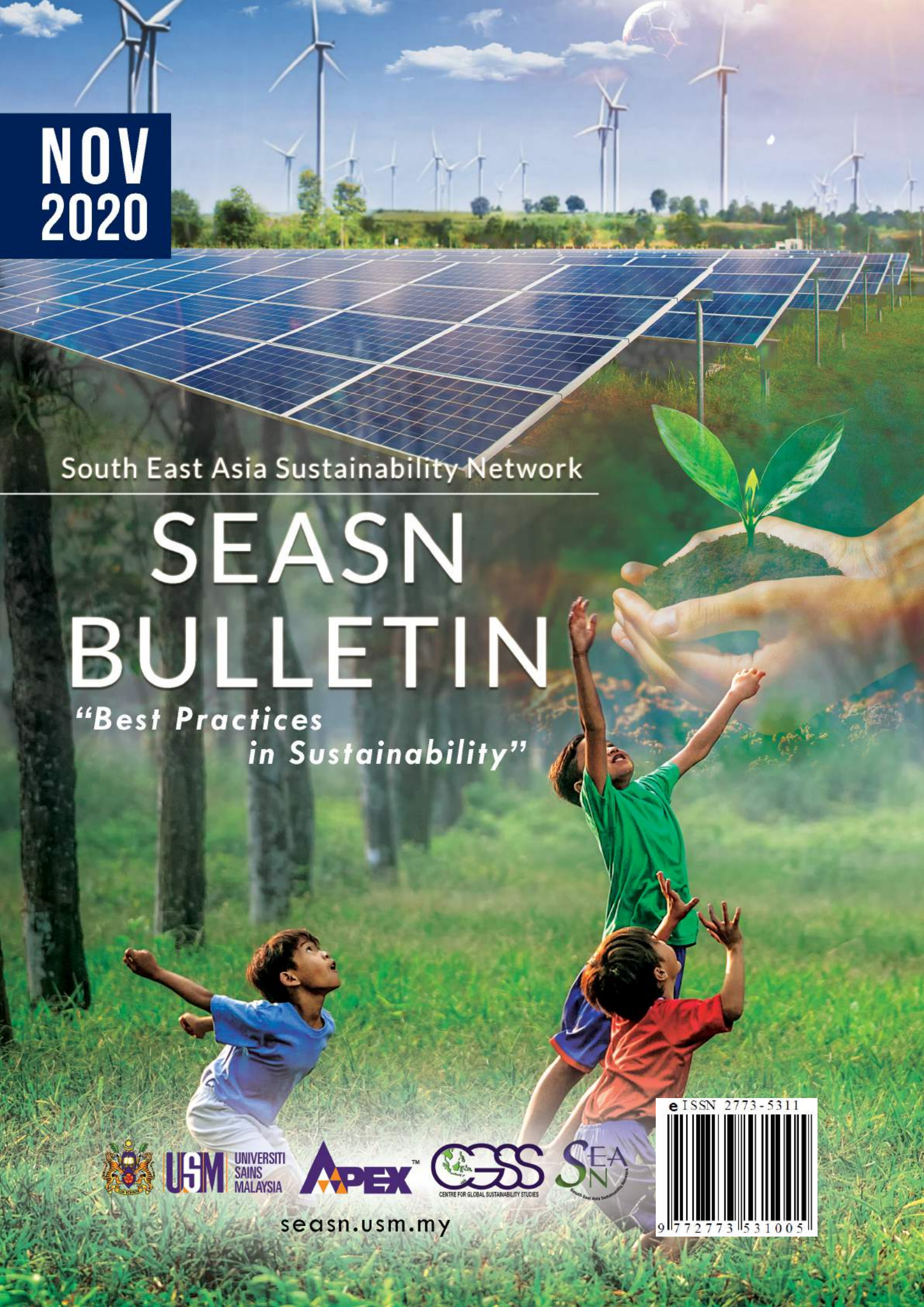

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Message from the SEASN CHAIRPERSON

Faisal Rafiq Mahamd Adikan
(Vice-Chancellor of Universiti Sains Malaysia)

Assalamu'alaikum warahmatullah and greetings from the South East Asia Sustainability Network (SEASN).

First and foremost, I would like to wish a good health to everyone and to stay safe throughout this duration of the 'new normal'. The year 2020 is almost coming to an end and time seems to fly even faster with the implementation of the "Movement Control Order", a preventive measure initiated by the government of Malaysia in response to the COVID-19 global pandemic. As we continue to deal with the difficulties of the COVID-19 pandemic, I hope that all SEASN members are coping well in handling the spread of this pandemic, while making efforts to embrace more sustainability-based programmes and activities involving our communities.

I am certain that, as we embrace the true spirit of SEASN in promoting the 17 Sustainable Development Goals (SDGs), more opportunities could be created during this challenging time in warding off COVID-19 in our respective countries. With SEASN, let us continue to be productive and proactive as we work together, communicate and encourage one another to share more information and generate useful ideas for the benefit of all to adapt and embrace the new normal as well as in overcoming the pandemic disease.

I would also like to take this opportunity to applaud the former Chairperson of SEASN, Professor Datuk Dr. Asma Ismail for her exemplary leadership in governing SEASN. The secretariat of SEASN had successfully organised its 2nd International Conference on Sustainable Development Goals 2019 (ICSDG2019) in Penang, Malaysia on 30-31 July 2019. This meaningful ICSDG2019 event was attended by more than 100 delegates from around 14 countries.

Congratulations to the organizing team and the secretariat of SEASN, as well as to all the sponsors and partners for this achievement. This event has truly made SEASN's presence felt beyond Southeast Asia. I sincerely hope that the upcoming events of ICSDG will also receive the same support and with more participants coming from around the globe.

I am delighted to be a part of this inaugural SEASN bulletin and would like to express my heartfelt appreciation to all the SEASN members who have contributed articles to this interesting bulletin. This bulletin is a good platform for us to share and disseminate the information regarding our best sustainability practices to all the members, as well as to other sustainability-based practitioners.

Let us continue to move SEASN forward as an important networking platform with our continuous support and commitment. Together, let us transform the world to ensure a brighter and more sustainable tomorrow for our future generations!

Thank you.

The History of SEASN

By Ng Theam Foo (SEASN)

Since September 2008, Universiti Sains Malaysia (USM) has been awarded with the status of APEX (Accelerated Programme for Excellence) which USM has embarked on new commitments in becoming an agent of change for sustainability to empower the bottom billions and with the vision of "Transforming Higher Education for a Sustainable Tomorrow". USM has brought about missions to integrate the entire activities of the university to promote sustainable development that are ecologically, socially and economically sustainable within and outside of its ecosystem particularly in Southeast Asia (SEA) region.

To integrate sustainability effectively and efficiently, USM requires a platform to promote, engage and integrate sustainability individuals and organisations in addressing the bottom billions within SEA region. Thus, these are the rationales of the establishment of South East Asia Sustainability Network (SEASN). SEASN was launched by the then Minister of Science, Technology and Innovation, Datuk Dr. Ewon Ebin on 28 October 2013 at Vistana Hotel, Penang in conjunction with the International Sustainability Conference 2013 (ISCO 2013). In the afternoon, the SEASN Assembly was held and attended by all the new members which comprised 35 members from five countries; Malaysia, Thailand, Indonesia, Philippines and Vietnam. The chairperson of SEASN is the Vice-Chancellor of USM. The Centre for Global Sustainability Studies (CGSS) is assigned as the secretariat of SEASN while the director of CGSS the secretary-general. The first SEASN Board Meeting held on 24 th March 2014 at Chancellery Meeting Room, Chancellery Building, USM.

