Annual Report
on SDG14 Life Below Water

14.3 Supporting aquatic ecosystems through action

14.3.4 - Does your university as a body work directly (research and/or engagement with industries) on technologies or practices that enable marine industry to minimise or prevent damage to aquatic ecosystems?

Technologies and Practices to Minimise or Prevent Damage to Aquatic Ecosystems

Connecting Research with Responsible Fisheries and Aquaculture Practices

Thaksin University works directly with community fisheries and aquaculture producers to support technologies and practices that combine aquatic resource use with environmental protection. Through research, technical advice and community engagement, the University connects knowledge of fish production and habitat management with the practical decisions made by fishers and producers. Its approach addresses both the materials and methods used in aquatic environments and the management arrangements needed to prevent disturbance and maintain conservation practices.

In 2025, this work included direct engagement with community fisheries at Ban Mai in Songkhla Lagoon, continued support for butter catfish producers through the Bang Kaeo Model, and the publication of research on the productive use of fishmeal-processing by-products in aquaculture feed. These contributions address different aspects of responsible production and resource management: site-appropriate habitat structures, environmentally considerate construction materials, efficient feed use and continuing cooperation with resource users.

Adapting Habitat Technologies to Local Fisheries Conditions

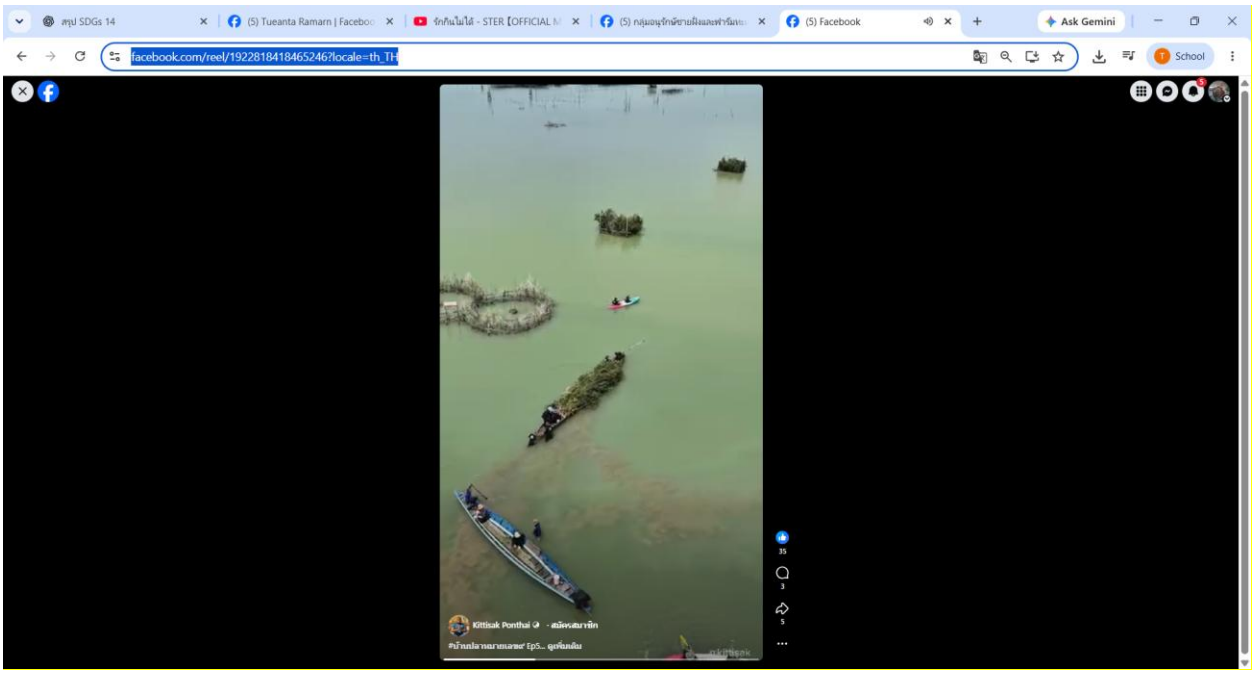
Through its Academic Service Unit for Natural Resource Management in the Songkhla Lagoon Area, the University worked directly with the Ban Mai community in Singhanakhon District, Songkhla Province. Fish-house activities on 28 May 2025 connected academic and technical support with the knowledge and participation of local fishers. University staff contributed guidance

on design, materials and construction, while community members contributed their experience of local fishing grounds, environmental conditions and the practical requirements of maintaining structures.

