Annual Report
on SDG14 Life Below Water

14.5 Maintaining a local ecosystem

14.5.5 Watershed Management Strategy Based on Location-Specific Aquatic Biodiversity

The **Songkhla Lagoon Basin** is a complex watershed covering freshwater, brackish, and marine ecosystems ("three-water zones"). Unsustainable fishing, urban runoff, and habitat loss have led to declines in native fish populations and ecological imbalance. Conventional management approaches often overlook the **distinct ecological characteristics** of each zone—upper (freshwater), middle (brackish), and lower (marine)—resulting in fragmented and ineffective resource management. Thaksin University has developed a **Location-Based Watershed Management Strategy** that integrates **scientific research, ecosystem diversity data, and community co-management**. The strategy recognizes the **unique biodiversity and ecological functions** of each sub-zone and promotes "One Watershed–Three Ecosystems" (*Upper–Middle–Lower Lagoon*) management under the concept of **"Fish, Water, and Life"**. It emphasizes habitat restoration through local innovation, species-specific conservation (native and migratory fish), and community participation as watershed stewards.

Thaksin University has implemented a series of activities and innovations under its location-based watershed management strategy for the Songkhla Lagoon Basin. Through multi-year biodiversity and ecosystem mapping, Thaksin University researchers identified more than 60 aquatic species across freshwater, brackish, and marine habitats, using the data to design location-specific management zones. The university has also launched the **"Aquatic Life Shelter"** and Habitat Restoration Program, constructing artificial habitats made from bamboo and cement tailored to each ecosystem type—shallow modules for freshwater fish and deeper ones for brackish and marine species—across areas such as Lam Pam, Pak Phayun, Sathing Phra, and Singhanakhon. Complementing these restoration efforts, Community Watershed Learning Centers have been established at Ban Klang and Ban Mai to promote integrated watershed awareness, train local people in mangrove rehabilitation, water quality monitoring, and species identification, and strengthen community participation in ecosystem-based management.

Research outcomes are shared with the Songkhla Lagoon Basin Committee. As measurable results, five watershed sub-zones are now co-managed through community–university partnerships; over 60 aquatic species have been documented and used for habitat-specific restoration; 20 fish-house sites have been constructed, increasing fish abundance by 80–100% within one year.

Aquatic Life Shelter Research Project

From Songkhla Lake, the "Aquatic Life Shelter" has progressed from a grassroots community idea into an international innovation. Asst. Prof. Dr. Tuentha Rahman from Thaksin University explains that mangroves provide natural safe zones, artificial reefs extend habitat lifespans, and local people gain additional income. Supported by the PMU-A, the project integrates local wisdom with scientific knowledge to conserve fish species within the lake basin. Its success earned global recognition at the 2024 Kaohsiung International Invention and Design EXPO in Taiwan, where it received a Silver Medal.

Public evidence: https://shorturl.at/0cCLo

Beyond technological invention, the Aquatic Life Shelter reflects a Watershed Management Strategy Based on Location-Specific Aquatic Biodiversity. Songkhla Lake is a unique ecological system influenced by freshwater, brackish water, and seawater. Therefore, conservation must be tailored to local species, hydrological conditions, and community livelihoods. By collaborating with villagers in Ban Mai Village, the project restored breeding grounds, feeding areas, and ecological balance. Within one year, fish species increased from two to eleven, proving that low-cost, site-specific interventions can generate measurable ecological outcomes.

This model demonstrates how watershed management can be driven by community participation, scientific monitoring, and biodiversity-based design. It supports the long-term vision of transforming Songkhla Lake into a Learning City where innovation protects ecosystems while sustaining local economies.

Public evidence: https://shorturl.at/PaO2s

Thaksin University has implemented a location-based watershed management strategy that integrates scientific research, ecosystem diversity data, and community co-management to conserve the Songkhla Lagoon Basin — a unique watershed connecting freshwater, brackish, and marine ecosystems. Under the concept of **"One Watershed–Three Ecosystems: Fish, Water, and Life,"** the strategy emphasizes habitat restoration, species-specific conservation, and community participation as watershed stewards. Key activities include multi-year surveys of aquatic species and habitats, the establishment of location-specific conservation zones, and the creation of "Living Fish Houses" adapted to local ecological conditions. Community-based learning centers such as the **Ban Klang Learning Center** and **Living Fish House Learning Center** promote public awareness and train local stakeholders in water quality monitoring, mangrove rehabilitation, and species identification. Research findings are shared with the Songkhla Lagoon Basin Committee and local authorities to support policy and zoning for sustainable ecosystem management. As a result, the program has documented over 60 aquatic species, restored five watershed sub-zones, and increased fish abundance by up to 100% in restored areas, while improving water quality and building the capacity of more than 400

community participants. This approach positions Thaksin University as a regional leader in ecosystem-based watershed management aligned with SDG 14.5.5

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Public evidence:

https://www.facebook.com/tuantar/videos/2505605636438851?locale=th_TH