VOYAGES of DISCOVERY

Exploring the Sunda Shelf with Universiti Malaysia Terengganu

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TRANSFORMING THE FISHING COMMUNITY

From Fishing to Bee Keeping

BUILDING STRONG NETWORKS

Achieving Mutual Benefits Through ASEAN-FEN

REACHING FOR GOLD STANDARD IN FISHERIES AND AQUACULTURE WITH UMT

ISSN 2289-4772


“WE KNOW THAT WHEN WE PROTECT OUR
OCEANS WE’RE PROTECTING OUR FUTURE.”

Message From The Vice-Chancellor

UNIVERSITI MALAYSIA TERENGGANU

Research and activities related to fisheries and aquaculture is increasingly recognized, as they are important contributors to the national economies of countries across Asia and the Pacific region. More importantly, fish products are also the most heavily traded natural food commodities in the world. Thus, this special edition of Voyages of Discovery portrays our passion in fisheries, aquaculture and marine sciences specifically how to increase awareness of the importance of such studies to the world.

Collaboration between Universiti Malaysia Terengganu and the Department of Fisheries Malaysia is seen to be crucial for us to showcase our efforts in being a national and regional leader in marine sciences. The synergy will strengthen our role in connecting our various schools and centres of excellence with other research centres and industry players and contribute to the local communities leading towards common economic benefits.

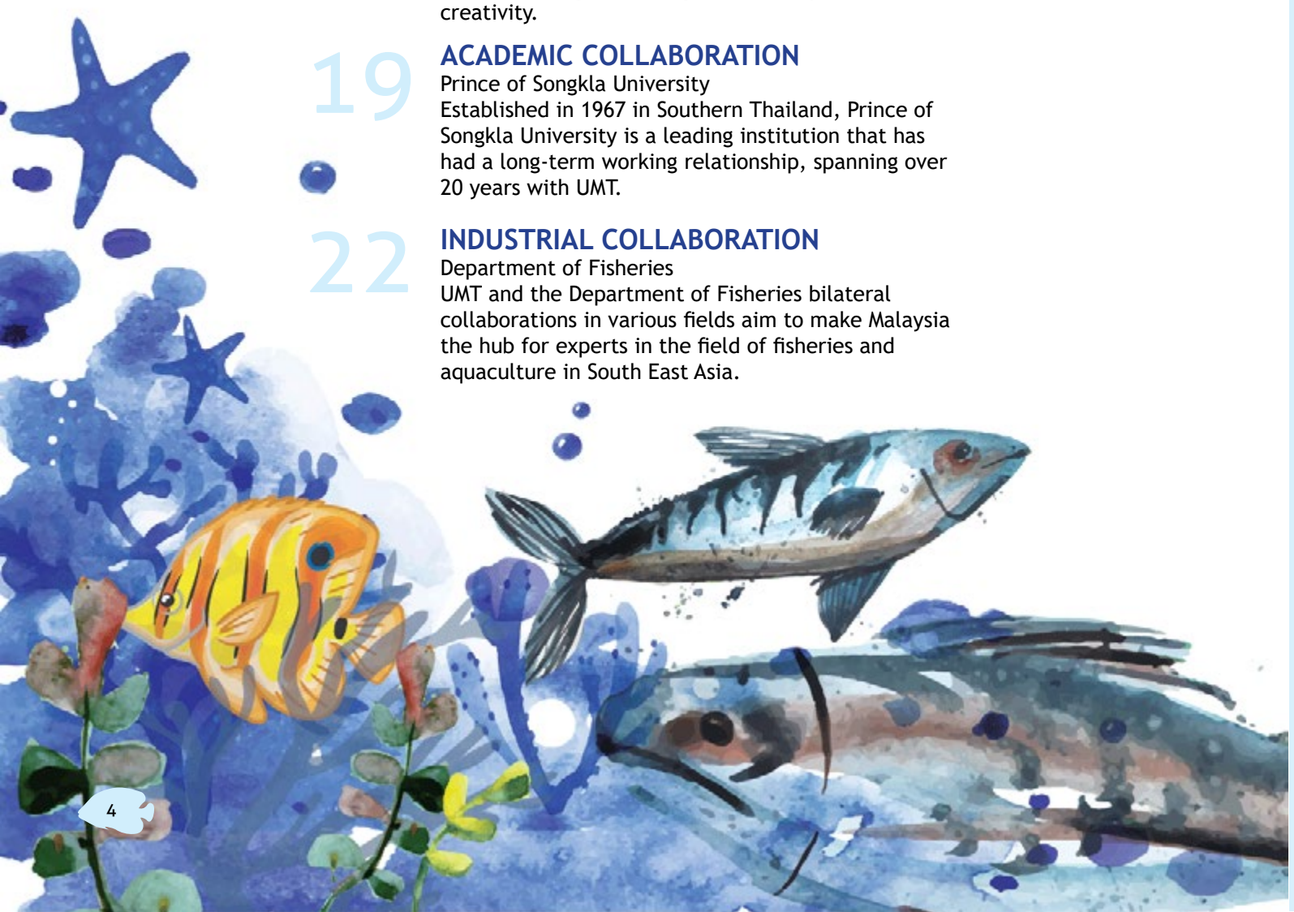
The challenges with regards to our limited food resources had made aquaculture even more important today and UMT's Institute of Tropical Aquaculture (AKUATROP) provides the link to turn science into action by working with local communities and enterprises to improve the technologies and methods used in the fishery industry as well as to better manage our fish resources.

At the international level, I am happy to see an article on ASEAN-Fisheries Education Network (ASEAN-FEN) which UMT is one of the core members. Its mission is to promote collaborative education, research and exchange in aquaculture and fisheries science and technology in the region and with the worldwide institutions, which works well with UMT's own objectives.

As we strive towards being a world-class institution of higher learning in both education and research, it is my hope that this edition of Voyages of Discovery can be a catalyst for further collaboration between UMT and other related players, both local and international.

Professor Dato' Dr. Nor Aieni
Binti Hj Mokhtar
Vice-Chancellor

Content



VOYAGES of DISCOVERY

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Fish For All

VOYAGES of
DISCOVERY
ABOUT UMT

UMT LEADING THE WAY IN FISHERIES AND AQUACULTURE

How It Started

In 1979, Universiti Putra Malaysia (UPM) set up a marine science station of the Faculty of Fisheries Science and Marine Science in Terengganu. This is how Universiti Malaysia Terengganu started. Initially, the centre was utilised by the third and fourth year students of the faculty. Eventually in 1996, after UPM went through a restructuring process, the entire Faculty of Fisheries Science and Marine Science was relocated here and the station became a branch campus and was renamed Universiti Putra Malaysia Terengganu (UPMT). The name was changed to Universiti Malaysia Terengganu in Feb 2007.

The strategic location of the campus, situated by the South China Sea enables it to become a conducive environment for research, training and information dissemination in the field of marine science and aquaculture.

Leading the way to excellence is The School of Fisheries and Aquaculture Sciences (FISHA) aiming to be the centre of academic excellence in fisheries, aquaculture, conservation ecology and aquatic environment. In line with their vision to be a marine-focused university, reputed nationally and respected globally, FISHA's current focus is divided into 4 categories – Education, Research, Knowledge Transfer and International Recognition.

BUILDING NETWORKS

“UMT is also becoming a host, the central point of reference because we recently won a European grant called the HORIZON 2020. We won the grant due to our involvement in ASEAN-FEN, we can use the grant to advance education in the field of fisheries and aquaculture, and this will provide great opportunities for young researchers in the region.”

One of the ways for them to gain International Recognition is through the ASEAN Fisheries Education Network (ASEAN-FEN), a consortium of universities in the South East Asia region, representing the fisheries and aquaculture oriented institutions. Currently, ASEAN-FEN comprises of 18 universities from 8 countries.

ASEAN-FEN plays an important role in exposing FISHA students and staff to international research practices and standards.

As co-chairman of ASEAN-FEN, the Dean for FISHA, Prof. Dr. Mazlan Abd. Ghaffar, is also actively involved in the initiatives implemented by the consortium. Speaking to the Voyages of Discovery team, he reveals, “With ASEAN-FEN, we have active collaborations in research as well as students and academic staff exchange amongst the universities. UMT is also becoming a host, the central point of reference because we recently won a European grant called the HORIZON 2020. We won the grant due to our involvement in ASEAN-FEN, we can use the grant to advance education in the field of fisheries and aquaculture, and this will provide great opportunities for young researchers in the region.”