The debut board members were from the countries of Malaysia, Thailand, Philippines, and Indonesia. New board members are to be elected once in every two years. Currently, SEASN has 49 members from Malaysia, Indonesia, Thailand, Philippines, Vietnam, Cambodia and Singapore.

SEASN came into play in 2014 to be a platform to support higher education institutions, other related sustainability organisations, agencies, NGOs, CSOs and industries in SEA countries in the exchange of ideas, findings, information, and good practices in teaching, research, community engagement and institutional arrangement with a focus on WEHAB+3 and Sustainable Development Goals (SDGs) to build a sustainable tomorrow. Before the SDGs were adopted in September 2015, SEASN focused on WEHAB+3, i.e., Water (W), Energy (E), Health (H), Agriculture (A), Biodiversity (B) and with +3 are the cross section areas on Climate Change & Disaster Risk Management,

The launching ceremony of SEASN

Consumption & Production and the Population & Poverty. Since September 2015, the United Nations (UN) has requested individuals, businesses, institutions and government agencies to take up the challenge to solve society's biggest global problems by 2030 through the advent of SDGs. Thus, SEASN has started to realign its objectives and activities towards achieving SDGs by 2030. Since then, various sustainability programmes and activities were successfully carried out such as SEASN Assembly and Board meetings, international conferences, thematic working group lab, disaster risk management for sustainable development training, capacity building, SEASN compendium, and strategic planning lab. Since its establishment, SEASN has been solely funded by USM to conduct its planned programmes and activities throughout the formation years. However, to sustain its annual financial standings, the SEASN Board has introduced an annual fee for the coming years to all SEASN members in ensuring that all activities can be conducted without any financial restraint.

One of SEASN activities - Sustainability discussion among SEASN members

The 9th SEASN Board Meeting

By Siti Izaidah Azmi & Ng Theam Foo (SEASN)

The 9th SEASN Board Meeting was held on 3rd December 2019 at Chancellory Conference Room (CCR) of USM, Penang. The Board Meeting was chaired by the newly appointed Vice-Chancellor of Universiti Sains Malaysia (USM), Professor Dr. Faisal Rafiq Mahamd Adikan who is the Chairperson of SEASN. A total of 8 board members participated in this important meeting. The board members who attended the meeting physically were Corporate Responsibility & Ethics Association for Thai Enterprise (CREATE), Thailand (as SEASN Vice-Chairperson): Mr. Alex Mavro (Vice-President of CREATE), AIMST University, Malaysia: Snr. Prof. Dr. M. Ravichandran (Dean, Faculty of Applied Sciences), Universiti Putra Malaysia, Malaysia: Prof. Dr. Mohammad Hamiruce Marhaban (Director, Research Management Centre), Prince of Songkla University, Thailand: Dr. Sutinee Sinutok (Chairperson, Department of Environmental Management), Anywheel Pte. Ltd., Singapore: Mr. Johan Sammy (Head of Expansion and Partnerships). The board members who joined the meeting virtually via online teleconferencing were Universiti Kebangsaan Malaysia, Malaysia: Assoc. Prof. Ts. Dr. Lee Khai Ern (Deputy Director, Infrastructure and Instrumentation (CRIM)/Fellow, Institute for Environment and Development (LESTARI)), Mindanao State University (MSU) at Naawan, Philippines: Dr. Elnor C. Roa, Chancellor of MSU, and World Wide Fund for Nature (WWF), Malaysia: Ms. Lavanya Rama Iyer (Head of Policy and Climate Change).

It was a fruitful two-hour meeting with proactive discussion and suggestions. Among the important matters being discussed in the meeting were the SEASN membership fees, the new member application, the 3rd International Conference on Sustainable Development Goals, the SEASN Assembly, SEASN Bulletin, and SEASN Sustainability Talk.

The 8th SEASN Board Meeting and the 3rd SEASN Assembly

By Siti Izaidah Azmi & Ng Theam Foo (SEASN)

The 8th SEASN Board Meeting and the 3rd SEASN Assembly were held at Olive Tree Hotel, Penang on 29th July 2019; in the morning and in the afternoon, respectively. The meeting and assembly were chaired by the SEASN Chairperson and Vice-Chancellor of USM, Prof. Datuk Dr. Asma Ismail who was also.

The board members who attended the 8th SEASN Board Meeting were Corporate Responsibility & Ethics Association for Thai Enterprise (CREATE), Thailand: Mr. Alex Mavro (Vice-President of CREATE), Chulalongkorn University, Thailand: Asst. Prof. Dr. Vorapat Inkarojrit (Assistant to the President for Physical Resources and Procurement), Far Eastern University (FEU), Philippines: Dr. Myrna P. Quinto (Vice-President for Academic Development), Universiti Kebangsaan Malaysia, Malaysia: Assoc. Prof. Ts. Dr. Lee Khai Ern (Deputy Director, Infrastructure and Instrumentation (CRIM)/ Fellow, Institute for Environment and Development (LESTARI)), Islamic Science University of Malaysia (USIM), Malaysia: Prof. Dr. Norita Md Norwawi (Coordinator of Sustainability and Serenity Hub, Faculty of Science and Technology), World Wide Fund for Nature (WWF), Malaysia: Ms. Lavanya Rama Iyer (Head of Policy and Climate Change), and Regional Centre of Expertise (RCE) Southern Vietnam, Vietnam: Dr. Pham Thi Hoa (joined virtually via online teleconferencing).

The 3rd SEASN Assembly was attended by 22 members (including the board members) from various institutions. The institutions and their representatives (excluding the board members) were AIMST University, Malaysia: Snr. Prof. Dr. Manickam Ravichandran (Dean, Faculty of Applied Sciences),

The board members of SEASN

Universiti Putra Malaysia (UPM), Malaysia: Prof. Dr. Azmawani Abd Rahman (Director, Corporate Strategy and Communications Office), Southeast Asian Ministers of Education Organization Regional Centre for Education in Science and Mathematics (SEAMEO RECSAM), Malaysia: Dr. Suhaidah Tahir (Director of SEAMEO RECSAM), Taylor's University, Malaysia: Mr. Edward Chong (Senior Manager, Sustainability, Environmental, Health, Safety (EHS), Events and Building Services), Universiti Malaya (UM), Malaysia: Prof. Dr. Sumiani Yusoff (Director, Institute of Ocean and Earth Sciences and Chairperson, UM Eco-Campus Secretariat Office and UM Living Labs), Universiti Malaysia Perlis (UniMAP), Malaysia: Dr. Siti Khadijah Za'aba (Coordinator, Sustainable Campus), Universiti Malaysia Sarawak (UNIMAS), Malaysia: Ms. Noraziah Abdul Wahab (Director, UNIMAS Community Sustainability Centre), Universiti Teknikal Malaysia Melaka (UTeM), Malaysia: Assoc. Prof. Dr. Juhari Ab. Razak (Director, Sustainability and Environmental Centre), Prince of Songkla University (PSU), Thailand: Asst. Prof. Dr. Kuaanan Techato (Dean, Faculty of Environmental Management), Mahidol University (MU), Thailand: Prof. Dr. Banchong Mahaisavariya, (President of MU), Assoc. Prof. Dr. Kitikorn Charmondusit (Vice-President for Environment and Sustainable Development), and Mr. Puttised Tantimekin (Director of Division of Physical and Environment), Mindanao State University (MSU), Naawan, Philippines: Dr. Elnor C. Roa (Chancellor of MSU), Diponegoro University (UNDIP), Indonesia: Prof. Ambariyanto (Vice-Rector for Research and Innovation), Water Watch Penang (WWP), Malaysia: Prof. Dr. Chan Ngai Weng (President of WWP) and Ms Phang Wai Leng (Treasurer of WWP), Language Works Sdn. Bhd., Malaysia: Mr. Brian Cracknell (Director), Anywheel Pte. Ltd., Singapore: Mr. Johan Sammy (Head of Expansion and Partnerships), and International Islamic University Malaysia (IIUM), Malaysia (as observer): Prof. Emeritus Tan Sri Dato' Dzulkifli Abdul Razak (Rector of IIUM) and Assoc. Prof. Dr. Zainal Abidin Sanusi (Director of Sejahtera Centre for Sustainability and Humanity).

