Climate change vulnerability assessment summary: Kaper Estuary, Laemson Marine National Park, Kraburi Estuary, Thailand

1 INTRODUCTION

“Mekong WET: Building Resilience of Wetlands in the Lower Mekong Region” (2017-2020) aims to build climate resilience by harnessing the benefits of wetlands in Cambodia, Lao PDR, Thailand, and Viet Nam. The project is funded by the International Climate Initiative (IKI) of the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB). Mekong WET will help the four countries address their commitments to the Ramsar Convention, an international treaty for the conservation and sustainable use of wetlands, and achieve the Aichi Biodiversity Targets.

Vulnerability Assessments (VAs) were conducted at ten sites in the four countries. VAs combined scientific assessments with participatory appraisals and dialogues with local communities and authorities including the Office of Natural Resources and Environmental Policy and Planning (ONEP). In Thailand, two sites were selected: Bang Pakong River Wetland, in Central Thailand and Kaper Estuary - Laemson Marine National Park - Kraburi Estuary Wetlands in southern Thailand, which is the focus of this summary.
The main objectives of the assessment were to determine the vulnerability of ecosystems and livelihoods to the impacts of climate change, and identify methods to address vulnerabilities and increase the resilience of wetlands and livelihoods to the impacts of climate change. The assessment incorporated community workshops and expert consultations with NGOs and academic specialists, to predict the potential implications that climate change may have on habitats, biodiversity and livelihoods. The VA covered villages that rely on wetland resources for their livelihoods, and assessed how these resources are affected by climate change and non-climate threats, including those from outside the wetland boundary. In this assessment, special attention was paid to the needs, perspectives and knowledge of women, because they may use wetlands and their resources differently than men.

2 SITE SELECTION

The “Kaper Estuary - Laemson Marine National Park - Kraburi Estuary” wetlands were registered as a Ramsar Site on August 14, 2002. The site is situated in the Thailand peninsula, extending into the Andaman Sea to the west. It has the largest mangrove forest area in the Indo-Pacific region and is the only place in the region where primary undisturbed mangrove still exists. It covers 1,084 km², spread over 22 subdistricts (5 districts) of Ranong Province, with the Kraburi River as its natural border with Myanmar. The site comprises many wetland types, providing habitats for a diversity of plants and animal species.

The area is characterised by past intensive use of the mangrove forest, followed by more recent conservation efforts, strong economic development in agriculture, fisheries and industry, and the expansion of the tourism and service sector. These developments have attracted many people, including labour migrants, affecting the environment through overexploitation and loss of habitats, waste disposal and changes in water and air quality. The area is sensitive to natural disasters such as landslides and storms, and climate change is expected to exacerbate these problems.

![Figure 1: Map of the wetlands](adapted from Office of Natural Resources and Environment Planning, 2017)
Historic data and future projections give an indication of the future climatic changes in the wetlands of Ranong Province. These include:

- Rising temperatures with longer summers, shorter winters and intensifying drought conditions;
- Heavy and more frequent rainfall during the rainy season and fluctuating weather conditions;
- The site in a risk-prone area, vulnerable to wind, monsoons and tropical cyclones (and despite the limited amount of forecasting data, cyclones are expected to become more severe);
- Sea level rise will increase by 5-10 mm/year up to 2040 (and will continue to rise after this date), exacerbating coastal erosion rates which are likely to be higher in the beach areas compared to the floodplains connected to the mangrove forests; and
- Ocean temperatures are likely to rise 1-3°C, affecting corals, aquatic nurseries, and fisheries and increase risks of floods and erosion.

Based on the habitat vulnerability assessment, coral reef ecosystems are the most vulnerable and least adaptive to the current ecosystem threats and future climate change. Increased sea temperature will cause coral bleaching and eventually death under sustained high temperatures. Reducing pressure from other impacts such as sedimentation and poor water quality can locally increase coral resilience to climate change, increasing survival. The second most vulnerable habitats are seagrass beds, canals and rivers, and coastal and marine areas; they are vulnerable to changing conditions of the ecosystem, especially human activities, but can adapt relatively well to climate change. Mangrove forests, beach forests and tidal flats are more adaptive, and therefore less vulnerable. Human activities, such as encroachment from shrimp farms and construction sites can threaten these ecosystems if not controlled.