Knowledge transfer is also vital in order for FISHA to stay relevant in their field of research and study. In 2014, UMT signed a memorandum of understanding with 5 universities, one each from Japan, Thailand, Indonesia, Philippines and Vietnam for a postgraduate programme on tropical fisheries with international linkage. This is the first time that UMT has embarked on a joint programme for a postgraduate Masters degree with foreign universities. This collaboration is between UMT and Kagoshima University (Japan), Sam Ratulangi University (Indonesia), Visayas University (Philippines), Kasetsart University (Thailand) and Nha Trang University (Vietnam).

“We developed the Sustainable Tropical Fisheries Masters programme here at UMT but it’s different from the other programmes. Under the International Linkage Programme (ILP), we have a common course bank so instead of just attending the courses at UMT, students can opt for elective courses at the other participating universities. Recently, 4 UMT students enrolled in the programme have actually attended summer courses at Kagoshima University. This is a new approach for us to connect with other universities,” Prof. Dr. Mazlan explains further.

Students enrolling in this programme will have to register at the university of their choice where they are required to take at least 10 credit hours, of which six will have to be taken at one of the five other universities.

ADVANCING AQUACULTURE

Due to UMT’s efforts and achievements in aquaculture, the government approved the establishment of the Institute of Tropical Aquaculture (AKUATROP) in 2004. Aquaculture can be viewed in 3 aspects – Food Security, Industry Empowerment and Sustainability.

In ensuring food security, feed development is vital. In 2015, Dr. Helena Khatoon from FISHA won gold medals at the 26th International and Innovation Exhibition (ITEX) in Kuala Lumpur. Her win was the result of her success in inventing the Dried Biofloc-Mixed Feed ‘LarvAid”, a 100% natural biofloc contained product free from aquaculture waste contamination. It is a premix shrimp larval feed which boosts the immunity and growth of shrimp post-larvae. This advancement will increase the survival rate of the shrimps. Another FISHA academician, Assoc. Prof. Dr. Yeong Yik Sung has also won gold medals in ITEX for his research in additive and novel feeds for shrimp aquaculture.

In terms of industry empowerment, AKUATROP has been involved with large scale tiger shrimp farming project in Gelang Patah, Johor. Continuous research with focus on crustacean culture is also being done by AKUATROP in order to address the issue of sustainability of mud crab and horseshoe crab farming in Malaysia.

AKUATROP has also established an Aquaculture Gallery in June 2015. At present, the gallery has 80 species of freshwater and marine aquaculture commercial fish, decorative fish, several types of prawns and crabs and a collection of Arowana fish. As well as functioning as a reference centre for students, the gallery also aims to create awareness and educate the public on aquaculture. To date, they have received more than 2,000 visitors and now the gallery has also become part of an edutourism package endorsed by the Ministry of Education.

"The mascot of FISHA, *Thunnus tonggol* or long tail tuna is the most important ingredient in the local culinary of the East Coast region"

VOYAGES of
DISCOVERY
ABOUT UMT

Forming An Identity

As Dean of FISHA, Prof. Dr.Mazlan has introduced new initiatives to strengthen the school's identity. One of it is by introducing the FISHA mascot, '*Thunnus tonggol* or longtail tuna'. The fish is also commonly known as "Ikan Tongkol". The fish was chosen as a mascot because of its importance as a food source especially for the local community of the East Coast of Malaysia (Terengganu and Kelantan). It is also featured in a lot of the local cuisine like "Nasi Dagang" and "Nasi Lemak".

Prof. Dr. Mazlan has also initiated the FISHA Magazine which aims to highlight the history, activities, events, research innovations and opportunity information for academicians and students of the school.

In his welcome note in the first issue of the magazine, Prof. Dr. Mazlan commented, "I believe this is an important platform for the school as we chart our transformation plans in moving towards the next level. I am sure such effort in publishing FISHA MAG will reveal the enormous potential and possibilities we have to offer at the research and industry levels."

Along with the magazine, Prof. Dr. Mazlan has also spearheaded the creation of the Directory of Expert for FISHA. The directory lists names of the academic staff that are eligible to supervise research students in different areas of expertise. The directory not only helps to distribute information about ongoing research and specialist subjects but it will also assist in creating a sense of belonging for the academicians.

With their ongoing projects and advancement in research, FISHA is undoubtedly heading in the right direction to become a dynamic and vibrant centre in the fisheries and aquaculture sectors in Malaysia.

FISHERIES EDUCATION THROUGH ASEAN-FEN

Aquaculture and fisheries are economic activities that are becoming more important, with the global market valued at some US$153 billion in 2014 and expected to grow annually by 5.5 per cent to reach US$235 billion by 2022.

Southeast Asia has the potential to be a key region for the production of aquaculture and fisheries and Universiti Malaysia Terengganu is at the forefront in supporting this endeavour through various research and studies conducted on campus and in collaboration with industry players as well as other institutions, both locally and abroad.

At the same time, it is a boon to have a regional support network of institutions to enhance the fisheries and aquaculture sector through education, research, and public outreach. This is the genesis for the formation of the ASEAN Fisheries Education Network (ASEAN-FEN).

Formed in 2011, it was the result of enduring friendship and professional respect between institutions in ASEAN that saw the network as a better platform to work together. The mission of ASEAN-FEN is to promote collaborations and partnerships between its members and other institutions worldwide. It consists of a team of university-based consortia representing institutions in Southeast Asia, where it supports and facilitates activities of educators, scientists, and agencies responding to various issues on fisheries and aquaculture.

The network is seen as a catalyst to promote opportunities for growth and development of aquaculture and fisheries, education, research and technology innovation in aquaculture and fisheries in ASEAN.

Members

The nine core members of ASEAN-FEN are UMT and Universiti Sains Malaysia of Malaysia, Can Tho University and Nong Lam University of Vietnam, Thailand's Kasetsart University, Prince of Songkla University and Rajamangala University of Technology Srivijaya, along with Universitas Air Langga and Universitas Brawijawa of Indonesia.

It has another nine associate institutional members from Malaysia, Vietnam, Thailand, Indonesia, The Philippines, Myanmar, Cambodia and Laos.

Being a core member of ASEAN-FEN, UMT is proud to have two representatives in the five-member board, namely Prof. Dr. Mazlan Abd Ghaffar as co-chairman and Assoc. Prof. Dr. Yeong Yik Sung who is the secretary.

"We have received many applications for new memberships, we are looking to admitting a few more members soon," explained Prof. Mazlan.

IFS2016 International Committee meeting at Can Tho University Meeting, Vietnam.

"WE WANT ASEAN-FEN TO BE A STRONG AND COHESIVE NETWORK IN FISHERIES EDUCATION AND RESEARCH ACTIVITIES,"

"We want ASEAN-FEN to be a strong and cohesive network in fisheries education and research activities," said Prof. Mazlan about the network.

Member institutions are now able to send their students and researchers to other member institutions for training and research collaboration activities.

The International Fisheries Symposium (IFS) has been the birthplace of ASEAN-FEN and Prof. Mazlan said that it is also an avenue for graduate students to interact with their ASEAN counterparts.

