the GEF will provide funding of 100% (small grants) or less (larger grants).

Disaster risk reduction: Around the globe most of the disasters occur following climatic extreme events landfall. It is more and more accepted that risk reduction through climate risk management is better than to response and relief. It is therefore very much likely to draw on this fund for CRM.

Insurance and pooling: The IPCC's *Third Assessment Report* discusses both the challenges facing the financial services sector (insurance and banking) as a result of climate change, as well as the opportunities for both the sector and society as a whole to benefit from insurance and related products, by using them as a proactive vehicle to cover losses due to extreme weather events (Vellinga et al., 2001).

Development assistance: The multi-agency paper on poverty and climate change (ADB et al., 2003) points out that climate change adaptation objectives can be incorporated into development activities funded through ODA. According to Klein (2001), the long-term effects of climate change on ODA are connected in at least three ways. First, climate change poses a threat to projects that involve ODA. Second, the community or ecosystem that benefits from ODA may be vulnerable to climate change. Third, the ODA project may have (positive or negative) effects on the vulnerability of the community or ecosystem to climate change. Risk assessments, vulnerability assessments and environmental impact assessments as part of ODA-funded projects could help to reduce the



vulnerability of these projects to climate change. The European Commission has identified adaptation as a relevant response strategy in development cooperation for most EU partner nations, using a set of indicators. Most of the proposed assistance, though, is limited to capacity-building (such as joint research and knowledge exchange), and does not include the provision of funds for the implementation of adaptation (EC, 2003).

Foreign direct investment: FDI flows are potentially important for adaptation. Ways could be found to influence investments and make them relevant to adaptation, most notably through national policy. Besides there were also proposals of non-compliance fund and resource could also be directed towards adaptation from Public expenditures and disaster relief and risk reduction fund (Bouwer, L.M. & Aerts, J.C.J.H. (2006)).

7.4 Governance

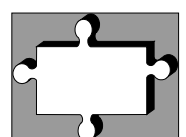
It is important to realize that the proposed FA would not function adequately if the governance for implementing FA is not practiced well. National level policy makers, including Parliamentarians and lawmakers, should be made aware of the merit of having the FA. Without political blessings, FA would not function especially in those countries where there are competition to secure lion share of scanty resources and there are many immediate development priorities. The complementarities of CRM issues with those of mainstream development activities should be explained first in order to ensure political blessing.

In many developing countries, especially in LDCs, it is recognized widely that lack of governance is often manifested in terms of excessive and unnecessary interference from political parties towards implementation of development programmes. Inappropriate use (and/or misuse) of funds, pilferage due to corruption, gross violation of policy directives in the processes of implementation of projects, political interference to make monitoring and evaluation processes ineffective – all these provide examples of politically-influenced malpractices that are rampant in the LDCs while implementing development programmes. Unless these are taken care of properly, it is difficult to imagine that the fruits of implementation of FA would be useful for the poor and the most vulnerable people in those countries.

Adjusting financial priorities is a major task. The LDC syndrome (i.e., placing almost all the finances available to serve immediate needs and ignoring longer term issues) needs to be overcome by integrating climate concerns into usual development prioritization. Integrating climate concerns essentially means integration of longer term issues and addressing those within the regular development programmes. Such integration might often require finances in addition to usual development finances. Determining the needs for finances to take care of longer term issues would largely depend on location-specific and situation-specific aspects, which should have strong footprints in CRRAPs at various tiers. Strengthening the bottom-up planning processes and simultaneous integration at each hierarchical levels above should be ensured. In doing so, the principles and approach mentioned earlier should be followed as closely as follows.

Once again, political interference might jeopardize the financing processes. Needs-based financing might not be possible if there are political interferences. Maintaining full transparency in project designing (tending to needs identified in the CRRAP processes) and implementation phases as well as in monitoring and evaluation phases and providing adequate financing in all stages of the project phase with adequate participation of local level people and administration might help remove political interference and enhance transparency towards implementation of projects at local levels.

Continuous monitoring, evaluation and feedback are prerequisite routine activities which would immensely help the governance processes. A monitoring frame work should be developed including an indicator framework for the purpose of monitoring the activities, evaluate and provide feedback and at the same time become a tool for evaluating achievements. Media should be brought in to conduct joint monitoring and dissemination of monitoring results in public. There should be advocacy groups who should take up responsibility to act as pressure groups and engage in dialogues with relevant agencies and focal points on unresolved issues of high importance.



7.5 Supplementary Issues: Knowledge Management for CRM

Knowledge is necessary on the impacts of climate change (and variability) on all different sectors covering natural resources, physical infrastructures, human and social conditions, livelihood options, institutional setting and financial resources and mechanism and all these constitute knowledge arena for climate risk management (CRM).

