

CHAPTER 1
INTRODUCTION

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1.1 BACKGROUND

Asia is undergoing unprecedented urban growth in terms of population and socioeconomic development. Much of this growth is occurring in large coastal cities at high risk from climate change and sea level rise. Recent loss and damage to life and property due to flooding amply demonstrated the potential for loss in the coastal mega-cities. Bangkok is a case in point. Yet, comprehensive modeling for the local inundation pattern, as well as thorough assessment of consequent impacts on physical infrastructure and socioeconomics had been lacking. The gap seriously impaired the city government's ability to consider appropriate adaptation options.

To fill the gap, the World Bank (WB) is collaborating with the Asian Development Bank (ADB) and the Japan Bank for International Cooperation (JBIC) to carry out an assessment of the impacts of climate change on major coastal cities in Asia (Bangkok, Ho Chi Minh, Kolkata, and Manila). A separate study is conducted for each coastal city whereupon a synthesis report is produced, integrating results from city-specific works. The study will: (i) evaluate similarities and differences of results and by doing so (ii) identify common approaches to adaptation, which could be readily utilized in other coastal cities in the region.

The World Bank entrusted Panya Consultants Co., Ltd. (the Consultant) to carry out an assessment for Bangkok and vicinities. The study addresses three major questions: (i) what can Bangkok expect due to climate change and associated impacts and what are the projected magnitude of these impacts; (ii) what adaptation measures could be employed to address the threat of climate change related impacts; and (iii) what are the key policy priorities for decision-makers to deal with the threat of climate change impacts.

The project consisted of: generating an extensive knowledge base of past and present climatic and socioeconomic situations, developing a mathematical model for simulating climate change effect on hydrology, assessing impact for the year 2050 under different climate change scenarios, and recommending suitable adaptation options for the city. Moreover, consultations with stakeholders were carried out to facilitate informed decision-making on the part of government and the private sector on measures needed to address climate change and its consequences.

1.2 STUDY GOAL AND OBJECTIVES

The study strengthened the understanding of: (i) the socioeconomic impacts of climate variability and change, and associated vulnerabilities of the urban communities, especially the poor, to such impacts; and (ii) the need to adapt urban infrastructure to mitigate these impacts and protect the urban population.

While the overall goal of the study entailed the Bangkok Metropolitan Administration (BMA) and governments developing effective approaches to strengthen their adaptation and amelioration capacities against the impacts of climate change and variability, the specific objectives of the study were to:

- 1) Assess the current knowledge base, including historical climate information, coping strategies, and local capacity to deal with natural disasters- especially those that are related to floods, cyclones, and tides;
- 2) Assess climate change scenarios and their consequences on the hydrology of coastal watersheds;
- 3) Identify the most vulnerable coastal and urban resources, including infrastructure and communities in the area, to impacts of climate change and variability;

- 4) Assess and quantify the likely magnitude of social, environmental and economic damages expected in Bangkok because of climate change and variability;
- 5) Identify and assess appropriate alternative intervention scenarios, and prioritize suitable interventions according to their effectiveness in terms of reducing vulnerability to threats from climate change and variability, associated cost, and implementation potential within the institutional setting of the city; and
- 6) Analyze the capacity of the city's government to deal with natural disasters (emergency prevention and preparedness capacity, early warning system, emergency evacuation system, notification procedure and its effectiveness, etc.) vis-à-vis international best practices, and provide appropriate recommendations.

1.3 SCOPE OF WORK

Scope of work consisted of:

- 1) Establish a climate change related historical knowledge base to aid climate change impact analysis, adaptation strategy formulation, and raise public awareness;
- 2) Define and evaluate the impacts of climate change (from socioeconomic viewpoints) on the basis of scenarios for the area; and
- 3) Help formulate city-level strategies for implementation in the short-, medium- and long-term to make city development plans more robust to climate change and increase the resiliency of natural and physical systems.

