PHUKET
THAILAND

THE JETTY AT PATONG BEACH, ONE OF THE MOST POPULAR BEACHES IN PHUKET
Photo Credit: Flickr User William Cho

Mekong – Building Climate Resilience in Asian Cities (M-BRACE)

A renowned tourist destination along Thailand's Andaman Coast, Phuket attracts visitors from all over the world. Led by the tourism sector, the province boasts the second-highest GDP in Thailand after Bangkok. Recent years have seen rapid increases in tourist visits—with visitor numbers rising from two and half million in 2009 to over nine million just four years later, with projections for fifteen million visitors in 2015. Alongside this expansion of the tourist industry, urban development has occurred throughout the island. Yet, despite the many positive economic benefits, this development and growth in the urban area has exacerbated existing pressures and created new vulnerabilities, particularly relating to land use, water management, flooding, transport and waste management. Climate change also threatens the island, with Phuket's coastal location and reliance on the local ecosystem for key services highlighting vulnerability to climate change. Recognizing the importance of resilient and sustainable development to the future of the island, Phuket has been working with the Mekong–Building Climate Resilience in Asian Cities (M-BRACE) initiative to understand the impacts of urbanization and climate change, focusing on interactions between land use change and water resource management, in order to chart a path towards more resilient development.

M-BRACE

Mekong–Building Climate Resilience in Asian Cities (M-BRACE) is a four-year initiative funded by the US Agency for International Development (USAID) and implemented by the Institute for Social and Environmental Transition (ISET) in partnership with Thailand Environment Institute (TEI) and the Vietnam National Institute for Science and Technology Policy and Strategy Studies (NISTPASS). M-BRACE works in four cities in Vietnam and Thailand to develop and apply practical methods for building resilience in cities experiencing rapid urbanization and climate change. In Phuket, M-BRACE worked with local stakeholders from government, the private sector, and civil society to conduct a vulnerability assessment focused on urbanization and climate change, implement a number of individual resilience-building projects, and promote the integration of climate resilience into urban policy and planning.

CLIMATE VULNERABILITY IN PHUKET

Phuket has intimate experience of natural disasters. The 2004 Indian Ocean Tsunami devastated several parts of the island, with high loss of life, and subsequent impacts on the local economy. Smaller scale shocks are far less severe but result in their own economic impacts. Recent rapid development throughout Phuket coupled with climate change is introducing a new range of hazards and threats that the island has rarely experienced before. Floods now regularly occur in the municipal center and major resort areas; water shortages are a nearly annual occurrence; and landslides threaten communities and resort developments. The trends driving these changes are complex and inter-related, but understanding them is critical to any efforts to build resilience on the island.

Urban development and new construction is encroaching on public land, impacting natural resources and increasing vulnerability. Phuket has seen rapid new construction, such as hotels, housing estates and condominium projects, shopping malls, and other tourist infrastructure like restaurants and shops, resulting in a doubling of the urbanized area in less than a decade. As the developments stretched beyond traditional city and village boundaries, they have often encroached on public

An old tin man that has sold water to the municipality in the past is filled in to allow for development of new condos

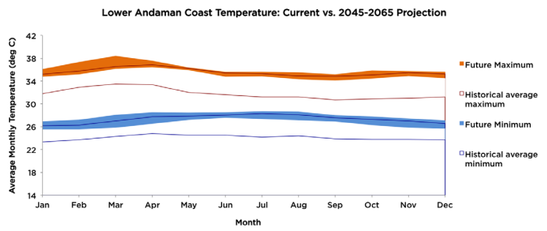
Photo credit: Justin Henceroth, ISET-International

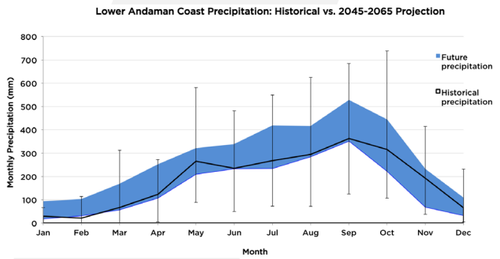
land, agricultural land, forest reserves, and green spaces. Both forested hillsides and important coastal areas have seen such development. For Phuket, the combined effects of these encroachments have not just been on important and natural resources; they have also increased vulnerability across the island by dramatically altering the ecological and hydrological landscapes in ways that threaten ecosystem services and contribute to overall risks. For example, flooding in Phuket City in 2012 occurred partly as a result of development of residential areas encroaching on the upper watershed and blockage from solid waste along the banks of many canals and floodways, including the city's largest, Khlong Bang Yai Canal.

Water supply and flood management systems have not developed to match new urban growth. Water supply on the island is largely dependent on the state reservoir system that was designed several decades ago; however many residents and businesses still depend on groundwater wells or old tin mines that serve as small, often privately owned, reservoirs. Despite rapid growth, there has been little investment to improve or expand these systems. Recent years have seen water shortages throughout the island, with private service providers selling water from these private water bodies and using trucks to transport water from other provinces. These alternative sources are highly vulnerable, with demands from other provinces straining external water sources. Despite legislation to protect existing water bodies, even those that are privately owned, the high value of land in Phuket makes infilling for development profitable and attractive. Similarly, growth in the urban area has not included growth in flood management systems, such as storm water drainage. As a result, floods in the most urbanized areas of the island, such as Phuket City and Patong, which were historically rare, are now increasing in frequency and intensity. Climate change, which is projected to bring changes in precipitation patterns, may produce circumstances with both increased flooding and increased water shortages. Maintaining a diversity of water sources would add to the overall climate resilience of Phuket.

