

# Seaweed farming, Borneo's blue economy



**Exploring Sustainable Development**  
with Dr. Goh Chun Sheng

THE World Bank defines the blue economy as the "sustainable use of ocean resources for economic growth, improved livelihoods, and jobs while preserving the health of ocean ecosystem."

This could be very relevant to the east coast of Borneo which is rich in marine-based biological resources. Coastal aquaculture along coastal floodplains, estuaries and marine waters is a major economic sector in the region. There was a rapid sector expansion throughout the 1980s and 1990s.

In addition to conventional aquaculture, biomass from coastal aquacultures, like seaweeds, could be potential raw materials for generating various high-added-value products using biotechnological processes.

Two genera of red seaweed with commercial value, i.e., *Kappaphycus* and *Eucheuma*, are widely cultivated, primarily for their carrageenan (a carbohydrate) to form hydrocolloids (a type of food ingredient).

**Supply and demand**  
Most seaweed produced in the region is farmed seaweed. Indonesia is the world's largest producer of red seaweed (the second largest producer of seaweeds), recording close to 10 million wet tonnes in 2019. The second largest producer of red seaweed is the Philippines, with about 1.5 million wet tonnes followed by Malaysia, with close to 0.18 million tonnes (all from Sabah).

In Sabah and North Kalimantan, the sector generated approximately US\$15 million and US\$61 million per year in 2019, respectively. Smallholders currently dominate the industry.

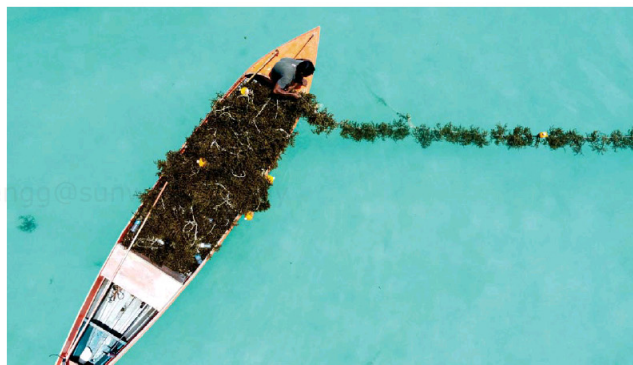
To date, the production potential of seaweed in the region is not entirely clear. Detailed mapping of the seaweed farming areas to identify the opportunities and risks from an ecological point of view will be needed.

Indonesia and the Philippines lead significantly in the export of seaweed and seaweed-based hydrocolloids, respectively. Malaysia turned out to be a net importer in terms of value. Raw seaweeds mainly went to China (>80%), while hydrocolloids ended up in multiple destinations.

There are several possible uses. Seaweeds can be consumed by humans directly as food or processed into additives, such as stabilisers or thickening and gelling agents. Seaweeds may also be used as animal feed and bio-stimulants as a solution to chemical fertilisers for crops. Furthermore, a variety of bioactive compounds from seaweed may be used as new ingredients for drugs and cosmetic products. In recent years, carrageenan has emerged as a promising material in tissue engineering and regenerative medicine applications.

Potentially, carbohydrates (hydrocolloids, mainly agar, carrageenan and alginate) from seaweed may be used to produce bioplastic and synthetic polymers for textiles or biomedical instruments. The carbohydrates may also be turned into sugars, biogas, bioethanol and other sugar-based biofuels.

However, there are no apparent signs these will drive the breakthrough in seaweed development in Southeast Asia. More in-depth market research will provide a better view of the various value chains and associated opportunities and risks.



A farmer harvests seaweed in the waters of Semporna, Malaysia produces close to 0.18 million tonnes of seaweed a year, all from Sabah. — Bernama photo

**Business models and challenges**

Coastal aquaculture on the east coast of Borneo is characterised by extensive small-scale farming with middlemen controlling the trade. There are a few sustainability considerations in the context of social dynamics. First, seaweed farming requires a large labour force from planting to post-harvest handling.

The demand for the labour force is often seasonal or occasional. This characteristic explains why the sector has not seen industrial farming like the plantation sectors in the region.

There were also reports of conflicts arising from land disputes due to aquaculture expansion. In places like the Mahakam delta in East Kalimantan (Indonesia), the governance of aquaculture activities is intertwined with complex local social dynamics, largely influenced by powerful and wealthy locals.

Finally, in Sabah, the seaweed sector is primarily fuelled by the foreign labour force, as the job is considered too laborious

and strenuous by the locals. The conditions of migrant (or stateless) workers are often less ideal due to unstable and low wages.

