

## **Flood risk management in Jakarta**

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### **Abstract**

Flood damage constitutes about a third of the economic losses inflicted by natural hazards worldwide, and is high on the agenda in climate change research. Cities are particularly vulnerable to floods as they have high population and infrastructure densities. As a result of expected future environmental and socioeconomic changes, the vulnerability of coastal cities to both coastal and riverine flooding is expected to increase in the coming decades. There is an increasing awareness that cities need to proactively adapt to these changes in order to reduce flood risk. Jakarta, the capital and largest city of

Indonesia, is a case in point. This mega-city of ca. 9 million people, located in the Ciliwung Delta, has faced several major floods in the last decade, causing billions of dollars in damage. Large areas of the northern part of the city already suffer regular inundation as a result of monthly high-tides under current conditions, even without considering future climate change. Two important issues for flood risk management in Jakarta are: (a) assessing the flood risk under current and future conditions; and (b) assessing the capacity of the cities' governance structure to manage that risk. We here present the results of ongoing research into these two questions.

In order to assess the current and future coastal flood hazard we have set up a GIS-based flood model of northern Jakarta (population ca. 2 million), to simulate inundated area and the value of exposed assets under current conditions and future scenarios of climate change and land subsidence. Under current conditions, the damage exposure to extreme coastal flood events with return periods of 100 and 1000 years are high, at ca. €4.0 billion and €5.2 billion respectively. Under the scenario for 2100, the damage exposure associated with both of these events increases to almost €17 billion, with hardly any difference between low or high sea level rise scenarios. This increase is mainly due to rapid land subsidence, and excludes increased exposure due to socioeconomic developments. In parallel to this activity, we are setting up a rainfall-runoff model to simulate the impacts of climate and land use change on river discharge through Jakarta.

Clearly, urgent adaptation measures are required to address this problem. The Jakarta city government is currently working towards a plan for flood risk management. Based on a literature review, we will identify several governance lessons that can benefit a successful paradigm shift from traditional flood protection to integrated flood risk management, and examine the opportunities and bottlenecks for implementing these in Jakarta. Flood risk will be placed in the wider framework of climate proofing of the Greater Jakarta area. The project links up with the recently established Delta Alliance in which deltas facing climate change cooperate to share and exchange knowledge.