Knowledge management is contextual and involves a series of actions depending on the scope to perform knowledge management functions. CRM requires knowledge at different resolutions and by various stakeholders. Certain knowledge could be available in a moment to a person or institution and at the same time there is nonexistence of certain needed knowledge. Again there are limitations of access to knowledge. Establishing access to knowledge shall make some knowledge available to others and still there shall be gaps that have to be filled in by acquisition and generation. Knowledge management includes among others awareness raising, identification of knowledge need, who needs what, inventory available knowledge (state of art), access to knowledge (protocols), knowledge gap identification, data acquisition, knowledge generation, communication and dissemination (PDO-ICZMP,2004). Functions of knowledge management shall be highly instrumental in supporting CRM in a partnership mode of operation. As such, knowledge management for CRM should be user driven and need based, participatory through out the process, should include qualitative information, experience along with structured data (standardized, formatted and versatile), information and knowledge.

In the context of climate change (and variability), the purpose of knowledge management and social communication is to:

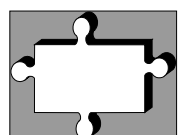
- Gather, assimilate, improve, update and make available data, information and knowledge necessary to device knowledge based climate risk management for all stakeholders;
- Through a co-operative approach, engage organizations and projects involved in climate risk management in collecting, collating knowledge and constructing and maintaining a dynamic and sustainable knowledge system;
- Integration of indigenous (local) knowledge and expert's knowledge to generate decision making parameters
- Serve as a specific means for social communication of knowledge both horizontally and vertically among many stakeholders (multidirectional communication) and for raising awareness and to informing and influencing to initiate climate risk management process; and
- Identification of knowledge gaps and filling through research

The knowledge management approach should be based on an assessment of who the main users of the knowledge are. It also requires co-operation with other actors for generation and supply of data and information and integration of knowledge available in their own activities and design process. Effective engagement of the users and partners is the key to successful knowledge management and therefore, for effective co-operation a sound communication, assimilation and dissemination procedures has to be in place. In addition to the climate risk management focal points in the country, potential users include: policy makers, development partners and other agencies at national and regional levels; government implementing agencies and professionals at various levels; and community and functional organizations (such as water user associations, cyclone preparedness volunteer groups) at a local level.

Country and context specific detail activities should be developed including user group formation, knowledge coordination, generation through research, review of the relevant policies, laws and regulations, office procedures and practice regarding data and information transaction shall identify constraints of free flow of information. Accordingly steps should be taken to adjust these instruments in favor of free information flow. To make this happen persuasion at policy and other relevant level should be conducted and a data and information sharing protocol should be developed. The DCFP should coordinate knowledge management including Acquisition & Archiving, Assimilation and Transaction.

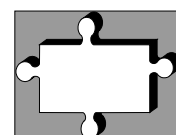
Climate change is impacting almost every sphere of life and livelihood. But we don't know for sure how far climate impacts are for example, on the aquatic live forms in the estuary or coast, on mangroves, vegetation regime, biodiversity, health, economy and so on. On the other hand what devoted actions are needed to treat this climate risks and adapt with. For example, new variety of saline tolerant paddy could be invented and adapted for salinity intruded coastal areas or shifting risks through crop insurance could be instrumental. Analysis of country specific contextual

knowledge and information available to deal climate risks and inventory of the available knowledge, consultation with the professionals of the respective sectors and the community shall identify adaptation research needs and conducted accordingly to fill required knowledge gaps.

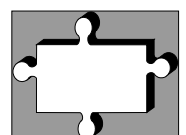


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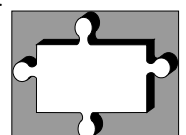
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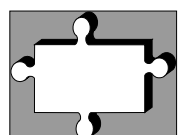


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Definitions and Terms Used

(unless otherwise stated, the terms and definitions are drawn from the Glossary, IPCC Third Assessment Report)

ADAPTATION

Adjustment in natural or human systems to a new or changing environment. Adaptation to climate change refers to adjustment in natural and human systems in response to actual or expected climate stimuli or their effects, which moderates or harm or exploits beneficial opportunities. Various types of adaptation can be distinguished including anticipatory and reactive adaptation, and autonomous and planned adaptation. IPCC 2001

CAPACITY BUILDING

In the context of climate change, capacity building is a process of developing the technical skills and the institutional capability in developing countries and economies in transition to enable them to participate in all aspects of adaptation to, mitigation of, and research on climate change, and the implementation of the Kyoto Mechanisms, etc.

