

**KERATAN AKHBAR-AKHBAR TEMPATAN
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Bil	Tajuk	Akhbar
1.	Bioeconomy on track	Sunday Star
2.	Fish for life	Sunday Star
3.	Biotechnology raising the ante for Malaysian economy	Sunday Star

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Bioeconomy on track

Biotech projects spurring the country's bioeconomy are a game-changer for Malaysia to become a high-income developed nation.

THE thought of eating creepy crawlies may give you the, er, creeps, but what if it can help you save the environment and reduce world hunger?

Entofood Sdn Bhd CEO Franck Ducharme assures that insects are the solution to the pressing food problem globally.

"We today have a permanent food crisis due to global warming and natural disasters affecting the production, supply and cost of food," he explains.

"With more than seven billion people in the world, we already have difficulty providing food for everybody and we have a forecast of another two billion mouths to feed by 2016."

At the same time, there is a growing demand for more protein sources like fish and meat from wealthier and growing economies including in South East Asia, which is putting pressure on the commodity sources and environment.

Enter insects, which Ducharme believes will help solve the world's food crisis.

"Many may see insects as a hazard or pests but these fantastic animals can feed the world's population. They are

excellent sources of protein and essential nutrients. There is also a high biomass of insects - it is the largest population of animals on the planet," he highlights, quoting the United Nations Food and Agricultural Organisation (FAO)'s recent call to embrace a "bug diet" as proof of their potential as the food of the future.

"Another thing many don't realise is that insects are clean animals that can survive in the dirtiest natural environments. This gives them a strong capacity to handle bacteria," he adds.

To study the feasibility of producing insects on a big scale for sustainable protein source, Ducharme and two business partners from France conducted research and development (R&D) in Madagascar for almost two years.

"Previously,



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biotech industries focused on algae and single cell (bacteria) to solve the crisis. We focused our research on insect biology with the target of developing the means and technology for a mass insect production."

The success of their research prompted them to look for a suitable location for their pilot insect farm.

"We knew we wanted to raise a tropical species and to break into the Asian market. Malaysia provided the strategic geographical location with the perfect climate and environment," says Ducharme.

The biggest attraction, he adds, is

Malaysia's strong push for biotechnology with its tax incentives and guarantees to attract investors into the country.

Taking advantage of these facilities, Entofood set up shop in Malaysia and wasted no time in applying for the BioNexus Status.

BioNexus Status is a recognition awarded by the Malaysian Government to qualified companies that participate in and undertake value-added biotechnology activities. The award is given via BiotechCorp, an agency under the Science, Technology and Innovation Ministry (MOSTI) responsible for executing the objectives of the National Biotechnology Policy (NBP). It identifies value propositions in both R&D and commerce and supports biotechnology ventures in Malaysia via financial assistance and developmental services.

"BiotechCorp has helped us deal with administration issues and find corporate partners to build a network," Ducharme says. "When you come from outside to a country where you don't know anyone, having the support of a dedicated and knowledgeable team of people is a big asset."

To develop their technology and conduct further research, Entofood is also actively hiring local specialists in the field.

"We have always believed in engaging the local work force, even if they don't have the know-how or technology, as long as they are well-educated and willing to grow with us. At the moment, we have a local entomologist and biologist on our staff."

Currently, Entofood is operating a small pilot farm in Kuang, Selangor to breed their insects.

"It is a small scale operation to try



Entofood CEO Franck Ducharme

our technology," says Ducharme, who is confident they are on schedule for their commercial operation.

Best of all, he says, Entofood has found two interesting by-products from their pilot project: a possible solution to our land fill issues and an organic fertiliser.

"A challenge we encountered when we started out was how to feed our insects. We did not want to plant specific plants as it would take up land that can be used for other things and will not be sustainable. The other option is to feed them recycled organic waste, or food waste," he says.

As another FAO study showed, one third of the food produced worldwide is wasted. In Malaysia, for example, we reportedly generate some 15,000 tonnes of food and kitchen waste daily.