However, the issues with migrant workers are not unique to the sector but a long-standing issue for the state of Sabah. The seaweed economy's sustainability must be carefully managed from a cross-border perspective.

**Integration with blue carbon, mangrove restoration and eco-tourism?**

One advantage of seaweed is its ability to capture carbon in plant bodies and sediment residues in the soil.

It is an essential part of the complex food webs, playing an important role in nutrient cycling. Its structure and ability to shield excessive light also make them habitats and shelters for various marine life. These characteristics open up opportunities for integrating with blue carbon mechanisms.

The critical question here is how seaweed and algae farming can be configured to produce biomass and become a net

carbon sink simultaneously. However, there are no known success cases yet.

Meanwhile, combining mangrove restoration initiatives may improve the sustainability of marine farming as both have a similar set of stakeholders. Coastal aquaculture sites in Borneo tend to be located close to mangroves which are rich in marine biodiversity.

Mangroves provide various critical ecosystem services for farming activities, including nutrient cycles and coastal protection. There are about 90,000 ha and 96,000 ha of mangrove forest in Sabah and North Kalimantan, respectively. The Coral Triangle that covers the entire Philippines, Malaysia's Sabah and the eastern islands of Indonesia is recognised for housing the world's highest concentration of marine biodiversity.

However, the region also suffers from mangrove destruction due to unsustainable aquaculture. Tapping into funding from blue carbon may improve the economic feasibility and sustainability of marine-based

bioeconomy in conjunction with mangrove restoration. However, the potential of combining blue carbon financing with seaweed farming is not yet well-understood.

Both options described above may also be integrated with sustainable coastal tourism, creating new business opportunities for local communities. There have been initiatives like the seaweed community-based homestay programme in Pulau Bum Bum (Sabah) and eco-tourism activities in Belaga One Karya mangrove (North Kalimantan).

In 2019, the tourism sector brought in close to US\$1.9 billion of revenues for Sabah from over 4 million tourists, supporting more than 80,000 jobs. The tourism industry is relatively weak in North Kalimantan, with less than 0.5 million tourists in the same year due to logistic constraints and a lack of infrastructure.

These lines of inquiry imply that the development thinking must adopt a community-based perspective considering the context of Borneo's society and environment.

A sustainable blue economy will have to consider not only the economic output but also the impacts on the society – in this case, the migrant workers and stateless populations, as well as the synergies with the environment like mangrove restoration and carbon benefits. It seems an exciting idea worth navigating in Borneo's quest for sustainable development.

Dr Goh Chun Sheng is a researcher at Sunway University and Harvard University. His research interests lie in the intersection of bio-economy development and environmental restoration with a special focus on both Malaysian and Indonesian Borneo.

## Belong not ignored in state's mainstream devt, assures minister

**KUCHING:** The state government would not forsake the Belong area in Asajaya, assures Minister of Youth Sport and Entrepreneur Development Dato Sri Abdul Karim Rahman Hamzah.

Adding on, he says Belong is definitely included in the state's mainstream development and this area is set to become an attractive tourist spot.

Abdul Karim, who is Asajaya assemblyman, acknowledges that people still need to use boat service to reach Belong, but he also points out that as soon as the ferry service is in place, the boat travelling would be a thing of the past.

"The ferry service proposal has been approved. We just need to identify the spots for the ramp."

"When the ferry points are completed, the ferries will operate," he told reporters when met after the flag-off of the 'Sarawak Adventure Challenge (SAC) 6.0' conducted by Draco Action Sports in Belong yesterday.

On this extreme sports event, Abdul Karim was happy that the organiser had chosen to hold the event in his constituency this year, noting that past editions had been conducted in various areas across Sarawak including the eco-tourism hotspot Siniawan in Bau.

"The adventure challenge is very unique and interesting, more so for it to be held in Belong, which is a multi-racial area – its population comprises the Chinese, the Malay and the Ibans, all living in harmony."

"The Malays and the Ibans mostly live in Kampung Betadek and Sungai Tanju, respectively."

Abdul Karim also hailed SAC 6.0 as an international one, with a number of participants coming from Brunei, Singapore, the Philippines and even from Romania. The theme for 6.0 event was 'The Dragons Challenge' – a reference to the popular temple on the island, said the event's organiser in a press tournament issued yesterday.

"Organised by local company, Draco Action Sports, and supported by the Ministry of Tourism, Creative Industry and Performing Arts, the SAC is a completely homegrown event and it has been held annually since its inception in 2017."