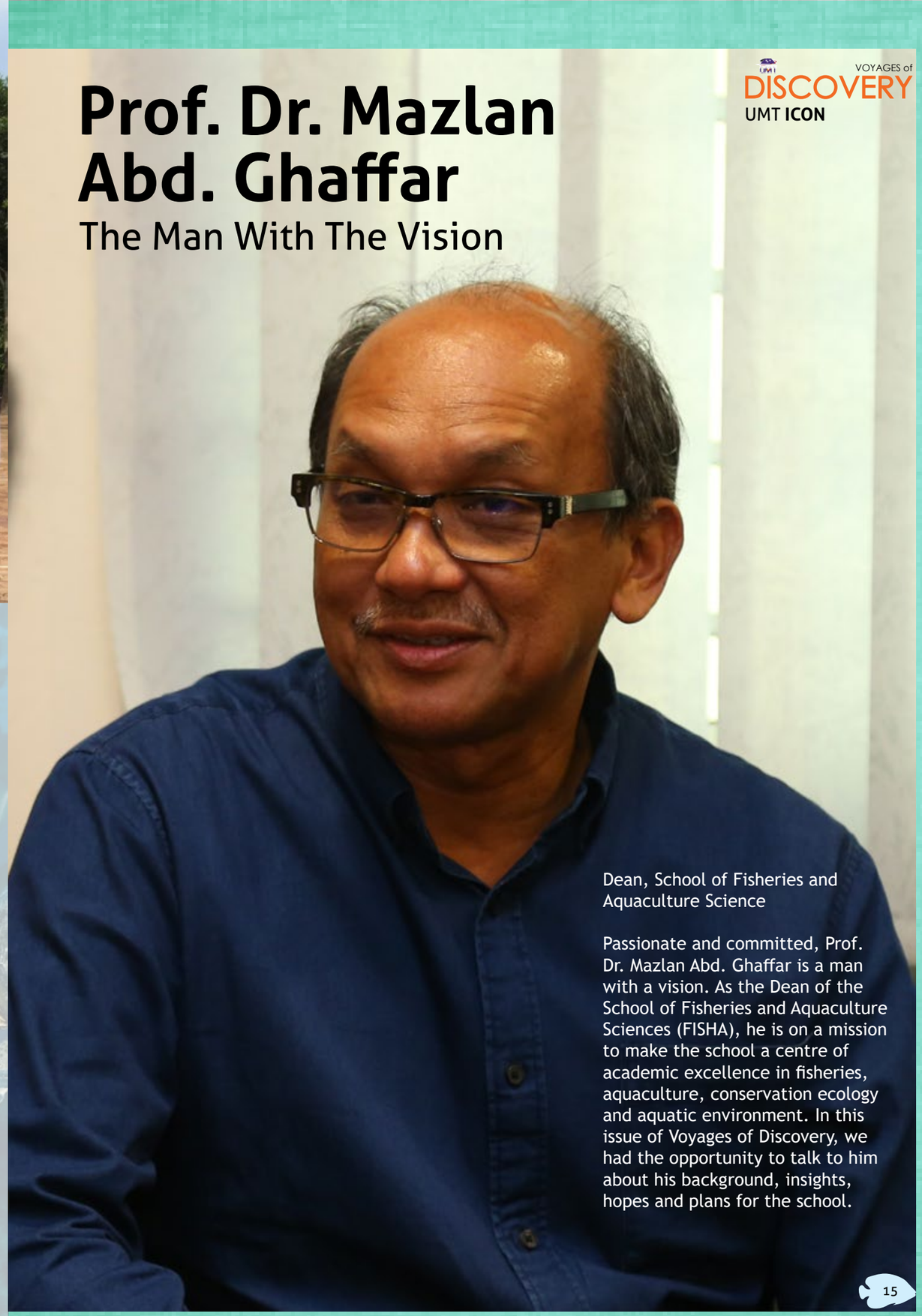
For this year, the sixth IFS2016 was recently held in Phu Quoc Island of Vietnam, from 31 October to 2 November, co-hosted by Can Tho University, Nong Lam University, Nha Trang University and Hue University of Agriculture and Forestry.

With the theme "Promoting Healthier Aquaculture and Fisheries for Food Safety and Security" the symposium highlighted the advanced innovation as well as addressing the newly emerged issues in aquaculture and fisheries for healthier aquatic food products. On the international front, Prof. Mazlan said that UMT, through ASEAN-FEN as a platform, had lead and coordinated an EU Fund Horizon 2020 with ASEAN-FEN members, with collaboration from Ghent University, Belgium.

With the new academic and research programmes in place, ASEAN-FEN would be looking at other potential collaboration to make the network as a preferred partner in fisheries-related research and study.

Prof. Dr. Mazlan Abd. Ghaffar

The Man With The Vision



Dean, School of Fisheries and Aquaculture Science

Passionate and committed, Prof. Dr. Mazlan Abd. Ghaffar is a man with a vision. As the Dean of the School of Fisheries and Aquaculture Sciences (FISHA), he is on a mission to make the school a centre of academic excellence in fisheries, aquaculture, conservation ecology and aquatic environment. In this issue of Voyages of Discovery, we had the opportunity to talk to him about his background, insights, hopes and plans for the school.

A LIFE LONG AMBITION

As far as he can remember, Prof. Dr. Mazlan Abd Ghaffar had always wanted a career in academia. “My ambition had always been to become a lecturer, after finishing my MCE (Malaysian Certificate Exam) in 1979, I was offered to do Agricultural Science at Universiti Pertanian Malaysia (UPM), I realised it wasn’t something that I was interested in, so after a year, I was promoted to the Faculty of Fisheries and Marine Science, and that was the beginning of my career in this field,” he reveals. His interest in the field can also be attributed to where he comes from because Prof. Dr. Mazlan hails from Terengganu, where the way of life of the community is closely linked to fishing and the sea. UMT was born when UPM set up the marine science station of the Faculty of Fisheries Science and Marine Science in Terengganu, the batch of students during this time was considered the first alumnis of UMT. Prof. Dr. Mazlan was one of them so he has actually been a part of UMT since the very beginning,

Discovering his passion in Fisheries and Marine Science, Prof. Dr. Mazlan excelled and upon graduation in 1985, he was given the opportunity to become a researcher. As a researcher, he and his colleagues managed to publish the first incidental research paper on the sea turtles of Terengganu. Being published in a high-impact journal (Biological Conservation) is quite an achievement and the paper is still being cited even up till now.

He then continued his MSc at the University of Newcastle, United Kingdom and upon his return in 1988, he joined Universiti Kebangsaan Malaysia (UKM) as a lecturer. He completed his PhD in the field of Fish Biology and Fisheries Sciences at the University of Wales in 2001. He came back to UKM, where he became an Associate Professor in the field of Fishery Sciences in 2004 and 4 years later, he was promoted as a Professor. Due to his vast experience and expertise in the field of fisheries, Prof. Dr. Mazlan was then appointed as Dean of Fisheries and Aquaculture Sciences (FISHA) at Universiti Malaysia Terengganu (UMT) in mid-2014.

“I was given a task to develop this school, and I saw that there was a wide gap between the senior and young lecturers in the school. Most of our lecturers are young and they need leadership and support from more senior lecturers to help them develop their research skills and knowledge as well as leadership. That was one of the reasons I came to UMT, I hope to be able to bridge this gap between them during my time here,” he adds.

Professor Mazlan with his collaborator, Professor Dr Seishi Kimura from the Fisheries Research Laboratory, Mie University looking at fish specimens.

Future Plans

When asked about his future plans for the school Prof. Dr. Mazlan replied, “My first publication was on the conservation of the turtles. My PhD was on fish resources, but for the past 10 years, I have been focusing on fish resilience to climate change in the coastal areas. I am planning to develop a full-scale validation lab at UMT so everyone can be involved in the research, I want UMT to be the national and regional referral centre for climate change, research in relation to their impact to marine biology, fisheries and aquaculture.”

Climate change has affected the sea in many ways to the whole fishing industry, even to the sea life that is part of our food resources. Prof. Dr. Mazlan hopes that with the creation of the validation lab, Malaysia will have their own national data and papers published in this field of research so it can act as supporting documents for the country’s climate change initiatives.

Prof Mazlan with students from Chittagong Veterinary And Agricultural Science University, Bangladesh.

"What I'm also planning to do is to re-develop the fisheries programmes in UMT, in a different way, in a different scenario, not the same as before. Why? Because the School of Fisheries has always been highly correlated to the fisherman. That is the wrong way of thinking. In fact, overseas, this field of research is very challenging and highly regarded. For example, in Japan, if you are a graduate from the Faculty of Fisheries, you gain the same respect as someone with a medical degree. This is because fishery plays an important part in their community, it has a close connection to their culture as well. Unfortunately, that is not the case in our society,"

Changing The Perception

Prof. Dr. Mazlan also believes that the overall perception towards the field of fisheries needs to change. "What I'm also planning to do is to re-develop the fisheries programmes in UMT, in a different way, in a different scenario, not the same as before. Why? Because the School of Fisheries has always been highly correlated to the fisherman. That is the wrong way of thinking. In fact, overseas, this field of research is very challenging and highly regarded. For example, in Japan, if you are a graduate from the Faculty of Fisheries, you gain the same respect as someone with a medical degree. This is because fishery plays an important part in their community, it has a close connection to their culture as well. Unfortunately, that is not the case in our society," he laments.