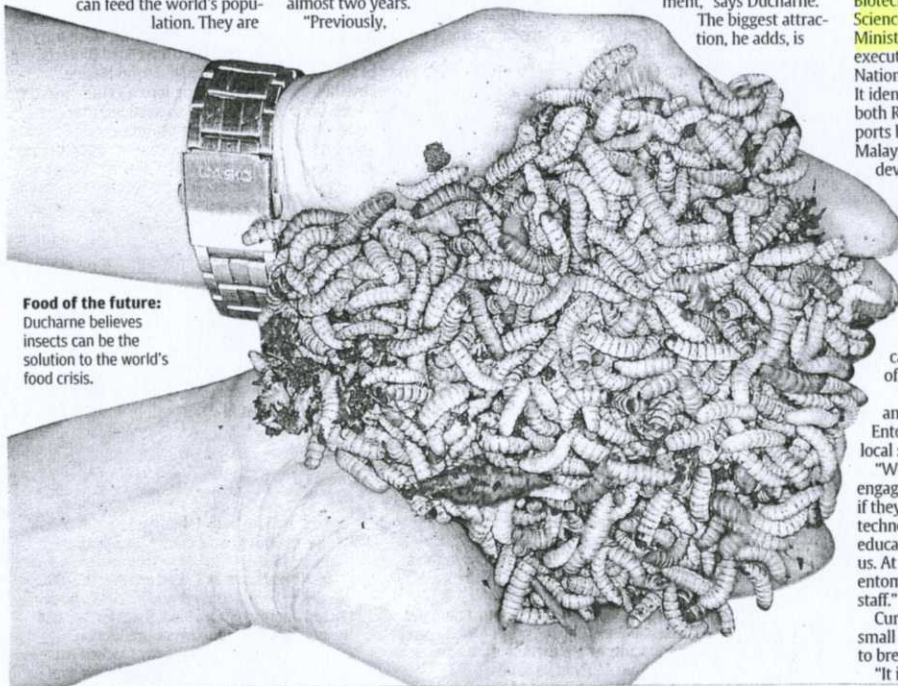
Entofood decided to tap into this ready resource and contacted big food operations such as universities, restaurants and supermarkets to get food waste. "We realise that this technology can also solve the problem of landfills, one of the main producers of greenhouse gas. It can be a waste management solution in future, especially if we can get the people to separate their waste at home..."

Another discovery from their insect farm, insect "manure", is proving to be a good organic fertiliser.

Nevertheless, the main focus remains their insect breeding for protein production, and they hope to start the construction of their commercial operation next year.

And if you are still not convinced to take a bite, be assured that the bug food does not come straight from the farm to your plate.

"To transform them into raw food material, we put them through a thorough cleaning and drying process that destroys all the bacteria.



Food of the future:

Ducharme believes insects can be the solution to the world's food crisis.

KERATAN AKHBAR
SUNDAY STAR (FOCUS): MUKA SURAT 29 & 30
TARIKH: 6 OKTOBER 2013 (AHAD)

Fish for life

WHEN local marine fish farming company Aquagrow Corporation Sdn Bhd was setting up in 2008, it received only one Malaysian applicant to join the company. In Malaysia, fish farming is still perceived as a small-scale rural activity, says its CEO Mohd Razali Mohamed.

"What many don't realise is that aquaculture (fish farming) is now a RM380bil global industry with some 160 million tonnes of fish being traded all over the world each year. Fish production is already the biggest food production sector in the world - bigger even than chicken, beef, dairy or pork. And the pay is fantastic and is on par with other industries," he says.

Crucially, aquaculture is becoming increasingly high tech, requiring extensive research and development to spur its growth, and experts in related specialisations from marine biologists to feed specialists, geneticists and food technologists.

Seeing the potential in the field, Mohd

Razali decided to turn his "side project" - a fish farm in Adelaide, Australia - into a full-time career.

Mohd Razali decided to walk away from his high tech career in Geographical Information System and Remote Sensing to pursue aquaculture fulltime.

"I entered the aquaculture industry at 36 years old. Initially, it was just for diversification of business portfolio. After five years, I gave up everything else and concentrated on fish farming, having seen how big the industry is."

Along with his business partners, Mohd Razali decided to test the waters here.

"We had a bit of a culture shock!

Compared to when we were in Australia, we got so much support from the government here and there were even funds available through various grants."

Through **BiotechCorp**, Aquagrow received the BioNexus Status, which gave them various incentives and guarantees to develop



Big business: Aquagrow Corporation's fish farm in Langkawi. Aquaculture is now a RM380bil global industry.

their aquaculture enterprise.

"With BioNexus, we got help at all stages of our development, even with petty issues," says Mohd Razali, describing BiotechCorp as a "nurturing" agency.

After studying the market, they decided to focus on Tiger Grouper, Giant Grouper, Barramundi and Red Snapper.

They started with a farm in Langkawi and another in Tok Bali, Kelantan. To reap optimum "catch", they invested in research and development (R&D) at their facilities and hatcheries, says Mohd Razali.