Climate change will also affect the livelihoods of local communities that depend on wetland resources. The agriculture and fisheries sectors are highly vulnerable to climate change. Local knowledge of weather patterns has been challenged by unpredictable climatic conditions, and the lack of predictability in seasonal patterns has affected agriculture and fishery livelihoods. Changes in precipitation can affect agriculture yields while increased severity of storms impacts fishing conditions and economically important marine species.

The study highlighted the wide variety of wetland resources used by women and men in the area. People along the coast and rivers collect various species of fish, crab, krill/shrimp, bivalves and snails. Other resources include jellyfish, mangroves, *Nypa fruticans*, fruit trees, and vegetables. While men prioritised resources based on economic value alone, women prioritized them based on economic value and easy access and use. While patterns of resource ranking among communities were very similar, there were also differences based on geographical location and local economy. Changes in environmental conditions may lead to changes in resource distribution in space and time, directly influencing the historical community ecological knowledge.

The species vulnerability assessment analyzed various important species and their baseline threats and risks from climate change:

- **Water onions (**Crinum thaianum**)**: endangered. Highly vulnerable to the impacts of climate change. The wetland plants are sensitive to changing water levels and water quality and magnitudes of currents, especially from heavy rains. Rainfall in Ranong is predicted to increase by 10-20% in the next 30-90 years, which increases future risks for water onions.
- **Scleractinian corals** were found to have the highest climate change vulnerability of all species surveyed. Water temperatures above 30.1°C for more than three weeks can induce coral bleaching. This led to the death of more than 50% of the corals in the area in 2010. Runoff from construction...
and agriculture, and wastewater discharge increase turbidity, and limit the light penetrating to the symbiotic photosynthetic zooxanthellae. Illegal fishing equipment such as trawler-nets can also cause physical damage to reefs, while the expansion of tourism can increase marine debris and damage from anchoring.

- Mangrove pitta (*Pitta megarhyncha*) a 'near threatened' passerine bird, faces habitat loss from coastal erosion and sea level rise. However, the conservation of mangroves in the area provides a refuge for the birds, making them relatively resilient to climate change.

- Long-whiskered catfish (*Sperata aor*), and mangrove *Bruguiera hainesii* XC.G.Rogers (white beans) have low climate change vulnerability. White beans can adapt relatively well to climate change but are fragile to other changes in the mangrove forest including shrimp farming and expansion of construction areas.

- Crustaceans the Meder’s mangrove crab (*Scylla serrata*), the serrated mud crab (*Sesarma mederi*) and the scorpion mud lobster (*Thalassina anomala*) have low baseline conservation risk, and low climate change vulnerability. They are able to adapt to changing climate conditions. However, the rehabilitation and preservation of their habitat ecosystems such as mangrove forests, canals and estuaries are essential to their survival.

## 4 CONCLUSIONS AND ADAPTATION PLANNING

The local community seems relatively well prepared for different types of climate impacts. Whereas current responses were more strongly associated with mitigation and prevention, future strategies focused on coping capacity and ecosystem rehabilitation. It is important to recognise the importance of actions at three different levels, and the need to implement them in parallel:

- **Household/individual level**: preparing for floods by raising houses, and digging household ponds deeper so that they can store more water in the dry season. Most of these responses are reactive and can be implemented immediately.

- **Community level**: constructing dams/walls to prevent erosions from waves and tides, mangrove reforestation, organizing regulations and public hearings with the community to announce specific plans.

- **Network-level**: increasing collaboration between government agencies, the private sector, communities, NGOs and external stakeholders, to develop a shared conservation and management plan.

Local stakeholders suggested setting up a “Wetland Management Committee” which will act as the collaborative mechanism and facilitate the implementation of the plan. The Committee is needed to assist in the nomination of the current Ramsar Site to Natural World Heritage Status. Conservation of cultural and natural values can highly benefit from dual designations under the Ramsar and World Heritage Conventions. This would further highlight the wetlands as a globally important natural ecosystem, and could serve to increase eco-tourism and garner government support on local, provincial and national levels for policies related to wetland conservation.

**REFERENCE**