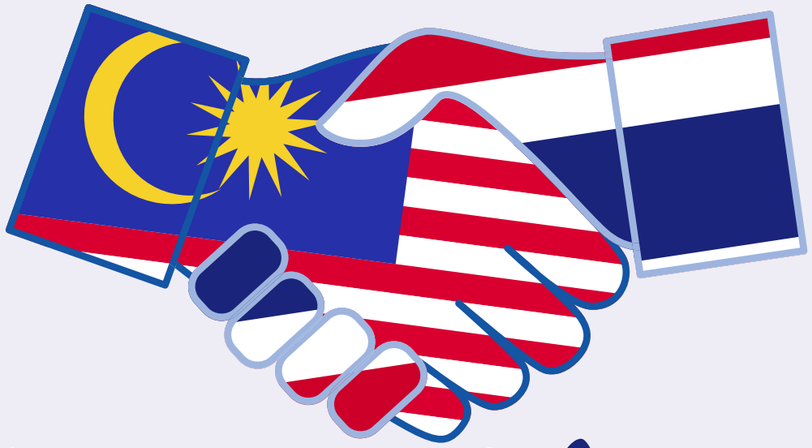
One of the ways Prof. Dr. Mazlan plans to achieve this is by introducing a new programme to the school, which is going to be called the Bachelor of Science in Fisheries Technology. Graduates from this programme will be equipped with the knowledge of engineering, building, construction and maintenance of fishing vessels as well as being well-versed in the electrical, electronic and mechanical aspects involved in fisheries. This degree programme will also be accredited and recognised by the Board of Engineers (BOE)/Board of Technology (BOT).

FiSHA lecturers captured memory at the front office of Pattani Inland Fisheries Research and Development Center with Assoc. Prof. Dr. Thumronk Amornsakun, lecturer Faculty of Science and Technology, PSU (3 from left), Mr. Ponpanom Promkaew, Director of Pattani Inland Fisheries Research and Development Center (four from left) and his co-workers.

WORKING TOGETHER TOWARDS A MUTUAL GOAL IN THE REGION

In their effort to expose their students and faculty to international research practices and knowledge transfer initiatives, Universiti Malaysia Terengganu (UMT) has collaborated with a number of universities from across the globe. The prestigious Prince of Songkla University (PSU) in Thailand is one of them. With a relationship spanning more than 20 years, the collaborations between these two universities seem to be growing stronger year by year.

Assoc. Prof. Dr Sukree bin Hajisamae, Dean of the Faculty of Science and Technology, Prince of Songkla University presenting a souvenir as a token of appreciation to Dr. Tan and her team.



A Long-Term Relationship

PSU and UMT have had a relationship going as far back as 1992. It came upon when alumni of UPMT (Universiti Pertanian Malaysia Terengganu) became part of the faculty at PSU and initiated the first collaboration.

International collaborations and cultural programs between the Bachelor of Science Aquaculture Programme from the School of Fisheries and Aquaculture Sciences (FISHA) at UMT and the Faculty of Science and Technology (SAT) at PSU have been held every year ever since then. Along with research presentations, students from both universities also take part in cultural performances and sports activities.

Recently, UMT and PSU have agreed to co-host the International Fisheries Symposium, a yearly symposium that focuses on advanced innovations and emerging issues in aquaculture and fisheries in the region.

The first UMT-PSU international staff sports day was also organized this year, to strengthen the relationship between both universities, not just academically but also socially. Each university take turns playing host for this event at every alternate year.

FISHA lecturers taking pictures at the Pattani Inland Fisheries Research and Development Centre. From left: Dr Sharifah Rahmah binti Syed Muhammad, Dr. Liew Hon Jung, Mr. Ponpanom Promkaew, Assoc. Prof. Dr. Thumronk Amornsakun, Dr. Tan Min Pau and the co-worker at the inland fisheries.

EXCHANGE OF KNOWLEDGE

Students of respective programs also visit the other university to participate in practical programs yearly. The one-week practical program is focused mainly on fishery and aquaculture-related fields. In Thailand, most of the activities will be based at the fishery building of PSU or the research unit at Sakom, while at UMT, the practical program will be based at AKUATROP.

An exchange of knowledge is also achieved when UMT would invite speakers from PSU to conduct lectures and talks with bachelor and postgraduate students at the university, PSU would also do the same with the experts from UMT. This collaboration is important for knowledge sharing among researchers within the region and it will also help the researchers to build a strong network with each other.

Recently, AKUATROP researchers from UMT had a chance to go to PSU to attend training on the subject of fish breeding. The researchers from both universities have joint supervision, joint publications and collaborations in research projects particularly on fish breeding and genetics. Researchers involved from the School of Fisheries and Aquaculture Sciences, UMT are namely Prof. Dr. Anuar Hassan, Dr. Shahreza Md. Sheriff and Dr. Tan Min Pau, who all have collaborated with AP. Dr. Thumronk Amornsakun from PSU. In addition, Dr. Shahrul Ismail from School of Ocean Engineering, UMT, also has research collaborations with Dr. Prawit Kongjan and Dr. Rattana Jariyaboon from PSU.

FiSHA (UMT) lecturers were invited to present their research findings at Faculty of Science and Technology, Prince of Songkla University, Pattani Campus. From left: Dr Sharifah Rahmah binti Syed Muhammad, Dr. Liew Hon Jung and Dr. Tan Min Pau.

UPCOMING PLANS

UMT and PSU are also paving the road to introduce a double degree program (DDP) for a Master Degree in the Fishery and Functional Food and Nutrition program at their universities. This move is a great step towards producing highly-qualified students as graduates from this program will be awarded a double degree program certified by both institutions.

UMT and PSU are also working on implementing a mobility program with credit transfer through the ASEAN International Mobility for Students (AIMS) program. The program is opened for students studying for their Bachelor Degree. To be eligible for credit transfer, students are required to take a minimum of 18 credit hours for one semester from the host university.

This year, 15 third-year students from the BSc. In Agrotechnology (Aquaculture) program in UMT have participated in Summer Camp 2016 at PSU, an outbound mobility program with credit transfer for public universities in Malaysia funded by the Ministry of Higher Education (MOHE).

The continuous collaborative efforts between UMT and PSU have resulted in a partnership that has been beneficial for both universities. Collaborations help to strengthen networks, improve knowledge transfer and encourage interaction between institutions in South East Asia. This will keep UMT on the forefront of research and technology especially in the field of fisheries and aquaculture.

DEVELOPING FISHERIES TOGETHER

UMT and The Department of Fisheries Malaysia Partnering Together to Bring the Fishery Industry to Greater Heights

Universiti Malaysia Terengganu (UMT) is one of the leading institutions spearheading research and development in the field of fisheries and aquaculture sciences. Their expertise in the subject has initiated collaborations with The Department of Fisheries Malaysia (DOF), this affiliation between the two has been cultivated since the establishment of UMT in 1997.

FORGING A WORKING RELATIONSHIP

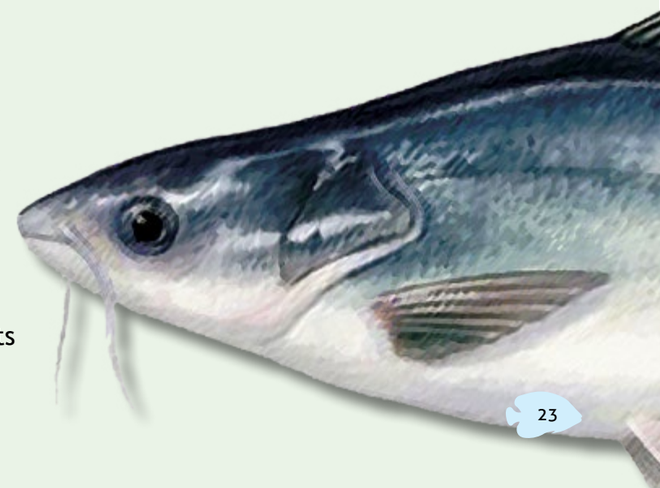
Officially, DOF and UMT has an MOU signed on 2nd May 2007, to collaborate and share resources and expertise to develop and optimise research, development and management of capture fisheries, aquaculture, marine sciences, post-harvest technology, biotechnology, fishing community development and other relevant technology.

