



MRC Management Information Booklet Series No.1

Adaptation to climate change in the countries of the Lower Mekong Basin

September 2009



Meeting the needs, keeping the balance

INTRODUCTION

There is growing concern about the potential effects of climate change on the socioeconomic characteristics and natural resources of the Lower Mekong Basin. As a result there is a need for a more understanding of the potential impacts from climate change.

In response, the Mekong River Commission (MRC) has launched the regional Climate Change and Adaptation Initiative (CCAI). The CCAI is a collaborative regional initiative designed to address the shared climate change adaptation challenges of LMB countries. A regional synthesis report (RSR) has been prepared as part of the initial phase of the CCAI to provide a snapshot of current knowledge and activities related to climate change in the LMB countries (MRC, 2009)¹.

The booklet provides a summary of existing regional and national knowledge on climate change, national responses to climate change, and an overview of stakeholders involved in supporting the LMB Governments a climate change. It concludes by providing a gap analysis and recommendations for priority action for improving the capacity of the LMB countries.

EXISTING KNOWLEDGE OF REGIONAL CLIMATE CHANGE SITUATION

Climate change is expected to result in modifications to weather patterns in the LMB in terms of temperature, rainfall and wind, not only in terms of intensity but also in terms of duration and frequency of extreme events. Seasonal water shortages, droughts and floods may become more common and more severe, as may saltwater intrusion. Such changes are expected to affect natural ecosystems and agriculture and food production, and exacerbate the problems of supplying increased food demand to growing populations. The impacts of such changes are likely to be particularly severe given the strong reliance of the LMB communities on natural resources for their livelihoods.

Several studies have attempted to accurately identify the potential future climate situation that could result in the region from global warming. However most of these studies were not able to fully capture the uncertainty around future climate projections. A recent study undertaken for CSIRO (Eastham *et al.*, 2008)² attempted to redress some of the limitations of earlier studies and based on the IPCC's Scenario A1B made the following predictions for the region in 2030:

- A basin wide temperature increase of 0.79°C, with greater increases for colder catchments in the north of the basin.
- An annual precipitation increase of 0.2m, equivalent to 15.3%, predominantly from increased wet season precipitation.
- An increase in dry season precipitation in northern catchments and a decrease in dry season precipitation in southern catchments, including most of the LMB.
- An increase in total annual runoff of 21% which will maintain or improve annual water availability in all catchments, however with pockets of high levels of water stress remaining during the dry season in some areas such as north-eastern Thailand and Tonle Sap.
- An increase in flooding in all parts of the basin, with the greatest impact in downstream catchments on the mainstream of the Mekong River.
- Changes to the productivity of capture fisheries which require further investigation, although it is predicted that the storage volumes and levels of Tonle Sap, a major source of capture fisheries, will increase.

- A possible 3.6% increase in agricultural productivity but with overall increases in food scarcity as food production in excess of demand reduces with population growth; further investigations are required to take into account effects of flooding and crop damage on these predictions.

EXISTING KNOWLEDGE OF NATIONAL CLIMATE CHANGE SITUATION

Accurate information on the climate change situation at the national level in each of the LMB countries is very limited. Available information is often drawn from global or regional level models with varying degrees of relevance to the national level. Quantitative information is lacking and most of the data is presented in terms of broad potential trends in climatic conditions.

In Cambodia, it is predicted that there will be an increase in mean annual temperature of between 1.4 and 4.3 °C by 2100. Mean annual rainfall is also predicted to increase, with the most significant increase experienced in the wet season. As with the other countries in the LMB, flooding and droughts are expected to increase in terms of frequency, severity and duration. The potential impacts of climate change include changes to rice productivity, with increases in wet season crops in some areas and decreases in others; acceleration of forest degradation including the loss of wet and dry forest ecosystems; inundation of the coastal zone and higher prevalence of infectious diseases.

In Lao PDR an increase in mean annual temperature is predicted together with an increase in the severity, duration and frequency of floods; most probable in plain areas adjacent to Mekong River. The impacts of climate change are predicted to include agricultural and infrastructure losses due to increased storm intensity and frequency; land degradation and soil erosion from increased precipitation and a higher prevalence of infectious diseases.

In Thailand, an increase in mean annual temperature is predicted together with an increase in the length of the hot season, with a higher number of days with a temperature greater than 33 °C, and a corresponding decrease in the length of the cold season. Higher rainfall intensity is expected in the cold season. Some river basins are expected to face water shortages and an increase in flood and drought frequency is predicted. The impacts of climate change are expected to include changes in rice productivity, with increases in wet season crop in some areas and decreases in others; damage to wetland sites from reduction in water availability; and damage to the coastal zone from changes to coastal erosion and accretion patterns.