The technical approach considers water depth, substrate, currents and existing vegetation when selecting a fish-house design and location. This helps ensure that habitat interventions are appropriate to local conditions and can be maintained by the community. At Ban Mai, the Living Fish House model combines a shelter structure with planted mangroves in shallow water near existing mangrove habitat, connecting structural shelter with living vegetation.

Practices applied during 2025 included selecting locally available plant materials, such as coconut leaves, palm fronds and paperbark branches. Material selection was intended to avoid introducing toxic substances or materials that could break down into microplastics. Plastics and discarded tyres were excluded from fish-house construction. This provided fishers with a practical approach to creating aquatic shelter while considering the environmental consequences of the materials placed in the lagoon.

Placement and maintenance formed additional safeguards. Fish houses were spaced sufficiently far apart to allow boats to enter and leave safely without obstructing navigation routes. Damaged structures were repaired to maintain their condition. These practices incorporated environmental care into the construction, positioning and continuing use of habitat structures.



Public evidence: https://www.facebook.com/reel/1922818418465246?locale=th_TH



Public evidence:
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Connecting Technical Practices with Community Conservation Arrangements

The University's technical engagement at Ban Mai was supported by a community conservation framework covering approximately 384 rai, equivalent to 61.44 hectares. The supplied memorandum of understanding sets out cooperation among the community, Singhanakhon Town Municipality, fisheries authorities, marine and coastal resource authorities, the Thai Sea Watch Association and the University's Academic Service Unit.

The framework connects habitat management with fishing restrictions, protection of aquatic nursery areas, surveillance and communication of community rules. It identifies academic knowledge, technology transfer, innovation and ecosystem research as contributions of the University. Community members contribute local stewardship and observation, while relevant public agencies provide technical advice and support within their respective responsibilities.

These arrangements give the technical intervention a continuing management context. Fish houses are accompanied by shared responsibilities for protecting the surrounding area and

communicating appropriate resource-use practices. The framework therefore supports cooperation between the University and the fisheries community in managing activities that could disturb aquatic habitats.



Public evidence:
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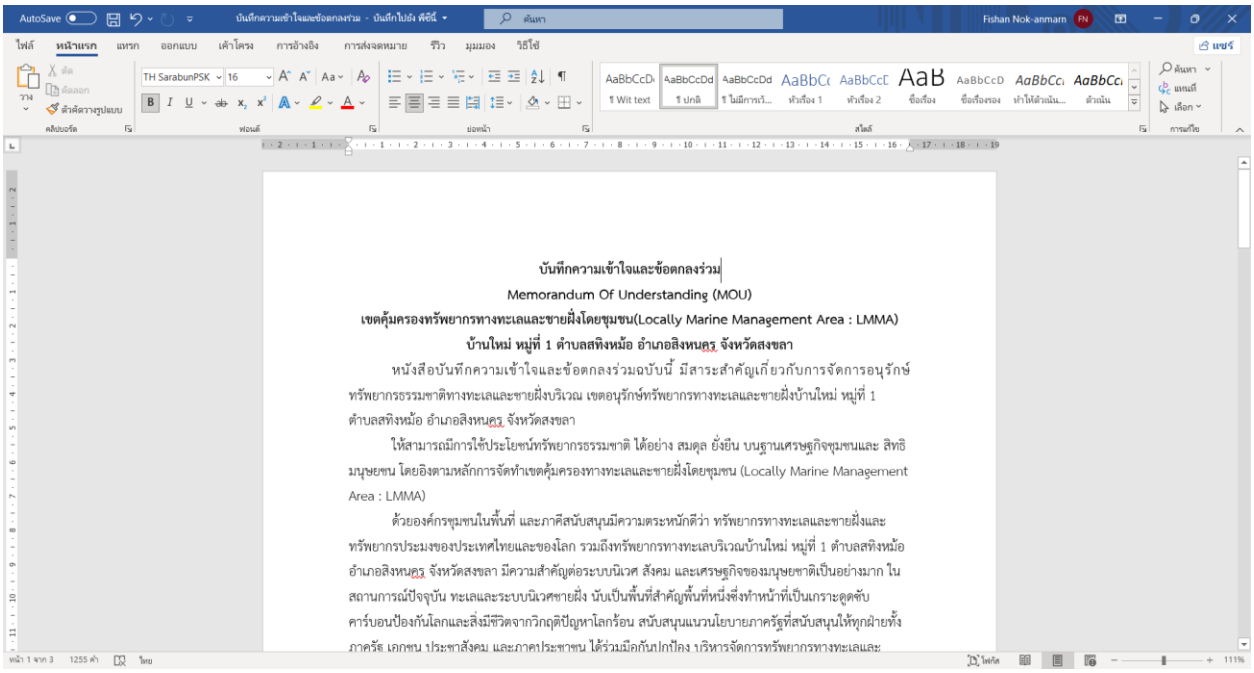
Ban Mai conservation area