The meeting and assembly have received many positive feedbacks and suggestions from the members. Several important issues

had been raised by the members such as i) the SEASN membership fees; ii) the benefits as a SEASN member; iii) the SEASN strategic planning; iv) the host of the International Conference on Sustainable Development Goals (ICSDG), and v) the discount rate for members to participate in the ICSDG.

Besides, the meeting also discussed on the SEASN Strategic Planning as a guideline for planning and organizing programmes/activities in achieving its mission and vision as well as the objective of SEASN. The roles and benefits of SEASN members were also discussed to be included in the strategic planning. All attendees were provided with a copy of SEASN Strategic Planning 2019-2021 which can be downloaded for free from https://seasn.usm.my/index.php/ms/documents for their reference.

Apart from discussing the arising issues, the election of new board members had been carried out during the assembly. The election was to elect new board members among the attendees to continue the legacy of the leadership and governance of the former board members as well as to advise and plan the SEASN agenda for the betterment of management and administration.

The term of appointment for this new board is from August 2019 until July 2021. The new board members are:

- Chairperson: Universiti Sains Malaysia (Malaysia)
- Vice-Chairperson: Corporate Responsibility and Ethics Association for Thai Enterprise (CREATE) (Thailand)
- Board Members:
  - Universiti Kebangsaan Malaysia (Malaysia)
  - Universiti Putra Malaysia (Malaysia)
  - AIMST University (Malaysia)
  - Prince of Songkla University (Thailand)
  - Mindanao State University (MSU) at Naawan (Philippines)
  - Diponegoro University (Indonesia)
  - World Wide Fund for Nature (WWF) (Malaysia)
  - Anywheel Pte. Ltd. (Singapore)

Some of the attendees attended the opening ceremony of the 2nd International Conference on Sustainable Development Goals (ICSDG2019), held a day after the meeting, at the same venue, Olive Tree Hotel.

SEASN Assembly attended by 22 members

Achieving SDGs: Rising to the Challenge

By Siti Izaidah Azmi & Ng Theam Foo (SEASN)

The 2nd International Conference on Sustainable Development Goals (ICSDG2019) was successfully held on 30th - 31st July 2019 at Olive Tree Hotel in Penang, Malaysia in conjuction with the 50th anniversary of University Sains Malaysia (USM). The conference, officiated by the former SEASN Chairperson, Prof. Datuk Dr. Asma Ismail, was organised by South East Asia Sustainability Network (SEASN) and Centre for Global Sustainability Studies (CGSS), USM in collaboration with Penang Convention and Exhibition Bureau (PCEB), Anywheel Pte. Ltd., Olive Tree Hotel, and Regional Centre of Expertise on Education for Sustainable Development (RCE), Penang.

The main objective of the conference was to provide a platform for sharing information, experiences, initiatives, and best practices in addressing sustainability challenges within the Sustainable Development Goals (SDGs) framework among researchers worldwide and seek strong collaboration and cooperation among researchers and organisations in achieving the SDGs. The theme of the conference was "Achieving SDGs: Rising to the Challenge" with a special focus on the three pillars of sustainability, i.e., Social, Economy, and Environment.

The ICSDG2019 was attended by more than 100 delegates from 14 different countries such as Bangladesh, China, Germany, India, Indonesia, Japan, Malaysia, Nigeria, Oman, Pakistan, Philippines, Singapore, South Africa, and Thailand. All delegates were representatives of various types of institutions such as higher education institutions, NGOs, and ministry departments.

SEASN Chairperson listening to the keynote speech

To introduce and enhance a better understanding in implementing the SDGs, keynote and plenary speakers were invited to share their views and current sustainability projects during the conference.

- Keynote: Prof. Emeritus Tan Sri Dato' Dzulkifli Abdul Razak (Rector of International Islamic University Malaysia (IIUM)), "Achieving SDGs: Rising to the Challenge"
- Plenary I: Prof. Dr. Nor Azazi Zakaria (Director of USM Engineering Campus and Director of River Engineering and Urban Drainage Research Centre (REDAC), USM), "Sustainable Integrated Water Resources Management Toward Practical Solution Addressing Water Issues in Malaysia"
- Plenary II: Prof. Dr. Daniel Lang (Director of Institute for Ethics and Transdisciplinary Sustainability Research, Leuphana University Luneburg, Germany), "Bridging the Divide between the Global Sustainability Goals and their Local Implementation"
- Plenary III: Dr. Myrna P. Quinto (Vice-President for Academic Development, Far Eastern University (FEU), Philippines), "The Road to Achieving a Sustainable Community Extension Program: The FEU Project HOPE Story"
- Plenary IV: Dr. Claudia Isabel Marques de Abreu Lopes (Research Fellow at United Nations University
- International Institute for Global Health (UNU-IIGH), Malaysia), "Gender Equality for Sustainable Development: Where do we Stand?"
- Plenary V: Asst. Prof. Dr. Vorapat Inkarojrit (Assistant to the President for Physical Resources and Procurement, Chulalongkorn University (CU), Thailand), "Role of University in Transforming Sustainability"

ICSDG2019 participants listening to the presenters

A forum that discussed on "Economic Growth vs Sustainability: A Myth or Reality" was also held during the conference. Theforum was moderated by Professor Dr. Azlan Amran (Dean of Graduate School of Business, USM). The invited panels were Professor Dr. Zinaida Fadeeva (Visiting Professor at TERI Institute of Advanced Studies and Senior Advisor, UN Office of Resident Coordinator (UNORC), India) and Dr. Muhammed Abdul Khalid (Economic Advisor to Malaysian Prime Minister). The conference ended with a sustainability visit to Setia Spice Convention Centre Roof Garden, located at a 5-minute walking distance from the conference venue. Setia Spice is the first hybrid solar powered convention centre in the world with the largest recreational roof garden with urban spice garden and the largest playground for children with special needs.

The ICSDG2019 was organised with great success and received full supports from all sponsors, delegates, speakers, and organisations. The conference has run smoothly with an interesting presentation from all speakers and delegates and has achieved the conference objective in providing knowledge, information, experiences, and best practices in achieving the SDGs. More information about the ICSDG2019 can be found at www.sdgconference.usm.my.