In Viet Nam, an increase in annual average temperature of 2.5 °C by 2070 is predicted with more significant increases probable in highland regions. The average annual maximum and minimum temperatures are also expected to increase. An increased incidence in floods and droughts is predicted, together with changes to seasonal rainfall patterns and an increased incidence and severity of typhoons. A possible sea level rise of 1.0 m by 2100 has been identified. It is estimated that there would be direct effects on 10% of population from 1.0m sea level rise and losses equivalent to 10% of GDP due to the inundation of 40,000 km² of coastal areas. Salinity intrusion in the Mekong Delta region is expected to increase, resulting in changes to cropping patterns and productivity and negative effects on aquatic and terrestrial ecosystems. A higher prevalence of infectious diseases is also forecasted.

NATIONAL RESPONSES TO CLIMATE CHANGE

National responses to climate change include policy, institutional and adaptation responses. All LMB countries have ratified the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. Each country has a primary policy document which outlines its strategy and responses to climate change. In Cambodia and Lao PDR, this takes the form of a National Adaptation Program of Action to Climate Change (NAPA). Thailand has prepared the 'Action Plan on National

Climate Change as the Five Year Strategy on Climate Change 2008 to 2012' and Viet Nam has prepared the 'National Target Program to Respond to Climate Change'. In general, climate change issues are not well integrated into the broader policy frameworks of national Governments.

Each of the LMB countries has nominated a national focal point for climate change issues. Within Cambodia the Ministry of Environment plays this role, within Lao PDR, the Water Resources and Environment Administration, and within Thailand and Viet Nam the respective Ministries of Natural Resources and Environment. All countries have established a high level Governmental body with responsibility for the development of climate change policy and strategies. Cambodia has established the National Climate Change Committee, Lao PDR has established the National Steering Committee on Climate Change, Thailand has established the National Board on Climate Change Policy and Viet Nam has established the National Climate Change Committee.

All LMB countries have a history of implementation of adaptation activities; although most activities implemented to date have been focused on natural disasters response management. The NAPAs of Cambodia and Lao PDR contain information on proposed adaptation projects including 39 activities planned for Cambodia and 45 for Lao PDR. Thailand's 'Action Plan on National Climate Change as the Five Year Strategy on Climate Change 2008 to 2012' contains strategic directions for development of detailed action plans for future adaptation activities. The Vietnamese 'National Target Program (NTP) to Respond to Climate Change' establishes directions for the development of sectoral and geographic adaptation action plans; to date, an action plan has been completed for agricultural and rural development sector.

A large number of international organizations are working on climate change issues in partnerships with national Governments. Across the LMB, more than 300 projects are being implemented or are planned.

REGIONAL CLIMATE CHANGE ACTIVITIES AND STAKEHOLDERS

A large number of stakeholders are working with national Governments and regional organizations on climate change activities at the regional level including:

- The MRC has recently launched the CCAI and has been involved in other related climate change activities as part of its various sector programs since 2000.
- The United Nations Development Program (UNDP) is mainstreaming climate change activities into development programs through the poverty and environment initiative (PEI).
- The Asian Development Bank (ADB) has a range of climate change activities in the preparatory phase as part of its GMS Core Environment Program.
- The 'Study on Climate Change Impact Adaptation and Mitigation in Asian Coastal Mega Cities' is being carried out with support from the ADB, World Bank and JBIC and is investigating climate change issues in Bangkok and Ho Chi Minh City.
- A wide range of climate change activities are being carried out by other stakeholders including SEA-START, IUCN Asia, FAO, WWF, ICM, SEI, Wetlands Alliance, Oxfam, CARE, Australian National University, ACIAR, IWMI/WorldFish and the Global Water Partnership³.

