

SIIDEx Program Book

5th Sarawak
Invention,
Innovation
& Design
Expo 2026
(SIIDEx 2026)



SIIDEx 2026

14 September 2026 The Waterfront Hotel, Kuching Sarawak

Creating, Innovating and Realising Ideas for a Sustainable Future



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Foreword

Rector of UiTM Sarawak

It is with great pride and institutional satisfaction that I commemorate the successful organization of the 5th Sarawak Invention, Innovation & Design Expo (SIIDEx) 2026 by Universiti Teknologi MARA (UiTM) Sarawak Branch. This landmark achievement exemplifies our steadfast commitment to advancing Malaysia's human capital development. Furthermore, it directly reinforces the strategic vision of the Malaysian Higher Education Blueprint 2026–2035, which emphasizes the cultivation of humanity-centric, purpose-driven leaders dedicated to nation-building.

Far beyond a conventional competitive showcase, SIIDEx 2026 serves as a premier platform for participants across the nation to present groundbreaking creative and technological innovations. The expo facilitates crucial scholarly discourse, cross-disciplinary exchange, and strategic networking. Robust academic networking remains vital to higher education, as it connects emerging scholars and researchers with mentors, experts, and industry leaders, thereby opening avenues for collaborative research, career advancement, and practical real-world impact.

In alignment with UiTM's overarching aspiration to sustain academic rigor, institutional progressiveness, and stakeholder value, SIIDEx actively fosters an ecosystem centered on creativity, innovation, and knowledge commercialization among researchers, educators, students, and industry practitioners. The exposition offers a rigorous forum where inventive prototypes and solutions are publicly presented and evaluated. By earning university-sanctioned accolades, participants secure prestigious recognition while leveraging the platform to bridge the gap between academic research and industry execution.

In closing, I extend my deepest appreciation to the steering committee, whose unwavering dedication, resilience, and operational excellence guaranteed the success of SIIDEx 2026. My sincere gratitude also goes to our esteemed sponsors and strategic partners for their vital support. I am confident that the transformative ideas and innovations that emerged from SIIDEx 2026 will yield enduring benefits for the UiTM community and contribute meaningfully to national socio-economic advancement.

Sincerely,

Professor Dr. Firdaus Abdullah
Rector
UiTM Sarawak Branch



Foreword

Chairman of SIIDEx 2026



Thank you to Almighty Allah. The 5th Sarawak Invention, Innovation & Design Expo (SIIDEx) 2026 was successfully organised by UiTM Sarawak. As the host of SIIDEx 2026, we are proud of UiTM Sarawak Branch in organising this expo.

The expo provides a platform for all academia, industry players and students to exhibit their products, designs, and ideas. The innovative and inventive products displayed can be recognised and made known to the public. The public can benefit from these products and build multiple networks among academia, industry players, and the community.

Moreover, the innovative products displayed at SIIDEx 2026 offer participants the opportunity to win lucrative awards and medals. It allows product winners to be recognised by peers and communities. Through this expo, the winning products can be identified and pave the way for them to participate in bigger events such as the Malaysian Invention and Exhibition Expo (MIIX).

Finally, I would like to take this opportunity to thank all the sponsors, the SIIDEx 2026 committees, the juries, and the participants for making SIIDEx 2026 a success. We hope SIIDEx 2026 can benefit academia, industry, and the community. Thank you.

Professor Ir. Dr. Juferi Idris
Chairman
SIIDEx 2026

About



BACKGROUND



Sarawak Invention, Innovation & Design Exposition (SIIDEx) 2026 is the fifth SIIDEx to be organised by Universiti Teknologi MARA (UiTM) Sarawak Branch. This SIIDEx 2026 is jointly organised with UiTM Penang Branch. SIIDEx 2026 will take place on **14 September 2026** at the **Waterfront Hotel, Kuching, Sarawak, Malaysia**.



It is a major innovation competition established to foster a culture of creativity, innovation, and commercialisation of knowledge among researchers, educators, students, and industry practitioners. Through SIIDEx, an exhibition of innovative and inventive products can be displayed to the public and contested.