The Launching of SEASN Compendium

By Siti Izaidah Azmi & Ng Theam Foo (SEASN)

In conjunction with the 2nd International Conference on Sustainable Development Goals (ICSDG2019) and the 3rd SEASN Assembly, the SEASN Compendium was launched by the former SEASN Chairperson, Professor Datuk Dr. Asma Ismail, witnessed by the delegates and authors of the compendium. The inaugural SEASN Compendium is the compilation of the best practices that can be enacted by institutions in order to achieve the Sustainable Development Goals (SDGs).

SEASN Compendium launched by SEASN Chairperson

The compendium showcases SEASN members' inspiring success stories on a number of sustainability projects that have demonstrated some good results and impacts fora sustainable future. Therefore, this compendium can be a useful reference and inspiring document for members of the academia, sustainability practitioners, policy-makers as well as the general public and private sectors with the passion for sustainability.

The SEASN Compendium comprises some great articles contributed by SEASN members, i.e., the Prince of Songkla University (Thailand), Southeast Asian Ministers of Education Organisation Regional Centre for Education in Science and Mathematics (SEAMEO RECSAM) (Malaysia), Mahidol University (Thailand), Universiti Putra Malaysia (Malaysia), Universiti Sains Islam Malaysia (Malaysia), Universiti Teknikal Malaysia Melaka (Malaysia), Universiti Malaya (Malaysia), Chulalongkorn University (Thailand), Language Works Sdn. Bhd. (Malaysia), and USM. The online version of the compendium can be downloaded for free on https://seasn.usm.my/index.php/ms/documents (click on SEASN Compendium Vol. 1 2019).

Hoya verticillata at EcoHub

EcoHub: The Living Lab of Universiti Sains Malaysia

By Siti Fairuz Mohd Radzi, Ng Theam Foo, Mohd Abdul Muin Md. Akil
(Centre for Global Sustainability Studies, Universiti Sains Malaysia)

As a university that includes sustainability element as one of its main pillars, it is important for Universiti Sains Malaysia (USM) to preserve the flora and fauna found within the USM compound. EcoHub, established on 17 December 2008, is a previously abandoned green space preserved by USM as a living lab. It is home to many unique flora and fauna that can hardly be found elsewhere. Located at Lorong Pegawai, close to the Centre for Global Archaeological Research, EcoHub was officially opened by the former USM Vice-Chancellor, Prof Tan Sri Dato' Dzulkifli Abdul Razak.

EcoHub aims at becoming the "nature repository" for storing information with regard to the campus ecological surroundings, preserving exotic flora and fauna which can benefit the community within or outside USM. As a living lab, students, lecturers, and researchers at USM are welcomed to carry out their research on the flora and fauna found in EcoHub to produce findings that can be beneficial to other researchers.

Throughout the establishment of EcoHub, various species of living plants have been preserved to ensure that the plants can benefit the future generations. Three groups of plants; orchard, herbaceous, and forest encompassing 150 different species can be found in EcoHub such as *Hoya verticillata, Amanita malayensis, Antidesma cuspidatum, Vitex pinnata,* and *Tetracera indica.* A number of herbaceous plants found in EcoHub have many medicinal properties, one of which is the ability to treat diseases including cancer. Moreover, since the area has a lot of shade trees, 115 types of birds such as Brahminy Kite, Asian Koel, and Asian Glossy Starling which can hardly be found elsewhere can also be spotted in the area.

Information board about birds at EcoHub

Under the coordination and supervision of the Centre for Global Sustainability Studies (CGSS), USM, a number of projects have been carried out to improve the current condition of EcoHub to accommodate visitors of the living lab from inside and outside USM. CGSS has collaborated with students from a sustainability course coordinated by CGSS, WSU101 (Sustainability: Issues, Challenges and Prospects) to label the plants found in EcoHub. The labels which consist of some basic information about the herbs such as the origin, characteristics, and usage were installed at several areas where the plants are located. The labels would allow visitors to learn about the plants found in EcoHub during their visit. CGSS has also collected the information of birds found in EcoHub which was then converted into an information board and displayed at EcoHub for visitors to see. The map of EcoHub has also been installed in several areas in EcoHub to accommodate EcoHub visitors. Visitors can also learn about the living web of EcoHub through an information board (the infographic is adapted from a similar board installed at Beacon Food Forest in Beacon Hill, Seattle). It is hoped that EcoHub can become an advanced living lab in Malaysia as well as one of the sustainability-based tourism spots in Penang. For more information about EcoHub, visit https://www.facebook.com/ecohubusm.

Brahminy kite spotted at EcoHub

Amanita malayensis at EcoHub

Information board about EcoHub Living Web

Phytoremediation in Aquaculture Industry: The Key Towards Nutrient Recycling

By Ng Yin Sim & Derek Chan Juinn Chieh
(School of Chemical Engineering, Engineering Campus, Universiti Sains Malaysia)

According to The State of World Fisheries and Aquaculture 2016, world total fish production had reached 167.2 million tonnes in 2014 while aquaculture production alone accounted for about 44% of the total fish production. Provided that aquaculture comprised only 7 percent of fish for human consumption in 1974, this share had risen up to 26 percent in 1994 and 39 percent in 2004 (FAO, 2016). It is not surprising that the figure will soon overtake the wild-caught fish production after 2014. Therefore, aquaculture would play a major role in world fish production now and in the future to ensure food security and nutrition to the ever-growing human population. Malaysia was listed as one of the top 25 major aquaculture producers in the world with total production of 521.0 thousand tonnes in 2014, ranked 15th among the countries. Its inland aquaculture covered an area of about 794.2 thousand hectares (Department of Fisheries, 2014). However, improper management of the aquaculture site in terms of effluent discharge would bring harm to the nearby water resources and environment.

In an enclosed, intensive inland aquaculture, the water used to culture the fish would be generally easier to be concentrated with suspended solids and dissolved nutrients due to accumulation of by-products

eg. uneaten feed, fish faeces and excrements. In order to maintain the health and welfare of the fish, water exchange need to be done regularly. However, this effluent is normally either directly discharged into the nearby waterways or into sedimentation pond before released. Sedimentation may help reduce suspended solids, but not to remove dissolved nutrient, so eventually fish farm wastewater still poses risk of harming the receiving water. This phenomenon is attributed to rural farmers who are characterised as low capital cultivators, making advanced treatment system too expensive for them to install and operate while the lack of clear provision with regard to local aquaculture effluents also results in no further treatment of the effluents since the issue is not prioritised. Therefore, an affordable, efficient yet easy to implement treatment system for the fish farm wastewater is needed. The system will give the farmers a shot in the arm if it can generate valuable products or side income.

Phytoremediation is identified to be a treatment system that fulfills those criteria. It is relatively low cost to maintain since it is solar-driven and only a simple containment system is needed. It is cheaper than conventional treatment methods that rely on electricity, pumping, aeration, or chemicals addition and usually need large concrete or steel vessels. Advanced treatment technologies for nutrient removal are costly and have high energy requirement and carbon footprint whereas phytoremediation is cheap and sustainable. Moreover, it is the least harmful method as it uses naturally occurring organisms and preserves the environment in a more natural way, and it is aesthetically pleasing as well. The wastewater treatment technology for land-based aquaculture is largely adapted from conventional/municipal wastewater treatment. Thus, it has the drawbacks of sludge production, high energy demand and frequent maintenance requirement. Furthermore, some of the adsorbents or coagulants added for water quality improvement may not be adaptable for treatment due to elevated costs, toxic residues, low treatment capacities, and high selectivity for a variety of pollutants, which include alum, polyaluminium chloride, activated carbon, clay minerals, polymer hydrogel, and zirconia. Conventional biological processes are also designed to meet secondary treatment effluent standards and

typically do not remove nitrogen and phosphorus to an exceptionally low level in protecting receiving water, so additional or enhanced treatment units are needed for further depurating the nutrient-rich wastewater.