"The biggest problem in fish farming is the

> SEE NEXT PAGE

No limit to potential of aquaculture

> FROM PREVIOUS PAGE

high mortality (about 50% for Barramundi and Snapper, and 70% for Grouper) due to viruses, diseases, parasites and bacteria. We apply aquaculture biotechnology in fish farming at all three stages of our operations - from hatchery, nursery to grow-out - to reduce the mortality and to increase profitability."

Through aquaculture technology, they are working to develop a long term Broodstock Enhancement Programme using a DNA-marker assisted family selection method to reverse the declining quality of their broodstock and a commercial scale Copepod production for first feeding in all their hatcheries.

Another initiative is to develop high-density polyethylene (HDPE) materials to make sea cages to allow them to keep their brood in deeper and higher quality waters.

According to Mohd Razali, the more common wooden cages restrict the fish farmers only to shallow, near shore and sheltered areas which have lower quality sea water. "HDPE cages are also designed to withstand monsoons," he adds.

Previously, they would have to import HDPE cages which are usually too expensive. "We are designing our own cages with assistance from a Danish aquaculture engineering company. We ordered the fabrication equipment from Europe and will start to fabricate the HDPE cages in Tok Bali soon, at a lower cost than the fully imported models."

It helps that they are given exemption for import duty as a BioNexus company, says Mohd Razali.

Having a BioNexus status has also made it easier for them to hire the foreign specialists they need.

"Being in the BioNexus programme gives us the freedom to hire any foreign expert we need, which in our case is in almost all departments as we are lacking talents in this field in Malaysia at the moment," he says.

All of Aquagrow's farm managers now are Europeans as there are not many Malaysians who have the experience in large scale commercial fish farming, says Mohd Razali.

"But we make sure that we also hire young Malaysian graduates to become their assistants, with the view to have mostly Malaysian managers in the near future."

Aquagrow also tries to tap into the local community for manpower.

"Both farms are located in very rural areas and we usually give employment preference to locals. We want the farms to have direct positive impacts on the local economies and employment of Langkawi and Tok Bali."

Their first harvest is expected this December. While all their focus has been on R&D, Mohd Razali is confident of their sales and marketing with their Australian connections.

"Our Barramundi and Snapper will be air-flown to Sydney and Melbourne on a weekly basis. When the production increases, we will export to Switzerland and France."

"Our live grouper will be exported to Hong Kong and China. There are many 'well boats' from Hong Kong that ply the South China Seas and Malacca Straits to purchase live Grouper directly from farms, to bring back to Hong Kong and China."

He says it was the global aspect of aquaculture that attracted him to the field.

"And virtually there is no limit to the size of the fish. The bigger the fish, the more profit you make."

Ultimately, it is an area with a demand. "Everyone needs fish!" quips Mohd Razali. Aquaculture is also Malaysia's answer to the sustainability of its fishes.

According to experts, Malaysia has lost 92% of its fishery resources due to overfishing.

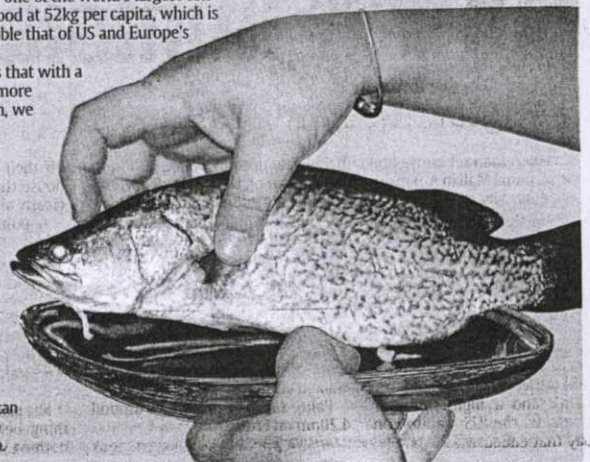
Mohd Razali points out this is because Malaysians are one of the world's largest consumers of seafood at 52kg per capita, which is more than double that of US and Europe's 20kg.

"That means that with a population of more than 27 million, we

consume more than 1.4 million tonnes of fish per year while we produce 1.5 million tonnes," he says.

In 10 years, we will need another 260,000 tonnes to feed ourselves and in 2048, the predicted doomsday for global fisheries, we will need to double our current production.

"Our wild catch has already reached the maximum yield, so unless we act now, we will run out of fish sooner. Where is the fish going to come from in the future? The answer is aquaculture, of course!"



Tapping into research: Biotechnology can help reduce the mortality of fish.