The product exhibition competition offers participants the opportunity to win an award recognised by the university and to use the platform to communicate with industry and academic participants.

COMPETITION CATEGORIES



CATEGORY A
Teaching and
Learning Innovation



CATEGORY B
Innovation



CATEGORY C
Invented Products



CATEGORY D
Design



Logo



Theme

“
*Creating, Innovating and Realising
Ideas for a Sustainable Future*”



Programme Objectives



To provide an **international platform** for researchers, academics, students, and **industry innovators** to showcase their inventions, innovations, and designs.



To promote a culture of **creativity, innovation**, and excellence in research and product development.



To encourage the development of **innovative digital solutions** capable of addressing real-world challenges in the areas of sustainability, healthcare, infrastructure, and community well-being.



To strengthen **strategic collaboration** among academia, industry, government, and other stakeholders.



To enhance the **recognition and commercialisation** potential of research outcomes and innovative products.



To strengthen the position of UiTM Sarawak Branch as a **leading institution in innovation development** at the national and international levels.



The implementation of SiIDEx 2026 is expected to enhance the **visibility, impact, and collaboration** of research, in line with the aspiration of UiTM Sarawak to become a **regional hub of innovation excellence**.



Tentative



14 September 2026 (Mon)

7.00 AM -
8.00 AM



Participant Exhibition Setup & Registration

📍 Exhibition Rooms: Tubau 1, 2 & 3, Kerangas & Kabu Rooms
Registration Counter: Nipah Room (Level 4, Waterfront Hotel)

8.30 AM -
4.00 PM



Exhibition & Judging (All Categories)

📍 Tubau 1, 2 & 3, Kerangas & Kabu Rooms
(Level 4, Waterfront Hotel)

11.30 AM -
1.00 PM



Break

4.00 PM



End of Judging

4.30 PM



End of Programme



15 September 2026 (Tues)

10.00 AM -
12.00 PM



Opening Ceremony of SIIDEX 2026 and SeAIM 2026 Conference

📍 Ranyai Ballroom, Level 4, Waterfront Hotel

3.30 PM



Closing of SIIDEX 2026 & Award Ceremony Announcement of SIIDEX 2026 Results

📍 Ranyai Ballroom, Level 4, Waterfront Hotel

Note: The programme is subject to change without prior notice.



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EXTENDED ABSTRACTS



Teaching and Learning Category



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AQUASYS: INTEGRATED AQUACULTURE SYSTEM

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ABSTRACT

Sarawak is the second-largest state in Malaysia by individual-holding aquaculture area (3,867 hectares, 34.7%), yet its coastal fish farmers remain exposed to monsoon damage, single-species monoculture inefficiency and nutrient waste accumulation that undermine food security and livelihoods. This abstract presents AQUASYS[®], a modular Integrated Multi-Trophic Aquaculture (IMTA) system combining fish, seaweed, and bivalves (oysters and mussels) within a zero-waste ecosystem. The cluster-based structure is transferable and dockable, allowing relocation during monsoon seasons, while individual modules; fish cages, seaweed lines, bivalve units, and bivalve shell artificial reefs functioning as anchors and filters can be configured to site-specific needs. Because low-trophic species feed naturally from the surrounding environment, AQUASYS[®] requires no external feed, directly addressing direct material cost, the largest single expenditure component (58%) reported for Malaysia's aquaculture subsector, while delivering environmental, economic and social impact. The system also functions as a living laboratory for research, education and training. A pilot deployment was carried out at Lundu, Sarawak. State government support for aquaculture development allocated RM7 million in December 2025. Potential strategic partnerships between Universiti Malaysia Sarawak (UNIMAS) and key stakeholders, including Jabatan Perikanan Laut Sarawak (JPLS), PPES Aqua Santubong, Sarawak Biodiversity Corporation (SFC) and coastal communities, will develop the aquaculture system that demonstrates a user-friendly, community-centric design aligned with the policy goals of Ministry of Agriculture and Food Security and the Sarawak Marine Fisheries Department (MFCORD) and the UN Sustainable Development Goals. The findings support AQUASYS as a scalable, low-cost design solution for climate-resilient coastal aquaculture, with strategic potential for expansion across Sarawak, Malaysia, and the wider ASEAN region.

