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Challenges for adapting Bangkok's flood management systems to climate change



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ABSTRACT

This paper explores challenges for adapting urban areas to climate change by analyzing urban flood management systems in Bangkok, Thailand. The paper first identifies a set of common integrated urban flood management measures. Then it analyzes whether such measures are being practiced in Bangkok with considerations to climate change. While the analysis reveals that most identified measures are already being practiced, none of the measures have explicitly taken climate change into account in the design of the interventions. Moreover, a number of measures are being implemented as stand-alone interventions without considering implications to flood management. This is because there is no systematic coordination among departments in the Bangkok Metropolitan Administration (BMA). The current practice emphasizes structural options such as heightening flood walls and strengthening drainage and pumping capacity, but reducing flood risks under uncertainty requires putting more non-structural options in place that are compatible with structural options. Although measures that BMA should take to make the ongoing interventions more effective and climate-resilient can generally be incremental to what is being practiced, institutional arrangements to achieve such objectives will require a transformational change. The paper describes specific areas and steps as to how relevant departments can strengthen collaboration.

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1. Introduction

The world is getting urbanized, with an increasing concentration of assets and economic activities. More than 90% of the world's urban population growth is currently taking place in developing countries (UN-DESA, 2012). While generalization of cities in developing countries in Asia is difficult, many cities are considered highly vulnerable to climate change: First, many large cities are located in coastal areas and exposed to impacts from sea-level rise and associated saline water intrusion. Many are also prone to extreme climate events such as cyclones and typhoons. More frequent and intense flooding is projected in many cities due to sea-level rise and/or increase in intensity of rainfall events. Moreover, a large section of the urban population is living in informal housing, not regulated by land use controls and building standards, making them particularly vulnerable to climate-induced disasters. Most cities in low- and middle-income countries face adaptation deficit; i.e., basic infrastructure and services are inadequate even under current climate conditions (Burton, 2004; Parry et al., 2009). Climate change and variability will exacerbate deficits in basic infrastructure and services.

Because of an increasing recognition of the need to adapt urban areas to climate change, or strengthen urban climate change resilience, urban climate adaptation is rapidly becoming an emerging policy domain (Birkmann et al., 2010). Climate change adaptation specific to a city in a developing country, which at least discusses the need for adaptation, and may include impact assessment and proposal of adaptation options, is increasingly available in the literature (e.g., Ahammad, 2011; Firman et al., 2011; Haque et al., 2012; Lwasa, 2010; Storch and Downes, 2011). While many developing country cities are still in the stage of planning urban adaptation/resilience, the experiences have also become available, mainly for cities supported by the Asian Cities Climate Change Resilience Network (ACCCRN) (e.g., Bahadur and Tanner, 2014; Brown et al., 2012; Kernaghan and da Silva, 2014).

However, questions still remain as to whether and how a city should change its approach to make its specific development projects more effective and sustainable when considering climate change. Considerable gaps particularly exist as to how city administrations need to be transformed to enhance its effectiveness in adapting to climate change. Among the climate-related impacts that cities would face, one common risk for many developing country cities in Asia is urban flooding and waterlogging to be caused by more intense rainfall with increased frequency. Many documents underscore the importance of addressing urban flooding problems through an integrated and holistic manner (e.g., World Bank, 2012a), but practical application is quite limited. Urban flood management is a complex issue normally beyond the jurisdiction of any single department or unit in the local government administration. Against this background, the paper aims to address three core questions by analyzing the flood management systems in Bangkok, Thailand in detail:

- Are important measures to improve urban flood management systems being practiced or planned?
- If so, do these measures incorporate climate change considerations in their design?
- How should a city change its approach to make its development projects more effective and climate-resilient?

The paper discusses how the current approach to improve urban flood management systems should be rectified, and calls for incremental and transformational adaptation. It describes specific areas and steps as to how relevant departments can strengthen collaboration to make the urban flood management systems more effective and robust to climate change.

2. Research method

The analyses are primarily based on the review of the available literature, including documents made available by various departments of the Bangkok Metropolitan Administration (BMA). BMA is the local government administering the city of Bangkok, governed by the BMA Act 1985. Interviews were conducted with officials of relevant departments of BMA, including the Department of Environment (DoE), Department of Drainage and Sewerage (DDS), City Planning Department (CPD), Bangkok Fire and Rescue Department (BFRD), and Department of Social Development (DSD). Discussions were

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