Despite that, significant amount of pollutants eg. phosphate and ammonia can be efficiently reduced by phytoremediation as shown in the available literature and have been successful in a variety of wastewater. *Lemna minor* based system fed with municipal and industrial wastewater was able to achieve up to 84%, 87%, 85% and 95% removal in COD, total nitrogen (TN), total phosphorus (TP) and ortho-phosphate respectively. In another study *Spirodela oligorrhiza* system was shown to be able to remove 83.7% TN and 89.4% of TP from 6% swine lagoon water in eight weeks at a harvest frequency of twice a week. Another similar study was shown to attain averagely 98% removal in Total Kjeldahl Nitrogen (TKN) and 98.8% in TP on swine effluent. Furthermore, *Salvinia minima* managed to decrease TKN, NH_4-N and P-PO_4 up to 97%, 99% and 88% respectively in anaerobic effluents of coffee wastewater. When dealing aquaculture wastewater, constructed wetland planted with *Typha latifolia* was able to reduce 61%, 78% and 98% of NH_4, NO_2 and PO_4 respectively. With wetland units of free water surface and subsurface flow planted with cattail and common reed, the shrimp aquaculture wastewater could have a reduction of 55-66% in TSS, 37-54% in 5-day BOD, 64-66% total ammonia, while nitrate and orthophosphate can be reduced by up to 84.6%, 34.8% and 44.4% in freshwater crayfish culture wastewater by applying water spinach aquaponic system.

The monoculture and polyculture types of macrophyte systems were also demonstrated to treat the wastewater. Periodic harvesting could be used to maintain optimal growth of the macrophytes colony as it avoids crowding of macrophytes, which may indirectly assist in efficient removal of pollutants from wastewater. When the phytoremediation system is coupled with sedimentation pond, it will aid in removing the dissolved nutrients in the effluent as well as the suspended solids. The macrophytes have their own potential uses. Traditionally, *Wolffia arrhizal* has been eaten in Myanmar, Laos, and northern Thailand. The *Salvinia molesta* in commercial fish feed diet will have higher fish weight on Nile tilapia (*Oreochromis niloticus*) compared to feeding with commercial feed alone and a significant effect is observed if feeding period is prolonged. Furthermore, biomass of *S. molesta* has the potential to be converted into organic fertilizer via vermiremediation. Similarly, *Spirodela polyrhiza* can be a promising substrate for biohydrogen production and can also be included in fish meals. Hence, the aquaculture farmers can earn extra income from the valuable plant stock harvested being applied to remediate the fish farm wastewater.

The different types of macrophytes A) *Lemna minor* and *Spyrodella polyrhiza* B) Close up on the *Spyrodella polyrhiza* and C) *Salvinia molesta*

They showed that charity isn't always about we giving away some cash but we also can do charity by expressing our kindness towards others.
- IIUM Student (Participant of Foster Family Program Perlis)

That is probably one of the biggest gems gained by the participants of International Islamic University Malaysia - Mercy Mission Malaysia (IIUM-MMM) Charity Right Community Engagement (Foster Family) Program during the three-day event that had taken place in Perlis from 14th to 16th February 2020.

This program was initiated in 2019 where the first IIUM-MMM Charity Right Community Engagement Program was successfully organised by IIUM in collaboration with Mercy Mission Malaysia (MMM) on 14th to 15th November 2019.Apart from motivational program with students from Sekolah Kebangsaan (SK) Seberang Ramai, SK Simpang Empat, and SK Padang Keria which was facilitated by the Students Facilitator Team (STEADFAST) Club under the Centre for Community Engagement and Services (CENSERVE), there was also a foster family program which involved the Charity Right recipients.

Group activities with students of SK Simpang Empat

Holistic Approach Towards Ending Poverty: Socio-demographic Profiling of Charity Right Recipients in Perlis

By Wan Zahidah Wan Zulkifle
(International Islamic University Malaysia)

Apart from exposing students on the reality of less fortunate people on the ground, the foster family program aimed to map a socio-demographic profile of the family of each of the Charity Right: Feed to Educate Program' recipients. During the program, all facilitators needed to collect the information of the recipients' family background by completing a questionnaire divided into three sections covering education, financial, and health information.

Through the success from the first program, relevant stakeholders have realized the need in ensuring the continuation of the program as well as the involvement of more participation of foster families. Upholding the spirit of Leaving No One Behind and *Rahmatan Lil Alamin* (mercy to all mankind), the second program was conducted with more participation from the students. The duration to stay with each foster family also has been made longer to provide an ample time for facilitators and their respective foster families to build rapport. The aim is to ensure the richness of the data collection that will help in understanding the full picture of socio-economic and health background of the families.

The program was conducted in two sessions; morning and evening sessions. During the morning session, all facilitators motivated and educated the school students and taught them basic English language. During the evening session, facilitators stayed with their respective foster families. In this program, facilitators were trained to sharpen their leadership skill, communication skills especially with various age groups of people, adaptation to new situation as well as team-building skill. Apart from the soft skills obtained, specific skills such as data collection and observation were also incorporated as part of on-job training in this program.

Energizer: Physical activity to boost participant's energy

IIUM and Mercy Mission Malaysia handing over the Charity Right assistance to the recipients

Home visit to one of Charity Right's recipients

Sejahtera Centre for Sustainability and Humanity of IIUM Team led by our Director, Assoc. Prof. Dr. Zainal Abidin Sanusi went to visit some of the recipients' family. The whole visit was eye-opening to us all. The common scenarios such as children with stunted growth, house with no proper rooms, the struggle to get clean water and sanitation as well as access to a meal once every other day were discovered during the visit. While some people in Malaysia enjoy various scrumptious delicacies, there are those who could not even afford a decent meal once a day. While we argue about which hotel is the best to stay for the next vacation, there are still those who find shelter in a small hut with no rooms or toilets.

As we have successfully conducted the program and strengthened our profiling database, we are now moving forward to involve more relevant stakeholders especially related agencies and community leaders to discuss the long-term solutions for the problems. Clearly, poverty eradication and zero hunger are not achievable by just giving stipend or other 'quick fix' solution, but the action from various stakeholders is needed in achieving these goals.

Putting all the stories of living proof of unsustainable development and economic gap aside, what amazed us the most was the ability of the affected family to happily greet us and offer their genuine smile even when the world around them seems to be collapsing. Upon returning to Kuala Lumpur, there was one conclusion all of us could agree on; *"What we did was just a first step and we definitely need to do more"*.

Group activities with students of SK Padang Keria

SK Simpang Empat community with facilitators and Director of Sejahtera Centre, IIUM

Our heartfelt gratitude to the agencies involved in ensuring the success of this program; Mercy Mission Malaysia, Majlis Agama Islam Perlis, SK Padang Keria, and SK Simpang Empat.

If you are interested to be a part of the program, or have amazing ideas, feel free to contact us at sejahtera@iium.edu.my.