Keywords: *Integrated Multi-Trophic Aquaculture, Modular Design, Blue Economy, Coastal Community, Sustainable Aquaculture*

1. INTRODUCTION

Sarawak's coastal aquaculture sector remains predominantly reliant on fixed, single-species cage systems that are vulnerable to monsoon damage and prone to nutrient waste accumulation, resulting in unstable yields and rising operational costs for smallholder fishermen and aquaculture entrepreneurs. Monoculture-based finfish farming further limits revenue diversification and leaves farmers exposed to disease outbreaks and market price fluctuations. Integrated Multi-Trophic Aquaculture (IMTA), which co-cultures fed species (e.g., finfish) with extractive species such as seaweed and bivalves, has been demonstrated internationally as an ecologically engineered approach that recycles waste nutrients across trophic levels, improving both environmental sustainability and farm profitability. However, existing IMTA models are largely designed for temperate, offshore, or large-scale commercial operations, with limited adaptation to the tropical, monsoon-affected, and community-scale context of Sarawak's coastal villages.



National statistics underscore the scale of this opportunity. Malaysia's aquaculture subsector recorded 573,682.5 tonnes of production in 2022 (DOSM, 2023), while the Census of Agriculture 2023 reported 10,279 aquaculture agricultural holdings nationwide generating RM4.63 billion in sales value, with Cost of Direct Materials largely feed accounting for 58% (RM1.0 billion) of total expenditure, the single largest cost component (DOSM, 2025). Sarawak ranks as the second-largest state by individual holding aquaculture area (3,867.0 ha, 34.7%), behind only Perak, and reported 609 individual holders generating RM141.69 million in sales value, of which the brackishwater subsector alone, with 80 holders across 140.8 ha, concentrated in Kuching, Daro and Lundu produced 9,997.0 tonnes (DOSM, 2025). Notably, 89.1% of Sarawak's aquaculture holders are aged above 45 and only 11.9% hold tertiary qualifications (DOSM, 2025), underscoring the need for low-cost, low-maintenance designs over complex digital systems. This is reinforced by state policy, in 2025, the Sarawak state government, through the Ministry of Agriculture and Food Security and the Sarawak Marine Fisheries Department (MFCORD), allocated RM7 million under the 12th Malaysia Plan for brackishwater aquaculture development, with RM1.9 million already disbursed to 44 farmers across ten districts in Sarawak (TVS, 2025). This extended abstract introduces AQUASYS[®], a modular and transferable IMTA system designed specifically for coastal conditions. Innovation addresses the dual challenge of climate resilience and economic sustainability by integrating engineering design with ecological principles and community centred deployment, in direct support of Malaysia's Aquaculture Strategic Plan 2021–2030 (SEAFDEC, 2026).

2. METHODOLOGY

AQUASYS[®] was developed through an iterative design-and-deployment process combining engineering design, ecological system integration, and stakeholder engagement. The design phase focused on a cluster-based modular structure that could be assembled, scaled, and relocated to suit site conditions and farmers' needs. Potential locations identified by the JPLS will be selected as the pilot site. A pilot unit will be fabricated and deployed at the same location for logistical convenience. The pilot will be validated with the key stakeholders to gather feedback for product enhancement.

2.1 System Components

The AQUASYS[®] cluster integrates four functional components: (i) fish cages for the fed (high-trophic)] species; (ii) seaweed cultivation lines that absorb dissolved inorganic nutrients released by the fish component; (iii) bivalve units (oysters and mussels) that filter particulate organic waste from the water column; and (iv) bivalve-shell artificial reef structures that function simultaneously as anchoring infrastructure and a biological filter. Each component can be included, excluded or resized according to site-specific ecological conditions and farmers' needs. The entire cluster is engineered to be transferable and dockable, enabling operators to relocate the system away from exposed areas ahead of monsoon swells, directly addressing the structural vulnerability of fixed cage systems.