"The race format for this multi-sports event involves mountain biking, trail running and other local activities spanning a total distance of about 50km."

The organiser also said in view of no land vehicle access to Belong, getting to this year's event, participants had to take participants to cross the river on board the local passenger ferries.

"We provided them with free ferry coupons as a way to encourage more participants from outside Sarawak, we had arranged for a shuttle service to ply between official hotel and the site to embark to/disembark from Belong," said the organiser.

It also regarded sports tourism as opening the possibility to



The SAC 6.0 participants charge on from the starting line. — Photo by Roystein Emmor

involve local communities and incorporate local culture.

"In so doing, this event has become an excellent vehicle for

promoting Sarawak.

"Events such as the SAC provide means to promote the adventure and recreation

potential of Sarawak, not only to the international tourists, but also to fellow Sarawakians," it added.

## Mawan retains SDNU presidency for fourth term

**KUCHING:** Tan Sri William Mawan Ikrom has been returned unopposed as Sarawak Dayak National Union (SDNU) president at the close of nominations for office bearers, ahead of its Triennial General Assembly (TGA) 2022 to be held in Sibau on Oct 29.

The Pakan assemblyman will be in his fourth term as union president since 2012.

In all four TGAs, he was unopposed.

Tamin assemblyman Christopher Gira Sambang is the new SDNU deputy president after he too was unopposed. Gira replaces Englishli assemblyman Dr Johnhal



Thaddeus Ling Allu

Rayong Ngipa who was elected to the post in the 2019 TGA.

The appointment of Mawan and Gira was disclosed by TGA permanent chairman Thaddeus Ling Allu when met at SDNU headquarters in MJC Batu

Kawah here Saturday. Apart from the 21 elected posts, SDNU has 15 appointed posts.

Thaddeus, however, declined to reveal more on the appointees.

"I'm sorry I can't disclose more. Let us all find out during the TGA itself at Kingwood Hotel in Sibau on Oct 29," he said.

As a prelude to the TGA, SDNU will be holding a welcoming dinner for all delegates on Oct 28.

SDNU, an umbrella body for various Dayak-based organisations, was established in 1956.

As of now, the union houses 48 branches including the two wings of Women and Youth.

## i-CATS UC inks MoUs on international collabs, skills enhancement

**KUCHING:** In its effort to raise the bar in its ongoing talent development initiatives, PPKS Ilmu Sdn Bhd, the entity that manages i-CATS University College (i-CATS UC), had signed memoranda of understanding (MoUs) with Asia China Education and Culture Association (ACEC), Farley Mall Sdn Bhd, and KTT Sdn Bhd.

i-CATS UC in a release said the signing of the MoUs was held during Sarawak Skills' 27th annual general meeting at a hotel here on Oct 17.

The signatories from the various organisations were Yang Chengcheng, executive regional director of ACEC; Eijing Lau, director of Farley Mall Sdn Bhd; Chan Hua Kheng, managing director of KTT Sdn Bhd; and Prof Dr Shahren Ahmad Zaidi Adruce, vice chancellor of i-CATS University College. Sarawak Skills chairman Tan

Sri Datuk Amar Dr Abdul Aziz Husain and executive director Hallman Sabri witnessed the MoU signings.

The three MoUs pave the way for the parties to formalise a host of mutually beneficial initiatives, including international collaborations with universities, skill enhancement initiatives for staff members from the industries through i-CATS UC's skilling and upskilling programmes, and industrial attachment for Sarawak Skills' and i-CATS UC's students.

The MoUs also serve as a start for various joint research initiatives that will benefit various stakeholders across Sarawak. In this respect, the signing of the MoUs was followed by the presentation of a Research Grant amounting to RM10,000 by KTT Sdn Bhd to i-CATS UC said in the press release.

In addition to the aforementioned signing of MoUs, a warm welcome was accorded to new members of Sarawak Skills, namely the Sibau Automobile Repairs Association (Sara) and the Sarawak Land Development Board (SLDB), bringing the number of Sarawak Skills members to 73.

It said such understanding and collaboration between the various stakeholders are vital to talent development in Sarawak, and in line with the vision of Premier Datuk Patinggi Tan Sri Abang Johari Tun Openg who is also i-CATS UC Chancellor.

Also present at the event were Sarawak Skills Management Council secretary Dato Maznah Damsi, members of the Sarawak Skills Management Council, Sarawak Skills members, and management and staff members of the Sarawak Skills Group of Learning Institutions and Companies.

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