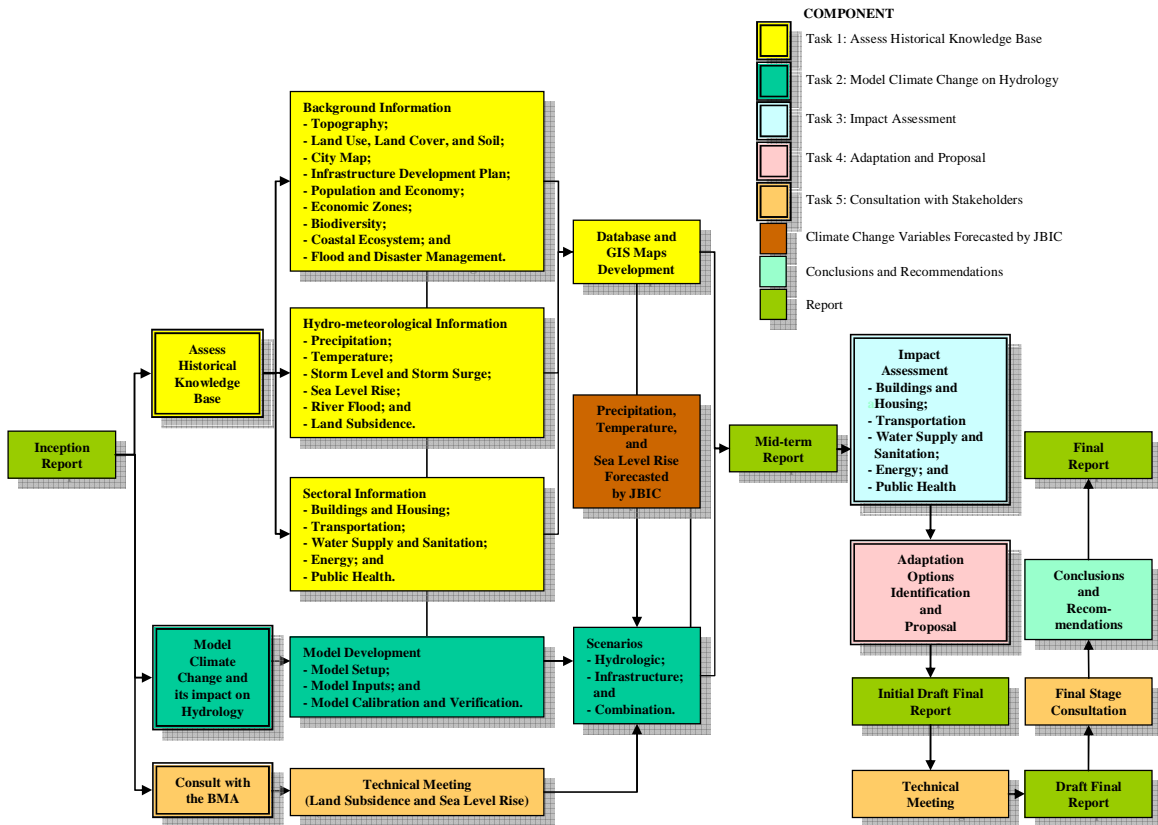
1.4 PROJECT AREA

The Bangkok Metropolitan Region (BMR) includes Bangkok and five provinces, namely Samut Prakarn, Samut Sakhon, Nonthaburi, Pathum Thani and Nakhon Pathom. The historical database for these areas is quite considerable. Therefore, this report focuses only on Bangkok and Samut Prakarn, which has shoreline along the Gulf of Thailand and will be directly affected by the sea level rise. However, the model on climate change on hydrology has to cover the whole Chao Phraya River Basin because most of the increased flood inflow from climate change into the delta area where Bangkok is situated comes from the upper basin.

1.5 ORGANIZATION OF WORK PROGRAM

To fulfill the objectives, five main tasks were accomplished. They are: assess the historical knowledge base; model climate change and its consequence on the hydrology of the area; impact assessment; adaptation and proposal; and consult with stakeholders. The tasks were carried out in order and relative to each other as shown in **Figure 1.5-1**.

Referring to the work flow diagram, the Inception Report was submitted in June 2008 to describe the proposed methodology approach and some collected data. After that, tasks 1 and 2 were accomplished in consultation with the BMA and the technical meeting on land subsidence and sea level rise was held in September 2008 at the World Bank's Office in Bangkok. The GIS database for this project was developed and applied throughout the study. The Mid-term Report was submitted in November 2008 and contained the historical knowledge base and the results of a hydrological simulation study under different climate scenarios. Tasks 3 and 4 evaluated the impact of climate change on hydrology and tested possible structural adaptation options. The second technical meeting was held in February 2009 after the submission of the Initial Draft Final Report and generated considerable feedback, especially on impacts and the adaptation study. The Draft Final Report was submitted in March 2009 and the final stage consultation was held in the same month. Subsequently, the report was finalized based on feedback from the stakeholder consultation.



Source: Panya Consultants

Figure 1.5-1 Work Flow Diagram

1.6 REPORT STRUCTURE

The Final Report consists of a Main Report and a number of Appendices. The Main Report summarizes major results contained in each appendix. There are six chapters in the main report along with an Executive Summary. The first chapter introduces the project while the second gives city descriptions from the historical knowledge base. Chapter 3 describes model development and simulation, presents the developed model and the results of flooding corresponding to the present situation and the future with climate change impact on hydrology. Chapter 4 presents the methodology and results of impact assessment. Chapter 5 is on adaptation and proposals to cope with the climate change. Chapter 6 elaborates the technical and stakeholder consultations carried out during the course of the project.