SK Padang Keria community with facilitators and Director of Sejahtera Centre, IIUM

Before returning back to IIUM; The facilitators with their foster family

Innovation in Wastewater and Recyclable Semi-Solid Wastes Produces Gas

By Azman Zakaria (Universiti Putra Malaysia)
Photo by Noor Azreen Awang

SERDANG: Wastewater from cow and chicken slaughterhouses and their wastewater, as well as solid or semi-solid samples of feces from cows, pigs and chickens can now be treated, and the products from the treatment can be reused for a specific purpose.

The Hybrid Upflow Anaerobic Sludge Blanket Reactor (UASB) treatment method, an innovation developed by Universiti Putra Malaysia (UPM) researchers, is used to treat liquid-like residues such as wastewater from cow and chicken slaughter and from slaughterhouses.

The innovative Continuous Stirred Tank Reactor (CSTR) treatment method is used for the treatment of solid or semi-solid sample such as food wastes and feces from cows, pigs and chickens.

Assoc. Prof. Dr. Syazwani Idrus ,a lecturer from the Department of Civil Engineering, Faculty of Engineering, UPM said the UASB method treatment allows wastewater, which is usually dark red in color, to be changed to light orange, light yellow or light grey that meets the Standard B of effluent discharge, a requirement set by the Department of Environment (DOE) under the Environmental Act (1974).

She added that UASB treatment system also produces methane gas which can be an alternative for cooking gas and can be converted into energy to power electric lamps.

Assoc. Prof. Dr. Syazwani Idrus

This innovation has a media filter inserted to increase methanogenic populations. The microorganism allows for treatment to be done effectively.
- Assoc. Prof. Dr. Syazwani Idrus

She led the research group which includes students, Tuan Nur Farhana Tuan Mohd Marzuki and Mohamed Ali Musa. Assoc. Prof. Dr. Syazwani further explains that UASB can also be used for sewage treatment and leachate treatment, i.e. water at dumpsites.

"This innovation has a media filter inserted to increase methanogenic populations. The microorganism allows for treatment to be done effectively," she said. Assoc. Prof. Dr. Syazwani Idrus further explains that treated water could be used to water plants and clean the floor of slaughterhouses.

She also organised a knowledge transfer programme of the method to the farmers

The research team

and staff of Veterinary Departments in Perak and Pulau Pinang in 2019 through the University Community Transformation Centre (UCTC), UPM. The innovation won a bronze medal at UPM's Engineering Innovation Exhibition (EIE) 2019. According to Assoc. Prof. Dr. Syazwani, the CSTR innovation is used for solid and semi-solid samples from food wastes and animal feces such as cows, pigs, and chickens by inserting them into the CSTR. She added that the digestate produced after the 24-hour process could be used as fertilizer for a variety of plants. It also produces methane gas up to 80 percent or 42 liters, which is much higher than that produced by UASB despite using only about 0.5 percent solid of the total liquid residue used by the UASB system.

The innovation created by the research group

The CSTR uses the acclimatisation method to improve the organic loading rate and reactor resistance. The innovation was developed under the FRGS Grant (MOE) three years ago. The innovation has attracted industry such as TNB Research Sdn. Bhd. to carry out a detailed study on biogas production. Assoc. Prof. Dr. Syazwani had also received an industry grant that is worth RM130,000 in 2018/2019 and RM 218,000 in 2019/2020 for her research on the potential of producing bio gas from food and livestock wastes from TNB Research Sdn. Bhd. The project also involved a co-researcher, Assoc. Prof. Dr. Mohd Razif Harun, who is also a lecturer from the Faculty of Engineering, UPM.

Blood pressure and glucose checks conducted by USM staff

Vaccination Awareness Programme

By Siok Yee Chan, Ting Wei Lim, Muhammad Nazri Fikri bin Abdul Rahim, Nurul Fareeza binti Abdul Raheem, & Thaigarajan A/L Parumasivam (School of Pharmaceutical Sciences, Universiti Sains Malaysia)

Immunisation and sustainable development goals coexist for the advancement of humanity. Indeed, the importance of vaccination is undeniable when the novel coronavirus (SARS-CoV-2) emerged in late 2019 and globally killed half a million people in just over six months. According to SDG 3, in view of generating human capital with healthy lives and well-being, immunisation is one of the most cost-effective ways to maintain public health and cover universal well-being. Maintaining global health has indirect impacts on the advancement of other SDGs. To name a few, it has an indirect impact on quality education with quality learning (SDG 4), no poverty via increased productivity (SDG 1), etc.

On 29th June 2019, a group of 56 pharmacy undergraduate students made a trip to Orang Asli Village in Kuala Mu, Sungai Siput, Perak, Malaysia. The trip was accompanied by three members of the academic staff from the School of Pharmaceutical Sciences, USM; Dr. Thaigarajan A/L Parumasivam, Dr. Chan Siok Yee and Dr. Vikneswaran A/L Murugaiyah. This is part of the Vaccination Awareness Program under the wings of Pharmaceutical Science Society, Universiti Sains Malaysia (USM) in collaboration with the Malaysian Pharmacy Student's Association (MyPSA). The program was led by Dr. Thaigarajan A/L Parumasivam (as advisor) and Miss Nurul Fareeza Abdul Raheem as the director of the whole project.

The main objective of the programme was to raise awareness on the importance and benefits of vaccination among people in the rural area as well as to nurture a loving culture among undergraduates through volunteer activities.

The programme was also aimed to provide free medical checkup and to educate the young aboriginal parents on the importance of vaccination of infants and children.

A representative from Hospital Sungai Siput gave a vaccination awareness talk. In addition, various activities related to vaccination have been conducted to engage the community. Among the activities are colouring and games for kids, while blood pressure and glucose level checks and lucky draw for the adults. The distribution of clothes and food via public donations was also conducted.

The vaccination programme has been highly successful, and the project director and the academic staff members pledged to come for a follow-up visit in future.

Coloring activity with the children during the vaccination programme

Eco-University Activities of Mahidol University in Year 2019

By Kitikorn Charmondusit (Mahidol University)

The summary of eco-university strategy

Mahidol University (MU) has its origins in the establishment of Siriraj Hospital in 1888 by His Majesty King Chulalongkorn (Rama V), and the hospital's medical school is the oldest institution of higher learning in Thailand, granting its first medical degree in 1893. Later becoming the University of Medical Sciences in 1943, Mahidol University was renamed with great honor in 1969 by H.M. King Bhumibol Adulyadej, after his Royal Father, H.R.H Prince Mahidol of Songkla. MU is organized into 17 faculties (responsible for both research and teaching), 7 institutes (mainly focusing on research), 6 colleges (mainly focusing on teaching) and 9 centers (mainly providing academic services). MU has approximately 24,000 students, of whom some 15,500 are undergraduate students and some 8,300 are postgraduate students. It also has a total of 3,000 academic staff members responsible for teaching and research, as well as some 6,500 academic assistants, 5,900 administrative employees, and 8,700 other employees (including hospital employees).

In 2015, MU launched the "Eco-University" policy, which has been driving the university

towards sustainable development in campus and the surrounding community by creating a balance of economic, social and environmental dimensions. This will lead to efficient use of resources, social equality, and improved quality of life of the staff, students, and the surrounding community. The university aims to reduce greenhouse gases by at least no less than 25% by the year 2021 in comparison with gas emissions of the base year 2016. This plan complies with Thailand policies in accordance with its ratification of Paris Agreement in reducing greenhouse gases by no less than 20-25%. To achieve this goal, the university has adopted three strategies including 1) Promotion of an increase in resource efficiency (which focuses on SDG12); 2) Promotion of low carbon technology and innovation to reduce greenhouse gases (which focuses on SDG13); and 3) Promotion of community engagement (which focuses on SDG 3 and 4).

