ICLEI Local Governments for Sustainability

Come rain or shine: Water resource management lessons from Bangkok

ICLEI Briefing Sheet - Bangkok Water Resource Management

Bangkok, as the major economic and political hub of Thailand and one of the largest metropolises in Southeast Asia, is a beacon of efficient water management in the region. The City's actions, undertaken despite a failing centralized system and rising climate change pressure, could benefit millions of people.

Key messages

- Bangkok can be a trailblazer in water management in Southeast Asia, showing cities and regions with similar climatic conditions how to regulate water shortages and excess;
- Dam mismanagement by the central government is charged with being responsible for the severe impacts of the 2011 flood, as well as the 2015-2016 droughts. A decentralized system would allow the City to implement an effective, integrated water management system;
- Innovative solutions can be simple solutions that work! The "Monkey Cheeks" project and other structural and non-structural solutions could enhance city resilience.

Climate change impacts translate into water impacts in Bangkok

Located in the south of the Chao Phraya River Basin, the City of Bangkok is home to over 5.6[1] million people. It is the largest city in Thailand and continues to experience high urban growth. Bangkok is situated on the central Thailand flood plains and experiences an annual rainy season from May to October and a dry season from November to April. Climate change is projected to cause more frequent and intense floods and droughts in the region.

Extreme weather events in the region can have wide ranging consequences. While the La Niña phenomenon in 2011 brought about an early onset of the rainy season, resulting in a one-hundred-year flood event across Thailand, the El Niño of 2015 and 2016 affected the country with the worst drought over the past 50 years. The end of 2016 saw many provinces suffer severe flooding again. Bangkok was largely spared, but not untouched.

After the 2011 flood, the central government developed a *Master Plan for Water Resource Management*. In line with that strategy, the Bangkok Metropolitan Administration (BMA) constructed flood walls, additional dikes, and increased the amount of water retention ponds, known as "Monkey Cheeks". These actions were at the center of preventative measures that ensured that Bangkok was not considerably damaged by flooding in 2016. On the other hand, climate change impacts are exacerbated by land subsidence and coastal erosion, as well as mismanagement of water resources. With the *Bangkok Master Plan on Climate Change 2013-2023*, the City is currently seeking answers to the recurring pattern of water shortage or excess.

Water resilience is not built in a day: Decisions since 2011 show traditional system is not enough

Water management in Thailand relies primarily on a simple, yet delicate and politically-laden system consisting of releasing and withholding water from the major national dams built in Northern Thailand to regulate water resources during the dry and the rainy season. This system is highly contentious in Thailand and the central government has come under scrutiny multiple times for either releasing too much water (which consequently leads to shortages during the dry season) or withholding too much water for too long (leading to

[1] Referring to Bangkok City, not the Bangkok Metropolitan Region which counts over 8.2 million.
Source: BMA website: http://www.bangkok.go.th/main/page.php?355

floods during the rainy season when the dams are in danger of overflowing). Dam mismanagement is cited alongside climate change as one of the key causes for the historic 2011 flood disaster in Thailand.

The 2011 flood is still engraved in the collective memory of Thai people as it generated awareness of the severity of climate change impacts; the need to be better prepared for disaster (at the national, local, and individual level) in the future; and the need to significantly adjust policies to counteract the failures in traditional water management efforts. In the aftermath of the 2011 flood, the central government was determined to take all steps possible to avoid another national tragedy as a result of flood. The Royal Irrigation Department, responsible for water resource management, responded with structural measures to protect important industrial centers across the country and within the Bangkok Metropolitan Region. The central government also insisted on releasing excess water annually from the major national dams to avert overflowing. The latter was great news for the farmers across the country, as they were able to generously irrigate their lands. No major drought hit the country between 2012 and 2014; however, as 2015 exhibited a particularly low rainfall level, drought was ultimately unavoidable.

The threat of drought quickly gave way to the threat of flooding at the end of 2016 and beginning of 2017, when 13 provinces experienced serious flooding. The south of the country bore the brunt of flooding, but the capital was also under threat resembling similar experiences in 2011 and highlighting once more gaps in the central water resource management strategy.

"Monkey Cheeks"

In addition to the central government strategy, which is already heavily focused on keeping Bangkok – the economic, political and cultural heart of Thailand – safe and dry, BMA is striving to enhance water resilience on its own. Shocked by the 2011 flood, the city responded by constructing additional flood prevention structures, including dikes, flood embankments and pumping stations along the Chao Praya River and major canals.