DOF and UMT have implemented several collaborative projects, amongst them are:

- The Development of Budu
- Purification and Characterization of digestive Proteases from Cobia and Patin
- Production of Protein Hydrolisate from Cobia, Patin and Catfish
- Antimicrobial and antioxidant effects of organic salts and spices on the refrigerated Tilapia

Two ongoing collaborative studies between DOF and UMT are also currently being conducted, which are the Oceanography in the Artificial Reef Areas (2015-2016) and the Nationwide Resource Surveys (2014-2015).

DOF and UMT are also working together on a coral propagation project in Pulau Bidong.



ACHIEVING MUTUAL BENEFITS

Speaking to Voyages of Discovery, Director of DOF, YBhg. Datuk Haji Ismail bin Abu Hassan revealed, “Universities do more academic research while we at DOF do more applied research, we need to combine the two to achieve the best results. For example, we have data but to analyse it we need expert researchers which is what UMT can provide.”

Through collaborations with UMT, DOF hopes to co-evolve knowledge capital and avoid duplications, exploit synergies and complementaries of scientific and technological capabilities, share costs of R&D, co-publish scientific papers and increase the capability to produce new research products and patents.

DOF also wants to achieve industrial link research, efficiency in national innovation systems and efficient use of national funds. DOF has also been providing industrial placements for students from UMT. So far, 500 practical students have been attached in the Biosecurity Lab and the Fisheries Research Institute (FRI). Recently, DOF has also collaborated with UMT through FRI in a nationwide resource survey, where many researchers from UMT participated in the data collection in the field of Demersal Survey, especially on board DOF’s research vessel K.K SENANGIN2 and the M.V SEAFDEC2 of SEAFDEC/TD Bangkok. The researchers were able to conduct important biological as well as oceanographic studies to compliment DOF’s main studies. Many of the UMT researchers also benefitted from the collaboration by using the studies they conducted as part of their degree requirements.

In terms of capacity building, 6 DOF researchers have obtained MSc while 2 have obtained PhD from UMT. Currently, 2 researchers are pursuing their PhD with a research project carried out between FRI and UMT. 15 scientific papers from the postgraduate projects have also been published in reputable journals, this has helped in increasing the status and contribution of both UMT and FRI in the fisheries research sector.

DOF and UMT have also jointly organised conferences and symposiums at the national level. This includes the International Fisheries Symposium held in December 2015 at Penang, Malaysia.

FUTURE PLANS

In the future, in view of the current economic climate, DOF foresees that more smart partnership collaborative works need to be implemented between DOF and their counterparts.

In capture fisheries, Malaysia needs to comply with the TPP Agreement on fish stock assessments, this requires more research and management projects to be done. UMT as one of the main university providing courses in the field of capture fisheries would be an important partner for DOF, not only in terms of research and studies but also as a platform for DOF’s personnel to develop and upgrade their skill and knowledge in the field.

VOYAGES of DISCOVERY RESEARCH & DEVELOPMENT

Changing The Mindset

INTRODUCING BEE FARMING TO KUALA BESUT FISHER FOLKS.

Transforming Fishermen To Farmers

Universiti Malaysia Terengganu (UMT) has always prided itself as an institution that values the community around them. Recently, UMT was involved in a project with the fishing community in Kuala Besut. We talked with Project Leader, Dr. Nazli Aziz to find out more about the benefits, effects and developments brought upon by the social initiatives implemented in the project.

Funded by the Ministry of Education (MOE) under the National Blue Ocean Strategy 4 (NBOS4), Dr. Nazli ‘s project is about uplifting and enhancing quality of life amongst a B40 group of fishing community in Kuala Besut. Bee farming is relatively new in Kuala Besut. If the project is successful, it could be a great additional income generator for the community.

“This project is divided into two phases - the software and the hardware of the social innovation. We began the phase-one of the project in February 2016. Hopefully, we could kick-off the phase-two soon, in January 2017, once we fulfil the standard rules and regulations of the land used there. However, we have already selected 10 stakeholders as a pioneer group to generate this project and another 15 persons as the trainees. They have been given basic training of bee farming twice so far,” Dr. Nazli explains.

The software he mentioned refers to social innovation activities that help to foster and nurture the target group so they can practice a sustainable life-style through long-life learning education and mindset change. Dr. Nazli strongly believes that investing in these exercises is vital as knowledge is a powerful tool for creating and establishing innovative communities in the long run. They have carried out activities such as mind therapy, mentor-mentee, education and enhancing family side-income and creating a saving culture. The stakeholders for these activities are the wives and children of fishermen in Kuala Besut.

The hardware refers to the actual bee farming. Dr. Nazli’s team use the hardware terminology as the project is meant to increase each participant’s income by about 50 per cent within a year. The economic impacts to the households are immediate. Stakeholders for this project are the fishermen themselves.

When asked about what he aims to achieve with this project, Dr. Nazli answered, “Our aim is to improve the quality of life amongst our participants in the long-term. We have 135 participants from five villages – Kg. Pengkalan Atap, Kg. Alor Pisang, Kg. Seri Kemunting, Kg. Gong Tengah and Kg. Nail. To achieve the aim, we have three objectives. First is to increase the socio-economic aspects of the community involved. Second is to establish and strengthen collaboration and networking between UMT and the community as well as UMT and related government/private agencies. Third is to foster leadership skills and nurture volunteerism amongst the stakeholders. The aim and all three objectives are intertwined to bring better impacts to the community.”

Establishing The Connection

To strengthen the ties and develop a relationship between UMT and the fishing community, Dr. Nazli has organised various activities to gain the trust and support from the stakeholders involved.

"I am very fortunate to have a wonderful team who have been so dedicated and committed to the project. We have 12 researchers from PPPSE, PPPM and PPSTM. A few lecturers from PPPSE, PPPPM, PPAL and PPIMG have also facilitated English, Mathematics and performing arts programmes in the schools. I would like to thank Sek. Men. Keb. Kuala Besut, Sek. Keb. Kuala Besut, Sek. Keb. Kg. Nail for their support as well as the JKKKs of all the kampungs involved. Malaysia Biotech Corporation and Flora Bee Hive Sdn. Bhd are our partners to oversee the bee farming project. Since the project started, 230 undergraduate students and 20 postgraduate students of PPPSE, mainly from the Policy and Social Environment Programme have been involved in various activities. Undergraduates of PPPPM (50 students) and PPSTM (10 students) have also participated as volunteers," Dr. Nazli adds.

CREATING IMPACT

Dr. Nazli hopes to establish and strengthen academic involvement of UMT in social innovation. He wants to create a sustainable innovative community as well as to support those who have been working with the B40 group to be able to share, learn and contribute to the community's development.

"I reckon, this Kuala Besut project, amongst other innovation projects by UMT is the step for us to broaden the networks in establishing the innovative community research profile especially on the coastal community of the B40 group. UMT can lead this and be the centre of excellence of social innovation for the coastal community. We hope that this project becomes a catalyst in stimulating and advancing social innovation. This can be undertaken through learning from works done by emerging researchers and academics as well as government agencies and business/ industry players in the market. UMT can be the centre for all social innovation projects for us to critically reflect and assess our own works in transforming the community.

As for the community, we stress more on long term impacts. It is very important to put the right software to make sure that they are sustainable. We want our main stakeholders to be able to plan and manage their socio-economic with a long term perspective, positive behaviour change, focusing on sustainable implementation and lifestyle. Once the phase-two starts, we hope the stakeholders would be able to manage their finance and project better with the support from their 'skilled' family members that we have trained in phase-one," Dr. Nazli commented.

The Importance Of Social Innovation

VOYAGES of DISCOVERY
RESEARCH & DEVELOPMENT

Dr. Nazli is confident that the community will benefit greatly from social innovation. Transforming and introducing new things to a community can be a daunting task but with the right knowledge and tools, it can produce excellent results.

