

EMPOWERING COASTAL COMMUNITIES IN MALAYSIA THROUGH OYSTER FARMING

By Aileen Tan Shau Hwai

Universiti Sains Malaysia (Science University of Malaysia) has pioneered research in oysters since 1988. Based on the fact that oyster farming is a clean and green aquaculture, plus its low cost and adoptable technology ('Low technology with high touch'), coastal communities have been introduced to sustainable oyster farming as a means of income generation. Through training and hands-on engagement, these empowered communities have become entrepreneurs, producing and marketing oysters successfully. The author concludes that a sustainable oyster farming system is able to offer economic returns for coastal communities, while significantly improving their living standards.



oysters, being filter feeders, do not require feeding like prawns or fish, where excessive feed will pollute the water and environment, besides needing a higher investment cost to operate.

In the late 1980s, the coastal communities in Malaysia had been encouraged to farm oysters but efforts failed due to lack of oyster seed supply and inadequate knowledge on farming and marketing. Under the auspices of the Bay of Bengal Program (1988 – 1993) and the Department of Fisheries Malaysia, oyster farming was introduced in the States of Kedah, Perak, Langkawi,

Based on the Food and Agriculture Organization (FAO) report entitled “Relocation of Fishermen Program in Peninsular Malaysia” (2010), the average income of traditional fishermen at the time was around USD50-USD60 per month per household. This clearly indicates that small artisanal fishermen are grouped in the ‘bottom billion’ community and that captive fisheries are no longer providing a sustainable income for fishermen due to over-harvesting and the pressure of climate change in the ocean. The global supply gap caused by decreasing harvests from capture fisheries therefore needs to be filled by aquaculture. However, aquaculture is not applicable to all because of the high costs involved, which most local communities are unable to sustain.

Fishing communities in Malaysia need to have an alternative or additional means of livelihood to sustain their daily expenses. One of the options is oyster farming, which requires easily-adoptable technology, and which can be readily applied by the fishermen and coastal communities. In addition, oyster farming is considered a form of green aquaculture because

Johore, Kelantan and Terengganu. The coastal communities were taught how to collect oyster seeds from the wild using materials such as oyster cultch and used tyres. The expansion of the oyster farming industry in Malaysia could have been much faster if not because of limited seed supply. Only hatchery production can provide the required supply of seed both in terms of quantity and quality, for any real progress in oyster farming.

Universiti Sains Malaysia (USM), based in the State of Penang, has more than 30 years of experience in oyster research and farming. The University has advanced from fundamental research to applied or advanced research innovation. In 2008, it successfully initiated a commercial oyster hatchery, which was considered a breakthrough in helping to solve the bottleneck of insufficient seed supply to sustain the oyster farming industry in the country.

The approach used to empower coastal communities to venture into oyster farming has been proven successful in several places in Malaysia. In general, the coastal communities

are supplied with sustainable oyster seeds from the hatchery and are also guided on how to culture the oysters so as to attain a high survival and growth rate. Through various social innovation projects by the Malaysian government where funds are awarded to institutions of higher learning, the researchers have been able to guide these communities how to farm oysters in a sustainable manner and how to market their products.

Based on three decades of research and engagement with the coastal communities, the research team has simplified the whole farming process to “biteable sizes”, making it easy for the coastal communities to adopt the technology. Simple oyster farming technology can therefore be easily introduced to the local community.

Unrealised potential for market growth

Oyster farming is relatively easy and can be adopted and adapted by coastal communities in the selected areas. However, usually these communities lack the financial resources to invest in setting up the facilities (i.e. floating cages) for oyster farming as well as to overcome insufficient seed supply from the wild. In addition, the coastal communities do not have the right information or means to market their product.

Guided by food security and community engagement policies, the Malaysian Government through the Ministry of Higher Education (MOHE) had pledged to strengthen the capability and to empower coastal communities to generate sustainable income through several initiatives such as “Knowledge Transfer Program” (KTP) and “Translational Research Grant” (TR@M). Under these initiatives, USM has transferred knowledge on technological innovation and development in oyster farming to the coastal communities. At the same time, MOHE had provided initial funding to start up a farm where the coastal communities could work closely with the researchers from USM using the research innovations generated since the late 1980s.

Oyster farming is a newly emerging seafood industry in Malaysia, having enormous potential for growth in both the local and international market. The oyster trade in Malaysia was valued at RM 24 million in 2015 (Trade Statistics, Malaysia) which is estimated at meeting only 14% of the demand. This indicates that there are solid grounds for increasing production in order to meet market demand. In the past, production has tended to be affected by the limited availability of oyster seed supply from the wild and the long culture cycles, but now, oyster farming can rely on hatchery-produced seeds instead of the natural seeds, which are inconsistent in amount and seasonally distributed. Therefore,

the oyster industry in Malaysia should be able to take off if the farming technology can be transferred to the coastal communities or growers.

Setting up sites for oyster culture

Preliminary assessment on site selection was conducted by USM researchers while talking to the coastal communities to promote oyster culture. Members of the communities were briefed on the advantages of venturing into oyster farming for sustainable income generation and as an alternative livelihood. They were assured that the right culture method as well as the right culture site will be able to produce a superior product with a regular shape and size, as well as high quality taste and texture. An initial site survey was conducted throughout Malaysia by the researchers from USM, who also determined the carrying capacity of the selected sites for the purposes of commercial culture. The sites selected needed to be away from the route of traditional fishing and other human activities.

Some trial oyster seeds were initially provided with the aim of confirming the feasibility of the selected site as well as to cultivate confidence and interest among the coastal communities on this new income-generating activity. It was important to ensure that the coastal communities get the buy-in and be committed to the project.