บันทึกความเข้าใจและข้อตกลงร่วม

Memorandum Of Understanding (MOU)

เขตคุ้มครองทรัพยากรทางทะเลและชายฝั่งโดยชุมชน(Locally Marine Management Area : LMMA)

บ้านใหม่ หมู่ที่ 1 ตำบลสทิงหม้อ อำเภอสิงหนคร จังหวัดสงขลา

หนังสือบันทึกความเข้าใจและข้อตกลงร่วมฉบับนี้ มีสาระสำคัญเกี่ยวกับการจัดการอนุรักษ์ทรัพยากรธรรมชาติทางทะเลและชายฝั่งบริเวณ เขตอนุรักษ์ทรัพยากรทางทะเลและชายฝั่งบ้านใหม่ หมู่ที่ 1 ตำบลสทิงหม้อ อำเภอสิงหนคร จังหวัดสงขลา

ให้สามารถมีการใช้ประโยชน์ทรัพยากรธรรมชาติ ได้อย่าง สมดุล ยั่งยืน บนฐานเศรษฐกิจชุมชนและ สิทธิมนุษยชน โดยอิงตามหลักการจัดทำเขตคุ้มครองทางทะเลและชายฝั่งโดยชุมชน (Locally Marine Management Area : LMMA)

ด้วยองค์กรชุมชนในพื้นที่ และภาคีสนับสนุนมีความตระหนักดีว่า ทรัพยากรทางทะเลและชายฝั่งและทรัพยากรประมงของประเทศไทยและของโลก รวมถึงทรัพยากรทางทะเลบริเวณบ้านใหม่ หมู่ที่ 1 ตำบลสทิงหม้อ อำเภอสิงหนคร จังหวัดสงขลา มีความสำคัญต่อระบบนิเวศ สังคม และเศรษฐกิจของมนุษยชาติเป็นอย่างมาก ในสถานการณ์ปัจจุบัน ทะเลและระบบนิเวศชายฝั่ง นับเป็นพื้นที่สำคัญพื้นที่หนึ่งซึ่งทำหน้าที่เป็นเกราะคุดซับคาร์บอนป้องกันโลกและสิ่งมีชีวิตจากวิกฤติปัญหาโลกร้อน สนับสนุนแนวนโยบายภาครัฐที่สนับสนุนให้ทุกฝ่ายทั้งภาครัฐ เอกชน ประชาสังคม และภาคประชาชน ได้ร่วมมือกันไปกำกับ บริหารจัดการทรัพยากรทางทะเลและ

Memorandum of Understanding (MOU) on Collaborative Management of the Ban Mai Community Marine and Coastal Conservation Area, Sathing Mo Subdistrict, Singhanakhon District, Songkhla Province.

Following Up Environmental Conditions

Continuing collaboration at Ban Mai included water quality and fish surveys undertaken every three months during 2025. The University supported survey design, equipment training, verification of fish identification and data analysis. Community members participated in sample collection, field measurements and recording, combining scientific support with local knowledge. Water quality monitoring covered temperature, salinity, dissolved oxygen and pH. Fish surveys used traditional fishing gear to record species, numbers, sizes and weights, documenting 32 fish species during the reporting year. These observations provide information for reviewing local aquatic conditions and discussing the management of fish houses and conservation areas.