Dr. Nazli ends the interview with a commentary on how changing the mindset of the community is the first step in ensuring success with social innovation, “Social innovation should not always be about quantifying the outputs or which quintessentially are human being activities. We can provide them with the best tools or machines or best invention but it won’t work if the subsidy mentality or inferiority complex amongst them is not being tackled or solved first. Social innovation should not always be about quantifying the outputs or impacts in dollars-and-cents. We are talking about changing a mind-set or shifting a life-style to create a sustainability community. Because it involves many stakeholders, social innovation is complex. It involves so many parties to ensure it would be fruitful. Dealing with people requires special skills. Engagement, immersion and dissemination of knowledge and information are vital for innovation to happen in any communities.”

UNDERSTANDING FISH'S ADAPTABILITY IN AN EVERCHANGING ENVIRONMENT

Our environment has been impacted greatly by the rapid development that Malaysia has gone through the years. Our seas and marine life have not been immuned to these adverse effects. Realising the importance of research in this field, Dr. Liew Hon Jung uses his expertise in fish physiology to help us understand and tackle the issue that is caused by change and pollution in our seas especially on how it influence the fishes.

EXPOSED TO THE ELEMENTS

"My current research papers are mainly focused on the interactions of fishes with their surrounding environment at all levels from molecular to responses of organismal, particularly focusing on the "sublethal" effects or the interaction impact of natural environmental factors such as temperature, dissolve oxygen limit, water chemistry, swimming, feeding, acidification and anthropogenic pollutants (ammonia & cortisol) on organismal function, their adaptation, metabolic compensation strategies and/or evolution by which fishes confront to changing environment in both captive or wild conditions, " Dr. Liew explains.

His countless research has resulted in a number of interesting findings. A couple of his research papers delve into how fish adapt when they are exposed to different elements.

One of the findings shows how fish are able to upregulate ionoregulatory activities from gill to kidney when exposed to copper. Dr. Liew also noted that in the hypoxia condition, his team also found that carp are able to maintain relatively low aerobic metabolism even though oxygen was limited. Exposure to sublethal thermal and ammonia stress seem to enable the common carp to improve their tolerance capability.

Dr. Liew also did a research to find out how specific species of fish to react to ammonia toxicity. "In this study, we screened the sensitivity of teleost, rainbow trout, common carp and goldfish when confronted with ammonia toxicity. Our study found that rainbow trout is the most sensitive followed by common carp. Goldfish exhibited better tolerance plasticity toward sublethal ammonia exposure. In this study, we also found that the specific ammonia transporter gene namely "Rhesus glycoprotein: Rhbg & Rhcg" were upregulated among the species to facilitate ammonia excretion as ammonia self-intoxication. Thus, at sublethal ammonia exposure, fish may be able to adapt with and get to recover the metabolic needs at a basal level," Dr. Liew shares.

VOYAGES of DISCOVERY
RESEARCH PAPER

Although Dr. Liew has done most of his research at the Institute of Tropical Aquaculture (AKUATROP), School of Fisheries and Aquaculture (FISHA) and Centre Laboratory of Univerisiti Malaysia Terengganu (UMT), he has also gotten the opportunity to do some research at the Bamfield Marine Science Center in Vancouver, Canada. His research there is in collaboration with Prof. Chris M Wood and his team focusing on "the role of the gills and the gastrointestinal tract in ionic, acid-base, and nitrogenous metabolite regulation in the Pacific dogfish shark, *Squalus acanthias*". When asked about his experience at Bamfield, Dr. Liew recounts," Bamfield is a place where you can gain experience on how to set-up and design your experiments and more importantly you get to interact with well-known scientists from all over the world. At Bamfield, one of the most indescribable aspects is the amazing natural beauty of the West Pacific Ocean view. This year we were lucky enough to encounter a group of whales and sea lions swimming near to our laboratory, saying 'hello' to us whilst we were busy with our experiments."

In the past, Dr. Liew has also conducted experiments together with Prof. Gudrun De Boeck at Systemic Physiological and Ecotoxicological Research (SPHERE) laboratory at University of Antwerp, Belgium.

Hopes For The Future

VOYAGES of
DISCOVERY
RESEARCH PAPER

Dr. Liew also stresses the significance of fundamentals in comprehending the subject matter. “Quality of sciences shouldn’t be measured by quantity but the merit of quality. And fundamental research is the key to success. As a researcher studying fish, we should “think like a fish” to understand them better,” he concludes.

Dr. Liew believes that further research is extremely needed and essential in order to get a clearer idea of the fish’s metabolic needs and their survival ability in this constantly changing environment. Commenting on how knowledge on fish adaptability can help aquaculture and fisheries, he said, “Based on research findings to date, I may highlight that the world is changing, the environment that we are living with is changing day by day. In order to live in this environment, fishes must compensate and re-strategize their metabolic needs in order to continue to survive. By understanding their metabolic needs, we can model more precisely the needs (conditions, nutrients or essential elements) for specific-species requirement and this knowledge can help aquaculturist to improve their management practices. We can also use this information to conserve our species by creating protection areas or closed seasons for fishing. This not only will improve to restore population, but also is able to increase our environment quality.”

Dr. Liew also stresses the significance of fundamentals in comprehending the subject matter. “Quality of sciences shouldn’t be measured by quantity but the merit of quality. And fundamental research is the key to success. As a researcher studying fish, we should “think like a fish” to understand them better,” he concludes.

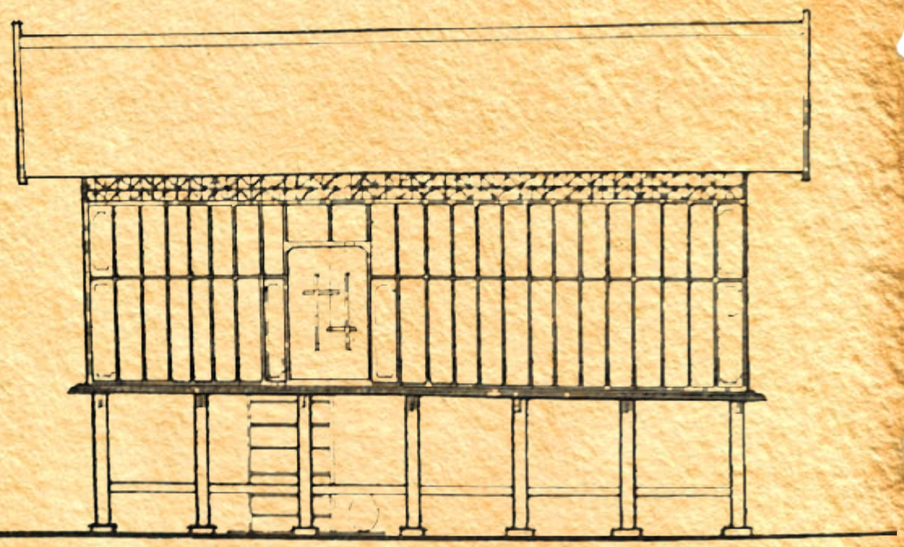
Traditional Terengganu Houses

I visited a friend who is building her house recently. She has been living in Terengganu for over a decade and explained that the new abode will be a fusion between a traditional Terengganu house style and contemporary features.

It made me realised that I am more familiar with the Minangkabau house with its dramatic curved roofs and even the long houses of Sabah and Sarawak but have very little awareness of the traditional Terengganu houses.

VOYAGES of
DISCOVERY
ABOUT TERENGGANU

Influences



One strong feature of the traditional Terengganu houses is the practice of raising the buildings on pillars several feet above the ground. This feature is prevalent across Asia, from India to China and the Malay Archipelago. It is a practical design to not only escape floods during the monsoon season, but to avoid ground dampness as well as provide security from wild animals.

For a Terengganu fisherman, he could also keep his perahu (fishing boat) along with the rest of his tools of trade under the house.

Another feature of the traditional Terengganu houses is the tiered roof of singgora tiles, which is also found in Cambodian and Thai house designs. It is one of the legacies of Terengganu being part of the Malay kingdom of Langkasuka from the 2nd to 16th century.

A visit to the Terengganu State Museum in Losong provided more information on these houses, such as the influences of Terengganu perahu decorative designs in the houses, with their high pointed gables resembling the gracious, curved neck of the egret. I also found out that one of the styles has Dutch architecural influences. A similar style can be found in houses in Melaka and Johor, I was told.