Constructing the oyster rafts

Several training sessions on oyster farming, which included handling, maintenance, grading and sorting were conducted, both formally and informally. As a result of the training, the

coastal communities were able to do grading as well as sorting the oyster seeds to enhance the growth and later, to separate the marketable-size oysters. They also gained knowledge on nutritional values and were briefed on the advantages of oyster farming. In addition, the coastal communities were made aware of the importance of preserving and protecting the mangrove areas as well as the environment surrounding their farms to enhance aquaculture sustainability.



Hands-on training was provided to the coastal communities including how to make floating rafts from scratch, to maintain them, cleaning, sorting and harvesting. This was to ensure that the coastal communities could build their own rafts as and when they decide to expand their culture capacity.

The USM team visited the sites regularly to ensure that the coastal communities were able to handle the oysters. Their regular presence helped to create trust between the researchers and the coastal communities, which made it much easier to effect the knowledge transfer. This also opened the opportunity to co-create and co-produce knowledge between the researchers and coastal communities.

Once the facilities had been set up, the oyster seeds, which were produced from USM and the commercial hatchery, were transferred to the growout site. The coastal communities' task was to monitor the growth and survival of the seeds until the oysters reach marketable size.

Since oyster farming USM-style requires simplified technology and low labour, this type of aquaculture can be done on a part-time basis. The coastal communities can still be involved in their daily activities, such as fishing or farming in the morning and handling the oyster farming in the afternoon. The major labour, once the floating rafts are built and the oysters are growing, is periodic agitation at the beginning (about once a week, to prevent seed oysters from fusing to one another) and removing algae and other fouling organisms which can restrict the flow of water and food organisms into the floats and compromise growth and survival. Regular checks on predators such as crabs and carnivorous snails are required and these predators needed to be removed.

Processing and marketing options

The coastal communities have been made aware of the importance of quality control of the oysters produced, to ensure that the industry remains sustainable in Malaysia. Along the pipeline, the project had incorporated technology to convert the fresh oysters to other marketable products such as freshly frozen oyster (whole and shucked), dried meat, shucked meat in saline water and extraction of the juice for other usages like oyster sauce or for pharmaceutical purposes. These technologies will open up more opportunities for the coastal communities to grow oysters, where the market for their products is wider.



Once the oysters reach marketable size (between 8 to 10 months, depending on the site selected), the coastal communities have the option to sell their harvest to their

own customers or to sell the mature oysters to middlemen at a controlled price. On average, each grower is able to sell approximately 2 000 oysters per month at USD1.50 per piece, which enables them to generate an additional USD3 000 per month on a part-time basis. There are some costs such as petrol and seeds (seeds need to be continuously purchased for sustainability), but the profit is still attractive.

The coastal communities involved in the oyster farming project have now started to enjoy the benefits from the farming, where oysters can be sold continuously after the first 8-10 months of culture. With the income they have generated, the culturists now are able to purchase their own oyster seeds to sustain the farming. As mentioned earlier, oyster farming is a sustainable activity because it is a clean aquaculture and involves minimal investment after the set-up of the floating rafts. The communities can extend their farming activities in the future by building more floating rafts to increase the holding capacity for the oysters.

Besides growing oysters, these coastal communities had been trained to be eco-tourism operators in order for them to promote sustainable green aquaculture as well as environment protection for a better and safer ocean and environment. There is opportunity for the local communities to be social entrepreneurs when they are able to manage their own eco-tourism business through oyster farming.

A quintuple-helix approach

Oyster farming has been proven successful with the coastal communities in the USM project and a similar approach can be used to create an industry for other communities in Malaysia through partnerships between university, government, industry and community. Oyster farming in fact, links the Higher Education Institution (HEI), government sector (Department of Fisheries, Ministry of Education, Tourism Malaysia, etc), private sector/industries, communities and it is also aligned with environment protection. This project is able to link all these five components with the SDGs – a “Quintuple-helix approach”, the first of its kind to be implemented successfully.

Oyster farming is not only able to address the issues of food security as well as protection of the environment (green and clean aquaculture), it fits in ideally within the Blue Economy’s

three Pillars of Sustainability (People, Planet & Profit). Therefore, through oyster farming, public awareness on environment protection and sustainability can be executed effectively among all communities as well as the younger generations. Oyster farming can also be an attraction for eco-tourism or knowledge-based tourism. This has been proven successfully at another site in Sg. Merbok, Kedah State, Malaysia.

In addition, from past experience and success stories, oyster farming can be an excellent vehicle for the empowerment of womenfolk in the community. In the past, women played a secondary role, usually preparing meals for eco-tourists at the oyster farm as well as the mangrove sites. The womenfolk have proven to be very committed and are open to learning new skills and knowledge. Currently, one or two of the targeted communities taking part in oyster farming projects consist of womenfolk from the coastal areas, which addresses the SDG#5 on Gender Equality.

In general, the knowledge and technology which had been translated to the coastal communities include:

- Production of entrepreneurs in oyster farming and seed production through technology transfer from USM or/and the commercial oyster seed producer;
- Training of farmers in producing seeds to ensure consistent and sustainable oyster seed supply;
- Training of farmers on the different forms of products that can be produced from oysters such as dried oysters, frozen oysters etc; and
- Initiation and empowerment of women in oyster farming.

The oyster culture model and its best practices as described in this article can be replicated easily. Oyster farming has now expanded to the States of Penang, Kedah, Perak, Negeri Sembilan, Selangor and also Sabah. It is hoped that Malaysia will soon be able to produce oysters for local consumption as well as for the export market. What is most important in this project is that the coastal communities were able to learn and be successful in oyster farming, resulting in a tremendous uplifting of their standard of living. Oyster farming is therefore an answer for poverty eradication in Malaysia. 🌱



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