CLIMATE CHANGE

Climate is characterized by average values, variability and extreme events of such parameters as precipitation, temperature, hours of sunshine, wind velocity. Climate change affects all three, namely average, variability and extremes. Climate affect natural systems and human beings/human activities directly and human activities also affect natural systems and hence the climate. Climate risks relates to the impact of climate variability and extreme events. Climate change changes these risks.

Adapting to climate change is adapting to the change in climate risks.

Climate Change refers to statistically significant variation in either the mean state of the climate or its variability, persisting for an extended period (typically decades or longer). Climate change may be due to natural internal processes or external forcings, or to persistent anthropogenic changes in the composition of the atmosphere or in land use. IPCC, 2001

The UNFCCC in its Article 1 defines climate change as a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.

CLIMATE PREDICTION

A climate prediction or climate forecast is the result of an attempt to produce a most likely description or estimate of the actual evolution of the climate in the future (e.g., at seasonal, interannual, or long-term time-scales).

CLIMATE CHANGE

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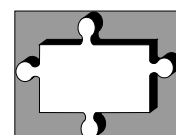
Adapting to climate change is adapting to the change in climate risks.

CLIMATE VARIABILITY

Climate variability refers to variations in the mean state and other statistics (such as standard deviations, the occurrence of extremes, etc.) of the climate on all temporal and spatial scales beyond that of individual weather events. Variability may be due to natural internal processes within the climate system (internal variability), or to variations in natural or anthropogenic external forcing (external variability). See also climate change.

ECOSYSTEM

A system of interacting living organisms together with their physical environment. The boundaries of what could be called an ecosystem are somewhat arbitrary, depending on the focus of interest or study. Thus the extent of an ecosystem may range from very small spatial scales to, ultimately, the entire Earth.



EMISSIONS

In the climate change context, emissions refer to the release of greenhouse gases and/ or their precursors and aerosols into the atmosphere over a specified area and period of time.

EXTREME WEATHER EVENTS

An extreme weather event is an event that is rare within its statistical reference distribution at a particular place. Definitions of "rare" vary, but an extreme weather event would normally be as rare as or rarer than the 10th or 90th percentile. By definition, the characteristics of what is called extreme weather may vary from place to place. An extreme climate event is an average of a number of weather vents over a certain period of time, an average which is itself extreme (e.g., rainfall over a season).

GREENHOUSE GAS

Greenhouse gases are those gaseous constituents of the *atmosphere*, both natural and *anthropogenic*, that absorb and emit radiation at specific wavelengths within the spectrum of *infrared radiation* emitted by the Earth's surface, the atmosphere, and clouds. This property causes the *greenhouse effect*. Water vapor (H₂O), carbon dioxide (CO₂), nitrous oxide (N₂O), methane (CH₄), and ozone (O₃) are the primary greenhouse gases in the Earth's atmosphere. Moreover there are a number of entirely human-made greenhouse gases in the atmosphere, such as the halocarbons and other chlorine- and bromine-containing substances, dealt with under the Montreal Protocol. Besides CO₂, N₂O, and CH₄, the Kyoto Protocol deals with the greenhouse gases sulfur hexafluoride (SF₆), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs).

IMPACTS

Consequences of *climate change* on natural and *human systems*. Depending on the consideration of *adaptation*, one can distinguish between potential impacts and residual impacts.

- Potential impacts: All impacts that may occur given a projected change in *climate*, without considering adaptation.
- Residual impacts: The impacts of climate change that would occur after adaptation.

See also *aggregate impacts*, *market impacts*, and *non-market impacts*.

IMPLEMENTATION

Implementation refers to the actions (legislation or regulations, judicial decrees, or other actions) that governments take to translate international accords into domestic law and policy. It includes those events and activities that occur after the issuing of authoritative public policy directives, which include the effort to administer and the substantive impacts on people and events. It is important to distinguish between the legal implementation of international commitments (in national law) and the effective implementation (measures that induce changes in the behavior of target groups). Compliance is a matter of whether and to what extent countries do adhere to the provisions of the accord. Compliance focuses on not only whether implementing measures are in effect, but also on whether there is compliance with the implementing actions. Compliance measures the degree to which the actors whose behavior is targeted by the agreement, whether they are local government units, corporations, organizations, or individuals, conform to the implementing measures and obligations.

LEVEL OF SCIENTIFIC UNDERSTANDING

This is an index on a 4-step scale (High, Medium, Low, and Very Low) designed to characterize the degree of scientific understanding of the *radiative forcing* agents that affect *climate change*. For each agent, the index represents a subjective judgement about the reliability of the estimate of its forcing, involving such factors as the assumptions necessary to evaluate the forcing, the degree of knowledge of the physical/chemical mechanisms determining the forcing, and the uncertainties surrounding the quantitative estimate.