RUMAH TIANG ENAM

It was said that Terengganu folk would usually describe the size of their houses by the number of posts holding up the roof structure. The two main types of such houses are Rumah Tiang Enam and the bigger Rumah Tiang Dua Belas. These are named after the number of posts they each have extending from their foundation to the roof.

Rumah Tiang Enam is the smaller of the two, with six posts, and is also known as Rumah Bujang. It is usually built without an open verandah and has a more limited space compared to the bigger Rumah Tiang Dua Belas with designs that are considered plain, indicating the economic and social status of its inhabitants.

RUMAH TIANG DUA BELAS

For the Rumah Tiang Dua Belas, the main house, known as rumah ibu, is normally used for social ceremonies and serves as the sleeping quarters of unmarried members of the house. Guests are often entertained in the open verandah at the front of the 12-posted house, which is normally the territory of the menfolk.

Intricate carvings on the walls and doors are usually found on such houses to mark the position of their inhabitants in the community.

RUMAH TELE

The word Tele means the portion at the back of a house specially built for womenfolk that is connected to the palace. One of such houses is the Rumah Tele in the compound of Istana Maziah in Kuala Terengganu, built circa 1888 by the late Sultan Zainal Abidin III.

Indeed, I recall an acquaintance of Terengganu royalty who grew up in the said Rumah Tele where the female relatives resided. However, this particular Rumah Tele is now located at the Terengganu State Museum where visitors can marvel at the decorative elements found on the walls and doors, influenced by nature as well as Islamic teachings.

RUMAH LIMAS BUNGKUS

Another type of traditional house found in Terengganu is the Rumah Limas Bungkus. The distinctive five-roofed feature of the house consists of a straight central ridge with four shorter ridges projecting down to the four edges of the roof. The edging immediately beneath the roofing is decorated with wooden carvings.

Many Rumah Limas Bungkus can be found in the Besut district in the northern part of Terengganu. They are also known as Rumah Belanda or Dutch House, to indicate the origin of the house design.

One famous palace with features of a Rumah Limas Bungkus is the Istana Tengku Long. Originally built in Besut, the palace has since moved to the State Museum compound.

The museum is definitely a good starting point for an introduction to traditional Terengganu houses. From the main building, a slight walk towards the river will bring you to traditional houses that were moved from their original locations and preserved to maintain their conditions for visitors to enjoy.

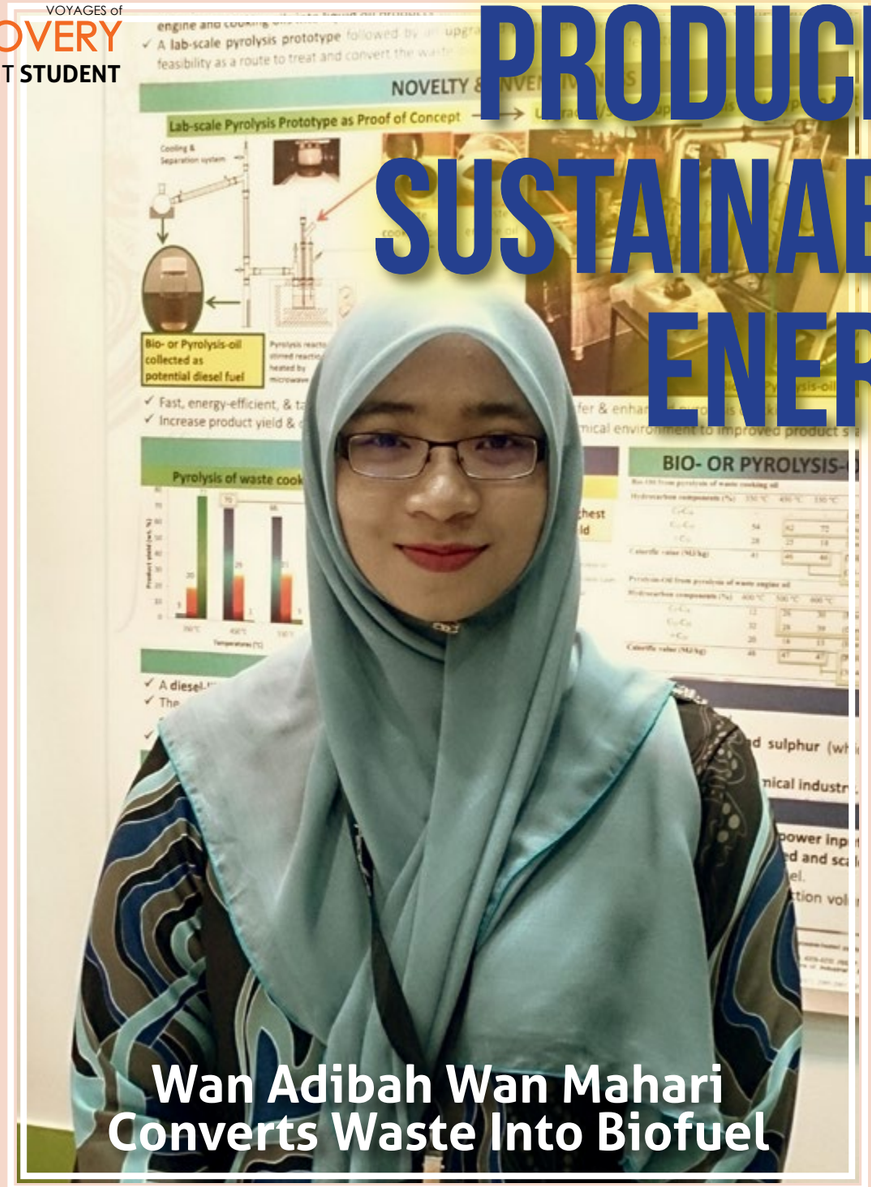
VOYAGES of DISCOVERY

"We should think like a fish to understand them better"–

Dr. Liew Hon Jung

VOYAGES of DISCOVERY

PRODUCING SUSTAINABLE ENERGY



Wan Adibah Wan Mahari Converts Waste Into Biofuel

Universiti Malaysia Terengganu (UMT) has been known to be an institution that has successfully produced highly-qualified graduates in their respective field of study. Graduates from UMT have won numerous awards for their breakthrough research in science and technology. One of the award-winning students is PhD student Wan Adibah Wan Mahari, who is currently undertaking her doctoral study in Chemical Technology under the supervision of Dr. Su Shiung Lam.

After finishing her matriculation at Pahang Matriculation College, she continued her studies at UMT. She graduated with a Bachelor of Technology in Environmental Technology degree in 2012. This was followed by her Masters of Science (Chemical Technology) degree, which she completed in 2015 and now she is currently doing her PhD in the same field.

VOYAGES of DISCOVERY
EXCELLENT STUDENT

AWARD-WINNING

During her Masters studies, as a Graduate Research Assistant, she successfully produced bio fuel through Mic-Pyro: an innovative pyrolysis sytem, which converts waste oil to diesel-like fuel. Her research in this field garnered a Bronze Medal award from Pencipta 2015. She was also recently awarded with a Gold Medal Award at the 27th International Invention, Innovation & Technology Exhibition 2016 (ITEX2016).

THRIVING AT UMT

Wan Adibah decided to stay on at UMT to do her PhD because she achieved great results and promising findings when she was doing her Masters project at the central lab of the university. Her success spurned her interest to delve into the research matter in more detail. With encouragement from her supervisor, Dr. Su Shiung Lam, she opts to pursue her PhD in her chosen subject as soon as she finished her Masters.

"I decided to do my PhD in Chemical Technology, focusing on converting waste into biofuel because I feel that we need to reduce waste significantly. Our landfills are filled up, converting waste into a useable product will not only help to manage our waste more efficiently but it will also be beneficial for our environment," said Wan Adibah.

Through her ongoing research on producing biofuel from waste, Wan Adibah is paving the way for advancements in alternative energy. Biofuel produces less greenhouse gases overall compared to fossil fuels and it also allows better fuel security for countries with no oil reserves of their own. Besides achieving academic excellence in her field of study, Wan Adibah's research will also contribute greatly to reducing waste and advancing the usage of sustainable energy in this region.