GAP ANALYSIS AND RECOMMENDATIONS

Table 1. *Climate change issues in the LMB and gap analysis (cells shaded blue indicate gaps).*

Issue	Cambodia	Lao PDR	Thailand	Viet Nam	Regional
Awareness of climate change in the general population					
Awareness of climate change at different institutional levels					
Low adaptation capacity to climate change in the general population					
Adaptation capacity					
Institutional strength and capacity					
Technical knowledge among government agencies & NGOs					
Concrete implementation of climate change policies					
Perception of climate change as sector and not mainstreaming necessity					
Prediction and assessment tools					
Climate change literature translated into local languages					
Tools for advising and instructing policy makers					
Analytical studies on climate change impacts					
Reliable climate change data					
Progress in implementation of NAPA/NTP					
Sectoral implications and adaptation					
Coordination to respond to climate change in developing policies & plans					
Financial support for climate change initiatives					

The gap analysis prepared by the national experts (NETs) and the CCAI study team identified a large degree of commonality in perceived shortcomings in climate change knowledge, activities and responses at both the national and regional level. A summary of the gap analysis is presented below; it has been categorised into (i) national issues for each of the LMB countries, and (ii) regional issues for the LMB region as a whole. The gap analysis reflects the key concerns and priority aspects as expressed by the national and regional experts. When a gap is not highlighted it does not mean that the issue is resolved only that other aspects are considered more immediate to address.

A large number of recommendations for future actions in climate change activities have also been developed. These are presented below in terms of recommendations for each of the LMB countries followed by a series of regional level recommendations.

CAMBODIA

- C1 – Support for implementation of NAPA priority activities
- C2 – Development and implementation of climate change awareness raising campaigns
- C3 – Mainstreaming of climate change adaptation into development programs
- C4 – Institutionalisation of an inter-organisational climate change coordination mechanism
- C5 – Integration of climate change adaptation into the national budgetary process
- C6 – Formulation of climate change adaptation and climate change proofing legislation/policies
- C7 – Strengthening of climate change research

LAO PDR

- L1 – Development and implementation of capacity building programmes
- L2 – Development and dissemination of modelling and assessment tools
- L3 – Support to policy frameworks and improved regulatory and institutional frameworks
- L4 – Pilot study of climate change impacts in selected provinces
- L5 – Development and implementation of national monitoring and reporting system
- L6 – Investigations into the appropriate use of forest resources as sink sources for carbon dioxide
- L7 – Research to strengthen health systems and services to better anticipate and address potential health challenges
- L8 – Development of a strategy for the multipurpose use of the water for national development activities

THAILAND

- T1 – Improved development and assessment of adaptation Strategies
- T2 – Development and implementation of capacity building programmes
- T3 – Development and implementation of awareness raising programs
- T4 – Mainstreaming adaptation to climate change in national policy development processes
- T5 – Mechanisms to increase funds for adaptation to climate change.
- T6 – Investigations into linkages between poverty and climate change
- T7 – Development and dissemination of Improved modelling tools
- T8 – Increased Scientific Research

VIET NAM

- V1 – Identification of funding sources for NTP activities and adaptation measures
- V2 – Further research on climate change impacts

- V3 – Improved information sharing networks and mechanisms
- V4 – Institutional coordination at a national level
- V5 – Guidance on adaptation planning for national agencies
- V6 – Communication of scientific results through translation of key findings

REGIONAL LEVEL

- R1 – Development of regional institutional structure to address climate change issues
- R2 – Climate change predictions and integrated basin wide assessment of climate change impacts
- R3 – Provisions for sustainability of climate change policy planning
- R4 – Development and implementation of stakeholder awareness raising campaigns
- R5 – Riparian country cooperation to address trans-boundary issues related to adaptation activities
- R6 – Development of regional information sharing networks and mechanisms

END NOTES

1. MRC (2009) Adaptation to climate change in the countries of the Lower Mekong Basin: a regional synthesis report. *MRC Technical Paper No. 24*. Mekong River Commission, Vientiane.
2. Eastham, J., Mpelasoka, F., Mainuddin, M., Ticehurst, C., Dyce, P., Hodgson, G., Ali, A. and M. Kirby (2008) Mekong River Basin Water Resources Assessment: Impacts of Climate Change. CSIRO: Water for a Healthy Country National Research Flagship.
3. Acronyms (not included in the text)

ACIAR	Australian Centre for International Agricultural Research
FAO	Food and Agriculture Organisation of the United Nations
ICEM	International Center for Environmental Management
IUCN	International Union for the Conservation of Nature
IWMI	International Water Management Institute I
SEI	Stockholm Environment Institute
WWF	World Wide Fund for Nature

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Series editor Dr Tim Burnhill

Mekong River Commission

P.O. Box 6101, 184 Fa Ngoum Road, Unit 18, Ban Sithane Neua

Sikhottabong District, Vientiane 01000 Lao PDR

Telephone: (856) 21 263 263 Facsimile: (856) 21 263 264

E-mail mrcs@mrcmekong.org Website www.mrcmekong.org