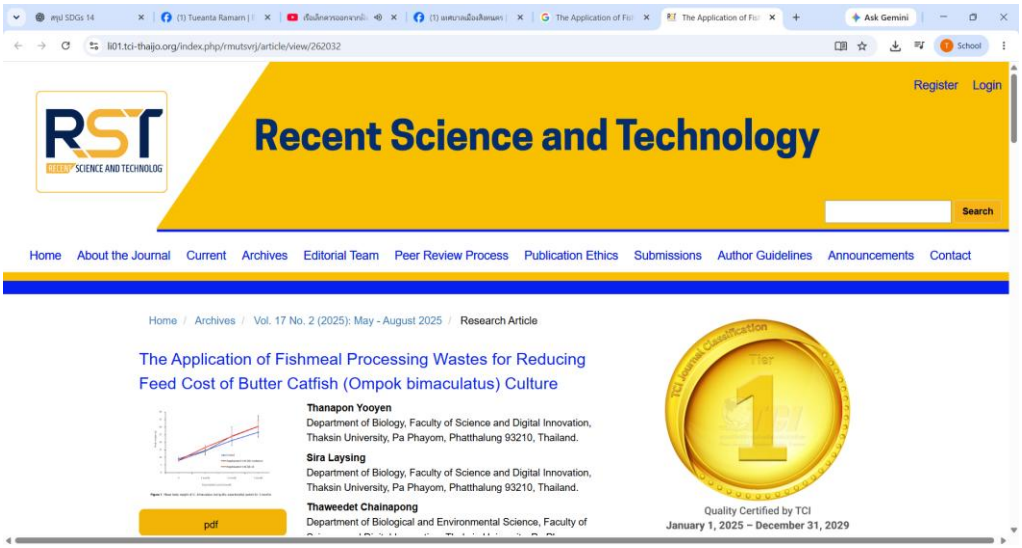
Monitoring supports continuing dialogue about the suitability and maintenance of habitat practices. The records provide a basis for examining conditions over time, while community observations help identify concerns requiring further investigation. The species total is reported as an observation from the surveys rather than as proof that fish-house construction alone caused an increase in biodiversity.

Research on Feed Efficiency and the Use of Fish-Processing By-products

The University also contributed research relevant to resource efficiency in aquaculture. A study published in 2025, entitled *The Application of Fishmeal Processing Wastes for Reducing Feed Cost of Butter Catfish (Ompok bimaculatus) Culture*, examined the use of fish condensate and fish oil as supplements to commercial feed. The research connected fishmeal-processing by-products with a potential productive use in fish culture.

The experiment compared commercial feed with diets supplemented with either fish condensate or fish oil at 10 millilitres per kilogram of feed over a three-month period. Under the experimental conditions, the supplemented diets achieved survival rates of approximately 97.33–99.33%, compared with 89.33% for the control diet. Feed conversion ratios were approximately 1.93–2.03 for the supplemented diets, compared with 2.93 for the control. Feed costs per kilogram of fish produced were approximately THB 58.9–59.9, compared with THB 83.5 for the control.

The environmental relevance lies in the productive use of processing by-products and the lower quantity of feed required per unit of fish production under the tested conditions. The findings provide a technical basis for considering resource-efficient feeding practices. The study measured production performance and feed costs; it did not directly quantify reductions in wastewater pollution or nutrient discharge.



Public evidence: https://li01.tci-thaijo.org/index.php/rmutsvrj/article/view/262032



Public evidence: file:///C:/Users/LENOVO/Downloads/262032%20(1).pdf

Maintaining Direct Engagement with Aquaculture Producers

Alongside this research contribution, the University continued engagement with butter catfish producers through the research project “Bang Kaeo Model: Small-Scale Fisheries for Poverty Alleviation.” On 21 January 2025, the project team followed up butter catfish culture activities among pilot households to assess implementation progress and support the application of fisheries knowledge to local production.

This engagement provided a practical connection between university expertise and household aquaculture. Follow-up focused on producers’ progress and the use of knowledge appropriate to their circumstances. Its documented contribution was continued technical engagement and support for livelihood development. The supplied activity record does not quantify changes in wastewater quality or demonstrate adoption of the feed formulation described above; these are therefore reported as complementary contributions rather than a single verified technology-transfer activity.



Public evidence: https://www.tsu.ac.th/home/details.php?id=6270

Summary

In 2025, Thaksin University supported technologies and practices relevant to preventing damage to aquatic ecosystems through direct engagement with community fisheries, continued cooperation with aquaculture producers and research on resource-efficient fish feeding. At Ban Mai, the University and community combined site-appropriate fish-house designs with locally available plant materials, the exclusion of plastics and discarded tyres, suitable spacing, maintenance and conservation arrangements. Quarterly water quality and fish surveys supported continuing assessment of local conditions. Research published during the year demonstrated improved feed conversion and the productive use of fishmeal-processing by-products, while the Bang Kaeo Model maintained engagement with butter catfish producers. Together, these activities connect technical knowledge with the practical management of aquatic habitats and production systems.