The city also further developed its unique system of water retention areas and reservoirs, known as "*Monkey Cheeks*" (Kaem Ling) – a term first coined by the late King of Thailand Bhumibol Adulyadej as a reference to a monkey's habit of storing food for later use. The project consists of canals excavated along the coastal areas of the Chao Phraya River which serve as reservoirs that drain excess amounts of water from the main river. Depending on the sea level, water from the reservoirs is either pumped into the Gulf of Thailand or restrained by means of floodgates to prevent the water from flowing back into the main course of the river. The "Monkey Cheeks" are accompanied by a system of flood barriers and water pumps and could collectively serve the capital in times of crises by alleviating some of the water stress. As intended by its creator, the entire project exemplifies the value of simple solutions to complex problems!

New solutions and old roadblocks to be overcome

The City of Bangkok is dedicated to finding lasting solutions to its recurring water-related threats. In collaboration with the Japan International Cooperation

Photo Credit: Evgenia Mitroliou, 2012

Figure 1: A short afternoon rain shower in Bangkok at the onset of the annual rainy/wet season, late-April 2012, foreshow traffic congestions and street inundation on the main roads of the capital

Agency (JICA), BMA is currently developing the *Bangkok Master Plan on Climate Change* 2013-2023, while a research project supported by the International Development Research Center (IDRC) aims at improving the existing Flood Management Master Plan by providing policy recommendations on water resource management. Some of these recommendations, as well as challenges ahead, were shared by the BMA, an ICLEI member since 1995, at the Resilient Cities 2016 congress.

The main roadblocks to Bangkok's water resilience trajectory seem to revolve around the inability of the city to decide its own fate when it comes to water excess or shortage in the Chao Phraya River. Bangkok is the end-receiver of the central government's dam management. Efforts for decentralization of water management in Thailand have yielded little so far, with the National Water Resource Committee and the River Basin Committees not functioning properly due to lack of legal authority and budget, and individual Water User Groups ignored in decision-making.

Decentralization of water management is an important step toward water resilience and climate change adaptation at the local level. Researchers are calling for an expanded mandate for the Chao Praya River Basin Committee and the various Water User Groups that belong in the same river basin, for effective implementation of policies.

Bangkok hosted the first *Resilient Cities Asia-Pacific Congress* held 11-13 February 2015, aiming to provide a regional platform for urban resilience and climate change adaptation. At the Congress, the City presented its resilience efforts to national governments and the global community in an appeal for appropriate recognition, empowerment, and engagement of local and subnational governments in local resilience actions.

A truly decentralized system would allow Bangkok (and other Thai cities) to implement a proactive, area based and integrated water management system that would necessitate structural and non-structural measures for its success. Structural measures would mean the development of more small reservoirs, and the maintenance of existing effective measures such as "Monkey Cheeks". However, the implementation of non-structural measures are expected to make the major difference in helping Bangkok mitigate drought and flood crises. These measures include effective early

Photo Credit: Sayamot Saiyot, 2015

Figure 2: The water trail demarcating the 2011 flood level (see building in the background), is visible on most buildings in Thai communities and remains as a reminder of the 2011 flood disaster.

warning systems, accurate dissemination of information on precipitation levels and dam capacity, water conservation measures, and disaster risk preparedness training (e.g. swimming lessons for vulnerable groups or evacuation drills). The latter is another example of a "simple" solution that could save the lives of flood vulnerable population, such as children. Lastly, closer collaboration on water management between the private sector, academia, central government and local communities would allow the capital to protect its residents and enhance its adaptive capacity over time.

The right recipe for a successful system, which includes a combination of decentralization, centralized dam-management and collaboration between key stakeholders, is a challenge that remains to be solved.

Further Reading

- Japan International Cooperation Agency. (2015). *Technical Cooperation Project on the Bangkok Master Plan on Climate Change 2013-2023 in the Kingdom of Thailand: Final Report (1)*. Japan, Overseas Environmental Cooperation Center (OECC).
- Bangkok Metropolitan Administration (BMA) in collaboration with Faculty of Political Science, Chulalongkorn University. (2013). *Bangkok Vision 2032: A Twenty-Year Vision of Bangkok; Executive Summary*. Bangkok, BMA.
- Poapongsakorn, N. and P. Meethom (2012), *'Impact of the 2011 Floods, and Flood Management in Thailand'*, in Sawada, Y. and S. Oum (eds.), Economic and Welfare Impacts of Disasters in East Asia and Policy Responses. ERIA Research Project Report 2011-8, Jakarta: ERIA. pp.247-310.
- ICLEI - Local Governments for Sustainability. 2016. *Resilient Cities Report 2016: Global developments in urban adaptation and resilience.*

Resilient Cities 2017

Resilient Cities 2017 will explore current and pressing issues for urban resilience and adaptation to climate change such as climate-related health risks, internal displacement and forced migration, and risk transfer and insurance as they represent serious challenges where further attention and support is needed. The congress will delve further into these topics, while continuing to track progress on financing resilience, DRR planning and policy, mechanisms for measuring, reporting and accelerating action for resilience building.

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Cover Photo: Jan Wulf, 2012

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