Education

Mahidol University recognizes the importance of course development that is contributive to sustainable development. By this, the university has initiated mapping of teaching subjects and researches with the Sustainable Development Goals (SDGs). The process of mapping is still incomplete and under improvement. The university expects to complete the mapping in the near future. With this data, the university will be able to develop subject and research to fulfill all SDGs that are currently lacking. Until now, there are 4,127 subjects and 3,589 researches related to SDGs as summarized in the figure 2.

Research Strategies and Publication

According to Mahidol University's vision, the university intends to be a world-class university and encourages research programs emphasizing on technology development, innovation, and entrepreneurship; which are the hubs of technology and innovations that play a vital role in development of important economic infrastructure at the national and regional levels. Besides, the university is committed to developing creation of value from innovations, enhancing researchers' potential for both basic and applied research as well as transferring knowledge, technology and innovations to the community and commercial sector for the betterment of Thai Society. Mahidol University has established a strategic functional framework in implementing research plans set in the University Strategy 1 with intention to conduct research that will benefit the academic sector, Thai people and the world society.

From the received funding, Mahidol University has increased research publications in international databases. In 2018, it had a total number of 2,424 published research papers, which constituted an increase of 22.9% from the previous year. Most of the publications were medical papers, accounting for 37.5% of all Mahidol publications, and the outstanding disciplines included immunology and microbiology.

Environmental Management and Activities

In 2018, the Division of Physical Systems and Environment launched a plan to attain ISO 14001: 2015 to ensure that its environmental management system is in compliance with an international standard. From this ambitious plan, the environmental management system of the Division has been successfully accredited ISO 14001: 2015 in 2019.

ISO 14001: 2015 Certification

Green Garden Contest Activity

According to the Mahidol University's Sustainability Management Strategy Plan 2015-2019, the university aims to achieve the Eco-University status. To promote students and staff to live with nature happily, the university has focused on conserving the original green space and increasing the size of the green area in the University. The Division of Physical Systems and Environment has organized a corner garden contest to encourage every work unit to improve their space areas to be the corner gardens for recreational activities as shown in figure 5. In 2018, there were 18 work units participating in this contest. As a result, a number of locations totalling 5,925.5 m^2 were improved to be garden corners, 5,291.5 m^2 of which is located in Salaya campus.

Water

Mahidol University has supported work units to save water resources as well as reuse and recycle for reducing water consumption. In 2018, the university continued organizing many campaigns and supplementing resources for water conservation such as providing a carwash self-service station that used reused water.

Energy

Mahidol University has operated energy saving projects, for instance, electricity generation from solar cells and production of biodiesel from used cooking oil to reduce energy dependence on the suppliers. In 2019, following the Mahidol University Announcement on Energy Saving Policy, the University organized several campaigns to promote energy conservation and energy saving as follows.

Recycle Water Activity

- Installation of a water tank was conducted to replace a booster pump to save electricity and the maintenance cost of Booster pump as shown in figure 8. This campaign reduced electricity consumption by 5,054 kW per year or reduced greenhouse gas emission by 135.6 kg CO_2 eq. per year.
- "SMART GREEN ENERGY" aimed at developing use of renewable energy resources such as the installation of solar panel on the top of the Sciences and Medical Technology building. The campaign was conducted to support adoption of technology and innovation for renewable energy.

» "The MU Light Out Project" was honored by the President and the executive team of Mahidol University since 2017. The project aimed at launching a campaign to persuade students and staffs to turn off unnecessary light in the entire area of the campus for 1 hour on the second and the fourth Wednesdays of every month from 12.00 to 13.00.

» "MU Energy Award" is an award for the work unit that has successfully reduced their energy consumption as well as demonstrated good performance in their resources management. Each work unit is expected to reach the national level for Thailand Energy Awards and the regional level for ASEAN Energy Awards. Likewise, the unit can also develop and expand their knowledge towards development of resource management. In 2018, 4 group projects, 7 individual projects, and 6 posters were awarded by the Division of Physical Systems and Environment.

» "Smart Energy Program" is the application of sensors in order to control the room temperature and moisture. This program helps to save electricity and is able to monitor the system in practice. The sensors of the Smart Energy program were installed in buildings of the university. When we compared the electricity usage between 2017 and 2018, we found an of average 7.99% of electricity consumption in the Office of President unit was reduced. In addition, in 2019, this program was expanded to many buildings in Salaya campus.

Solar panel on the top of the Sciences and Medical Technology building

Waste

The problem of wastes requires cooperation from all parties to campaign and resolve in order to reduce social and global burdens. Mahidol University has been running a campaign on waste separation by providing waste sorting bin to increase the rate of material recovery and reuse them, in an effort to apply 3-Rs strategy; to reduce, reuse and recycle waste, lightening the load to landfill as well as being a good management model for the surrounding communities.

Digester for production of biodiesel extracted from used cooking oil

MU 3-Rs Program

"The waste recycling bank" is one of the environmental projects that Mahidol University has undertaken to support its Eco University policy. The project has a definite goal of creating sustainability development within the University and community around campus. The "3R" principle of Reduce, Reuse, and Recycle was introduced and has also transferred the knowledge of the implementation of this project to the community especially schools as it is a suitable place to cultivate knowledge and instill awareness for the youth to grow up to be good and quality citizens as a key force in the country's development.

The "Mahidol Reduces and Reuses Plastic Bag" project aimed to encourage the Mahidol community to avoid using plastic bags and recycle them. The project was initiated in Salaya and Phaya Thai campuses. It also encouraged students, staff, and the public to raise their awareness on the value of resources and use them in the most efficient way. With the participation of 12 convenience stores, over 950,000 plastic bags were cut off from the process which is equivalent to approximately 190.4 CO_2 eq. reduced emission.

The Waste Recycling Bank

Moreover, biodegradable wastes including residual food and litters were collected from every unit and fermented by aerated static pile composting system. In 2018, around 15.93 tons of organic fertilizer were produced.

Since 2015, Mahidol University has conducted the Greenhouse Gases Emission Inventory Program to estimate the emission from activities in the University. The Division of Physical Systems and Environment has organized the MU Carbon Footprint Program to facilitate reporting on the emission inventory of all work units. Therefore, the amount of greenhouse gases (GHGs) emission can be calculated following Thailand Greenhouse Gas Management Organization (TGO)'s guideline. The university's staff has to systematically document the GHGs emission in their work unit. In 2018, the GHGs emission inventory system of the Faculty of Tropical Medicine and the Faculty of Information and Communication Technology was certified by TGO's Carbon Footprint for Organization (CFO). This success is to ensure that the GHG data derived is accurate and reliable for development of effective GHG mitigation measures. Continuing from 2018, the Faculty of Environment

Organic Fertilizer from Yard Waste

To become a role model as a presenter of high environmental responsibility, the Low Carbon Administrator Project was launched. The project was intended to offset the amount of GHGs annually emitted by activities of high-level administrator who volunteered to participate in this project. For this project, 14 executive management inidividuals of Mahidol University including the president and vice-presidents were asked through a questionnaire about their daily activities. Then, GHG emissions from such activities were calculated referring to TGO's methodology.

In the first year of this project, 2018, 14 voluntary administrators emitted a total amount of 110.42 tons CO_2 eq. and the carbon offsetting of such emission was conducted by purchasing 118 tons CO_2 eq. of certified carbon credit from TGO.