ADVANCING MALAYSIAN AQUACULTURE

A lecturer in the field of Aquaculture whose work on the Aquatic Invertebrate Culture and Biology is making waves at home and abroad

VOYAGES of
DISCOVERY
YOUNG ACADEMICIAN

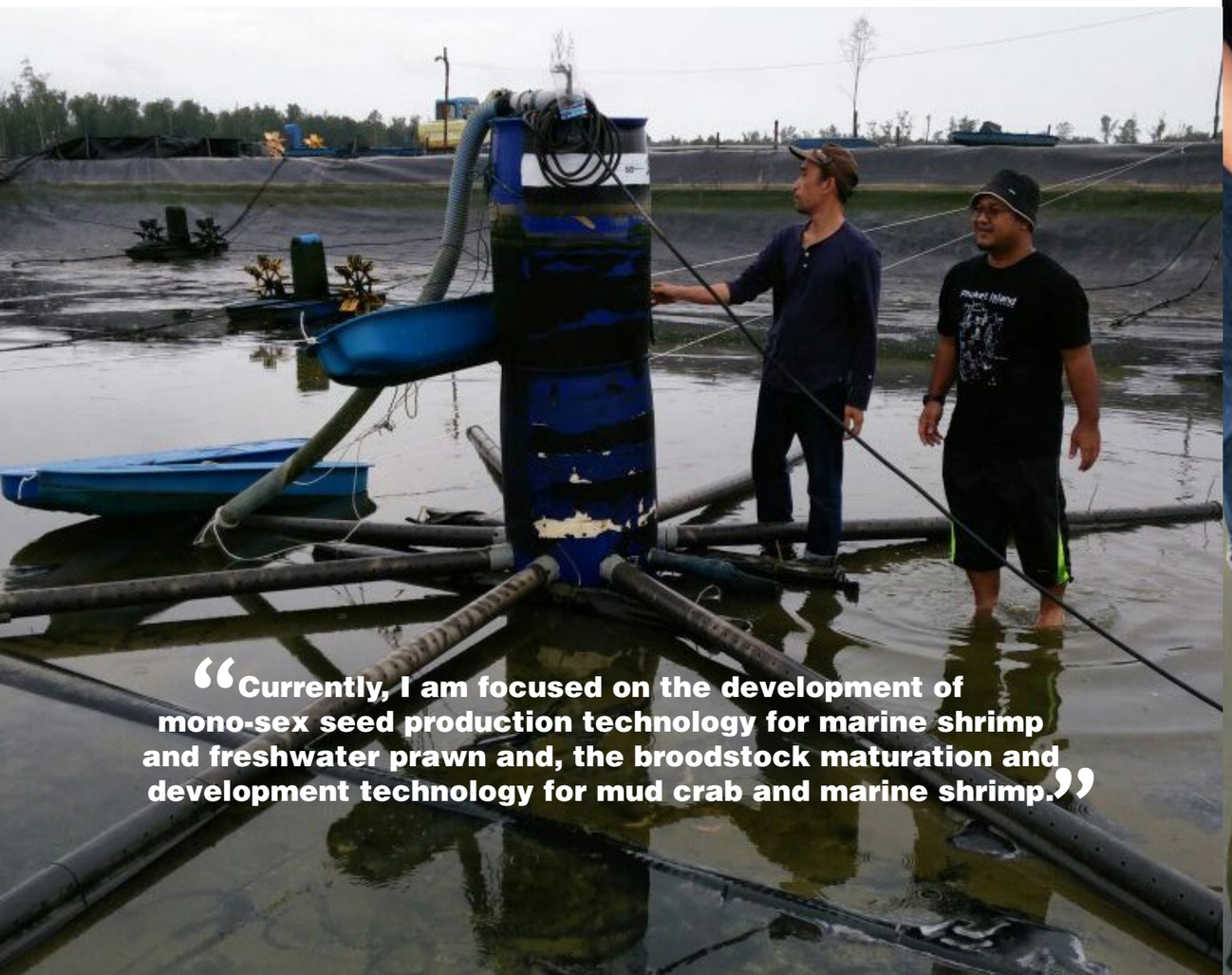
A SPECIALIST IN HIS FIELD

An expert in Aquaculture, Prof. Dr. Mhd Ikhwanuddin Abdullah has accomplished huge success in his field of research in crustacean reproduction and culture. In this issue, Voyages of Discovery got a chance to address several questions to the dedicated academician, to find out more about his background, current research work and future plans.

From Officer To Professor

Even as a teenager, Prof. Dr. Mhd. Ikhwanuddin Abdullah had always found the field of animal sciences fascinating. His keen interest in the subject encouraged him to further his studies at Universiti Putra Malaysia (UPM) and he graduated with a degree in Fisheries Sciences in 1991. He then continued his education at Universiti Malaysia Sarawak (UNIMAS), gaining a Masters in Aquatic Science in 2002 and a PhD in Marine Biology six years later.

Before becoming an academician, Prof. Dr. Ikhwanuddin was a Fisheries Officer at the Sarawak Fisheries Department for 16 years. Realising his potential in the field of research and academia, the former Director of the Institute of Tropical Aquaculture, Prof. Emeritus Dr. Faizal Mohd Sharoum offered him to join Universiti Malaysia Terengganu (UMT) in 2008. His academic career flourished and he was appointed as Professor at UMT in June 2016.



“Currently, I am focused on the development of mono-sex seed production technology for marine shrimp and freshwater prawn and, the broodstock maturation and development technology for mud crab and marine shrimp.”

VOYAGES of DISCOVERY
YOUNG ACADEMICIAN

Culturing Crustaceans

Prof. Dr. ikhwanuddin specialised field is Aquaculture. When asked how UMT has helped him in his field of research, Prof. Dr. Ikhwanuddin answered, ”UMT has provided me with the platform and opportunity to continue my previous works at Sarawak Fisheries Department on crustacean reproduction (hatchery technology) and culture (larvae rearing & grow-out technology) at the Institute of Tropical Aquaculture, UMT. My research in crustacean reproduction and culture are mostly related to the mud crab, blue swimming crab, marine shrimp and freshwater prawns. Currently, I am focused on the development of mono-sex seed production technology for marine shrimp and freshwater prawn and, the broodstock maturation and development technology for mud crab and marine shrimp.”

Prof. Dr. Ikhwanuddin’s hard work and determination has garnered remarkable results. He has achieved great advancements in tiger shrimp seed technology using a chromosome manipulation technique to produce all female and fast-growth shrimp known as ‘Super Female Monodon’. His success has prompted UMT’s Institute of Tropical Aquaculture (AKUATROP) to embark on a large-scale tiger shrimp farming project in Gelang Patah, Johor. The project is expected to yield 28 tonnes of tiger shrimps valued at RM1.7 million after three months. He achieved this by using two methods – triploid and gynogenesis, resulting in 80 to 90 per cent of the shrimps hatched being female. This ensures greater yield as female shrimps have a faster growth rate compared to the males. Even more impressive is the fact that the shrimps hatched were also disease-free.

Unsustainable aquaculture negatively impacts the oceans, food supplies and food security of coastal developing countries. Prof. Dr. Ikhwanuddin believes that his research could improve the situation, by creating better technology for aquaculture in the region.

“The information of reproductive biology and culture technology can offer better understanding in grow out and seed technologies to assist towards sustainable management strategies of aquaculture productions. I hope that my research would help to further develop and ensure the sustainability of the crustacean aquaculture industries in Malaysia especially and within South East Asia,” he adds.

MOVING FORWARD

Not one to rest on his laurels, Prof. Dr. Ikhwanuddin's upcoming projects includes advancing and developing the hatchery technology of mud crabs. Fuelled by his success in tiger shrimp seed technology, he is also involved in the development of the first Marine Shrimp (Tiger Shrimp) Broodstock Manipulation Centre (BMC) in Malaysia. "This development is a collaborative effort with the local industries and the Department of Fisheries Malaysia. The success of BMC is expected to be one of the major factors to ensure the sustainability of the tiger shrimp farming industry in Malaysia," he concludes.

Although Prof. Dr. Ikhwanuddin has accomplished a lot already, his continued triumph in the field has made him one of the leading specialists in Aquaculture in this region. Focused and diligent, the future is bright for the conscientious academician as he is definitely on the right path to achieve even more success in his career.

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