MALADAPTATION

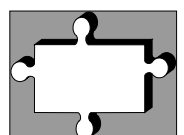
Any changes in natural or *human systems* that inadvertently increase *vulnerability* to climatic *stimuli*; an *adaptation* that does not succeed in reducing vulnerability but increases it instead.

MAINSTREAMING

This word obviously derives from the metaphor of a small, isolated flow of water being drawn into the mainstream of a river where it will expand to flow smoothly without loss or diversion. Therefore 'mainstreaming adaptation to climate change' describes a process to fully incorporate adaptation into development policy and practice. It means radically expanding and enhancing adaptation so that it becomes normal practice, fully institutionalised within an agency's development agenda.

Mainstreaming has three purposes:

- To make certain that all the development programmes and projects that originate from or are funded by an agency are designed with evident consideration for potential climate change risks and to resist/reduce impacts.
- To make certain that all the development programmes and projects that originate from or are funded by an agency do not inadvertently increase vulnerability to climate change in all sectors: social, physical, economic and environment.
- To make certain that all the development programmes and projects that originate from or are funded by an agency are designed to contribute to developmental aims and to reduce future climate change related risk.



NO REGRETS POLICY

One that would generate net social benefits whether or not there is *climate change*. No-regrets opportunities for *greenhouse gas emissions* reduction are defined as those options whose benefits such as reduced energy costs and reduced emissions of local/regional pollutants equal or exceed their costs to society, excluding the benefits of avoided climate change. No-regrets potential is defined as the gap between the *market potential* and the *socio-economic potential*.

RAPID CLIMATE CHANGE

The non-linearity of the *climate system* may lead to rapid *climate change*, sometimes called abrupt events or even surprises. Some such abrupt events may be imaginable, such as a dramatic reorganization of the *thermohaline circulation*, rapid deglaciation, or massive melting of *permafrost* leading to fast changes in the *carbon cycle*. Others may be truly unexpected, as a consequence of a strong, rapidly changing, forcing of a non-linear system.

RESILIENCE/RESILIENT

Amount of change a system can undergo without changing state. (IPCC)

The capacity of a system, community or society potentially exposed to hazards to adapt, by resisting or changing in order to reach and maintain an acceptable level of functioning and structure. This is determined by the degree to which the social system is capable of organizing itself to increase its capacity for learning from past disasters for better future protection and to improve risk reduction measures. (UN- ISDR)

SUSTAINABLE DEVELOPMENT

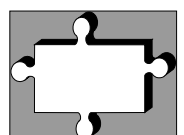
Development that meets the needs of the present without compromising the ability of future generations to meet their own needs. (IPCC).

It contains within it two key concepts: the concept of "needs", in particular the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and the future needs. (Brundtland Commission, 1987).

Sustainable development is based on socio-cultural development, political stability and decorum, economic growth and ecosystem protection, which all relate to disaster risk reduction. (UN-ISDR)

VULNERABILITY

The degree to which a system is susceptible to, or unable to cope with, adverse effects of *climate change*, including *climate variability* and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its *sensitivity*, and its *adaptive capacity*.



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About the Climate Change Cell

The Climate Change Cell has been established in the Department of Environment in 2004 under the Comprehensive Disaster Management Program (CDMP) of the Government of Bangladesh. It responds to the recognition that Bangladesh is particularly vulnerable to the effects of climate change, and that the number and scale of climate-related disasters is likely to increase. The Cell is supported by DFID International and the UNDP Bangladesh.

Climate change will have far-reaching effects across many sectors. The Cell provides the central focus for the Government's climate change related work, operating as a unit of the Department of Environment (DoE) under the Ministry of Environment and Forests (MoEF).

Its objective is to enable the management of long term climate risks and uncertainties as an integral part of national development planning.

This will contribute to the primary objective of the wider Comprehensive Disaster Management Programme, which aims to strengthen the capacity of the Bangladesh disaster management system to reduce unacceptable risks and improve response and recovery activities.

Meeting these objectives will enable more effective and sustained poverty reduction through the reduction of disaster and climate risks within the overall development process.

A core mandate for the Climate Change Cell is **Building the capacity of Government** to coordinate and integrate climate change issues in mainstream development activities.

The Working Paper CLIMATE RESILIENT DEVELOPMENT – COUNTRY FRAMEWORK TO MAINSTREAM CLIMATE RISK MANAGEMENT AND ADAPTATION provides a much needed service to development practitioners and policy makers, as well as a wide range of actors and institutions to engage in climate risk management and adaptation practice at country level in all aspects of development.