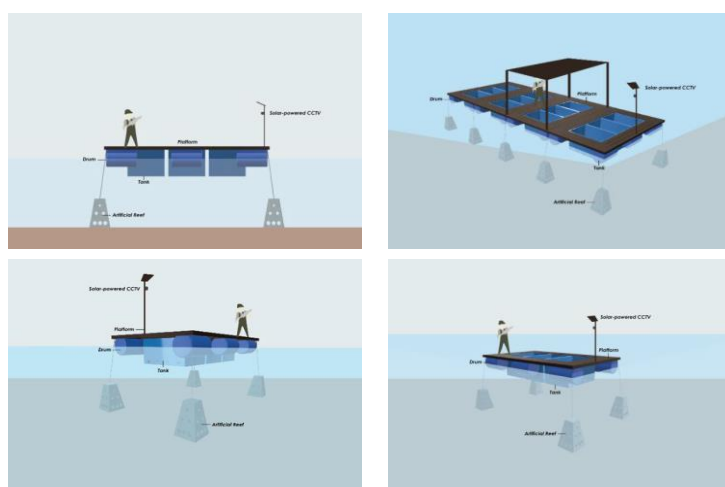


Figure 1 Schematic diagrams of AQUASYS[®].



3. FINDINGS

Sarawak's Census of Agriculture 2023 data (Table 1) confirm that brackishwater aquaculture AQUASYS[®] target subsector already outproduces freshwater culture in the state despite fewer holders and less area, indicating higher productivity per hectare and strong potential for technology-driven intensification.

Table 1 Sarawak Aquaculture Subsector Profile, 2023

Subsector	Holders / Area	Production	Top Districts
Brackishwater	80 holders / 140.8 ha	9,997.0 t	Kuching (8,621.4 t), Daro (315.5 t), Lundu (281.5 t)
Freshwater	549 holders/ 151.1 a	4,962.3 t	Kuching (1,530.2 t), Serian (1,071.5 t), Bau (722.6 t)
State total	609 holders/ 305.8 ha	14,959.3 t	Sales value RM141.69 million; income RM151.57 million

Source: Department of Statistics Malaysia (DOSM), Census of Agriculture 2023: Aquaculture (2025)

Beyond production volume, initial deployment and stakeholder engagement outcomes indicate that AQUASYS has high potential to deliver value across three dimensions consistent with its intended triple-impact design, summarised in Table 2.

Table 2 Triple-Impact Value Proposition of AQUASYS[®]

Impact Dimension	Observed / Anticipated Outcome
Environmental	Waste-to-resource nutrient cycling between fish, seaweed, and bivalves; no external feed required for low-trophic species, reducing ecological footprint.
Economic	Directly offsets Direct Materials cost, the largest expenditure component (58%) in Malaysia's aquaculture subsector (DOSM, 2025); multiple revenue streams identified: aquaculture produce, tourism, research and training.
Social	User-friendly, community-centric design suited to an ageing farmer population (89.1% aged over 45; DOSM, 2025); living-lab function supports research, education and training; strengthens food security in line with MFCORD policy goals.

Early engagement with key stakeholders JPLS, Aqua Santubong, and aquaculture's project participants will validate stakeholder interest across the target groups: fishermen, entrepreneurs and relevant agencies. The transferable, dockable cluster design was confirmed at the pilot site as a practical mitigation against monsoon-related structural loss, while the modular configuration adapted to the species mix and spatial constraints of the proposed selected location. These findings will support AQUASYS[®] as a technically viable and commercially scalable design, with a proposed strategy of piloting in Sarawak followed by strategic partnerships across Malaysia and the ASEAN region.

4. CONCLUSION

AQUASYS[®] demonstrates that thoughtful modular design integrating multi-trophic ecological principles with transferable, monsoon-resilient design can address the structural and economic vulnerabilities of coastal aquaculture in Sarawak. By eliminating external feed dependency, diversifying revenue streams and embedding a living-lab function, the system offers a replicable, community-centric model for sustainable coastal aquaculture. Building on the pilot study and early stakeholder partnerships, future work will scale deployment across additional Sarawak coastal sites



and formalise commercialization pathways; system sales, installation, training and licensing supporting broader adoption across Malaysia and the ASEAN blue economy.

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