Planning and forecasting in Phuket do not adequately consider urbanization and climate change. Land-use planning, water management, and weather forecasting in Phuket are not able to account for the rapid changes the island is experiencing. Land use plans rarely outline a future vision for development; instead, they reflect changes that have already happened. In the instances where land use plans have noted potential dangers and outlined development that would mitigate against these impacts, plans were not fully enforced. Similarly, while water supply has arisen as an important issue, there is no effective mechanism in place to comprehensively assess water supply and water use, preventing government officials, the private sector and local stakeholders from effectively assessing current and future vulnerabilities and risks or considering options to address these challenges. Planning processes are often limited by quality and availability of data. For example, despite highly variable weather patterns, there are only two weather monitoring stations on the island; as a result, weather data offers limited insight to day-to-day management and longer-term planning processes.

Climate projections for Phuket point to a future of greater uncertainty. Rainfall projections show that a shift towards a somewhat drier or significantly wetter climate is possible, which, among many impacts, will offer significant challenges to an already strained water system. While temperature projections do predict a somewhat uniform rise of temperature of 2-4° C throughout the year, this has the potential to affect a range of systems, such as the environment, weather, public health, and water supply, in known and still unknown ways.





ACTIVITIES IN PHUKET

As part of M-BRACE, individual projects—activities targeted at building capacity or knowledge that will aid resilience—were conducted in Phuket. Together, they represent diverse and complementary solutions that, when combined with others, lead to measurable improvements in the city. These projects targeted a range of issues and capacities.

Promote collaboration and new ways of working to improve climate change resilience.

Under M-BRACE there have been numerous efforts to improve collaboration and promote new ways of working among key stakeholders and communities. In Patong, a key resort area on the island, a Climate Change Resilience Center was established and staffed by the Municipality. This center supports specific activities to improve data and information around climate change, such as a station for measuring rainfall and temperature. It is also positioning itself to serve as a center for building awareness and improving collaboration between key stakeholders in Patong.

Engage youth in understanding, measuring, and building awareness of climate change.

As the future leaders of Phuket and Thailand, youth represent a key platform for promoting long-term learning and change. Within M-BRACE young people throughout Phuket were engaged in many efforts to help them understand climate change and to do things to lessen its impact. Pupils at a number of schools throughout the island were offered the opportunity to participate in collecting data for climate monitoring and forecasting and were engaged in understanding how this data contributes to an overall improved understanding of climate. In another set of activities, young people participated in a video contest to tell stories about climate change and the environment. Following a series of educational events at schools to raise awareness of the issues, students submitted short films about climate change, urbanization, and environmental sustainability that were judged by a panel of local leaders. Building such networks for generating and analyzing climate related information contributes to sustainable, comprehensive information systems, while also making such information more accessible to the public.

Collect and share water and climate data for more effective use in decision-making.

Government agencies and departments in Phuket collect large amounts of very valuable data. However, due to a variety of reasons, much of this data is not shared, not linked to other similar data, or inaccessible to people who might find value in it. In partnership with the US Army Corps of Engineers, M-BRACE has helped Phuket develop a model of the water balance that collects and links water data from different sources throughout the island. This model provides a platform for more integrated decision-making by government agencies and policy-makers and citizens across the island. M-BRACE has also worked with the Association for Environmental Projection in Phuket to develop a database that collects climate data and weather forecasts and makes them available for both government agencies, citizens, and private organizations to use as the basis for informed public dialogue.

LOOKING TO THE FUTURE

Phuket is well positioned to continue its efforts to build resilience in the future. The intervention projects in the city have created a number of tools and institutions, such as the Climate Change Resilience Center in Patong and the Climate Change Information Database, which will provide ongoing support to resilience building efforts. In addition, a wide range of stakeholders, from the M-BRACE working group and key government officials to young people throughout the island, all have increased knowledge and capacity for working on climate change and urbanization-related issues that will influence the ways that Phuket addresses these issues going forward. Finally, some of the work that has started under M-BRACE will continue after the project ends, most notably the water models being developed with the US Army Corps of Engineers. These models will continue to be refined so they can be used by stakeholders and government agencies in regular water planning and decision-making processes. These efforts represent a suite of tools that open space for informed public dialogue, monitoring and assessment that the island can use to envision and plan for a more resilient future.

M-BRACE is undertaken with the generous support of the American People through the United States Agency for International Development (USAID) in partnership with the Institute for Social and Environmental Transition (ISET), Thailand Environment Institute (TEI), and Vietnam National Institute for Science and Technology Policy and Strategy Studies (NISTPASS).

FLOODING IN DOWNTOWN PHUKET
Photo Credit: Voroj