Mahidol University is determined to be a world class university. In order to reach the excellence in management for sustainable organization, eco-university policy is one of the focused policy. The three strategies regarding environmental friendly and sustainable development activities, including education, research, and environment had been implemented in order to achieve the UN sustainable development goals.

Universiti Malaysia Kelantan (UMK)'s Engagement with the Kelantan State Government in Developing Community-Based Tourism (CBT)

By Mohd Fadil Mohd Yusof & Marlisa Abdul Rahim
(Universiti Malaysia Kelantan)

On July 9th and 10th, 2019, the Human Resource Division (HRD) for the Kelantan state government office organised a community-based tourism (CBT) workshop at Min House Camp (MHC), Kota Bahru, Kelantan. The MHC is located at Kampung Pulau, a small village in Kota Bharu district. It is an ideal location to organize the workshop due to the various recognitions received by the property.

CBT brainstorming activities

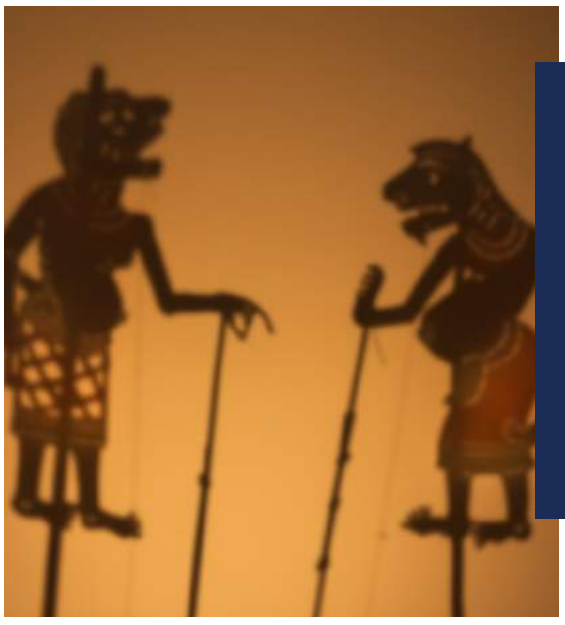
MHC has earned several recognitions and standards such as ASEAN Green Hotel Standard 2018-2020, ASEAN CBT Standard 2019-2021 as well as recognitions from global travel companies such as TripAdvisor and Booking.com. The HRD appointed six members from the Faculty of Hospitality, Tourism and Wellness, Universiti Malaysia Kelantan (UMK) as CBT project consultants to assist the state government in developing CBT for identified districts in Kelantan. The appointed members are tourism experts and experienced in research and consultation projects. There were three main objectives of this CBT workshop. First, to give exposure to the participants about CBT and the tourism industry in general. Second, to create awareness among kampung community management about the importance of CBT in creating new jobs and providing additional incomes to the local people. Third, to train relevant officers to lead their respective kampung in developing CBT together with the local villagers.

The two-day CBT workshop was opened to all state district officers in charge of development as well as local representatives of kampung community and approximately 50 participants were in attendance. During the workshop, participants worked as a team in identifying the potential sites in their respective districts that can be developed for CBT ventures. The participants were guided to conduct SWOT (Strengths, Weaknesses, Opportunities, Threats) of their own area and to justify the feasibility of developing CBT projects. Towards the end of the workshop, participants presented the details of the SWOT analysis of their area in front of a panel of UMK consultants, the State Director of HRD and the director of State Development.

Following the presentation, brief comments and suggestions from the groups were delivered on the viability of the area and their proposed project. Some concerns and issues raised by the participants about the CBT projects were also addressed towards the end. One of the crucial outcomes of the workshop was to have viable CBT projects proposed by each district and to apply for funding from the Ministry of Rural Development. YM Dato' Dr. Tengku Mohamed Faziharudean bin Tengku Feissal (Tengku Kaya Perkasa) the Deputy State Secretary of Development officiated the event and spoke about a variety of economic issues and the importance of tourism sector in stimulating the local economy. Kelantan is one of the 13 states in Malaysia. The state is located in the North-Eastern corner of the peninsular Malaysia and occupies an area of 15,044 km^2 of land. with a total population of 1.89 million in 2019. Even though poverty in Malaysia is very low and expected to decrease (0.4 percent of Malaysia households were living below the national poverty in 2015), Kelantan is still considered as a poor state among other states such as Sabah, Sarawak and Kedah. There are many ways to address poverty in developing countries such as microfinance and providing equal access to health, education and basic infrastructure. Tourism has been identified as an economic sector that may alleviate poverty by providing additional income to local people and create new job opportunities.

The Kelantan state's economy depends mostly on agricultural activities dominated by rice, rubber, fishing and cottage industries such as handcraft production, weaving and woodcarving. However, Kelantan has many 'assets' that can be developed as tourism potentials such as its natural resources, local culture and heritage.

Capitalizing on the global shift of tourism markets towards ecotourism and nature tourism, Kelantan has the advantage of attracting many visitors. In 2018, the state launched the Visit Kota Bharu campaign and managed to attract more than 6 million of mostly domestic tourists and also tourists from other countries such as Thailand, Singapore, China and Korea. The influx of tourists to the state has signalled the state administration that tourism is an area that can be further developed to stimulate the local economy. There is an urgent need to diversify the state tourism products which currently depend on heritage, culture and food as the main attractions. Therefore, the state government has decided to embark on CBT projects to diversify its tourism products and encourage the local community to get involved in tourism.



Participants from various districts in Kelantan

Community-based tourism or CBT is a form of tourism that emphasizes the involvement of the host community in planning and maintaining tourism development in order to create a more sustainable industry. The CBT concept is not new and has been introduced since the mid-90s to promote community participation in the tourism industry. CBT has been identified as a viable tool to support socio-economic development and poverty reduction. In theory, CBT can provide significant economic benefits to the local community as an income supplement through many tourism activities such as homestay, selling local handicrafts and guiding fees. CBT ventures are managed by a community comprising various enterprises and businesses owned and operated by community with the goals of providing economic benefits to the community. Through CBT ventures, there will be active participation by the community in tourism planning, promotion of host-guest interactions, and preservation of cultural and natural heritage.

The engagement between UMK and the state government is part of the university's contribution to the society especially in the context of developing the tourism industry. The faculty members are extending their expertise beyond the university walls and inviting the community including the industry players, NGOs and relevant stakeholders to work as a team in developing the community. This is exciting for both the university and the state government to work on such meaningful CBT projects. The CBT ventures are expected to give benefits not only to the state economy but also to create additional jobs and incomes for the local people.

The state government through the State Development Office has agreed to continue working with the Faculty of Hospitality, Tourism and Wellness, UMK in providing training and capacity building workshops among local leaders, NGOs and state officers in developing CBT ventures at various districts in Kelantan. The aim of the training is to create awareness among the participants and equip them with tourism knowledge and therefore to get them ready to implement various CBT projects at their respective districts. The local MHC model will be followed in order to achieve the CBT ASEAN standard and the state government is expecting more CBT areas to be established. It is hoped that such engagement may create an ecosystem that facilitates more interactions between the university and society and enlarge its networks.

The University's Role in Enabling the Localisation of Sustainable Development Goals

By Mohd Fadhil bin Md Din, Wahid Omar, Shazwin Mat Taib, Shamsul Sarip, & Noor Aireen Ibrahim (Universiti Teknologi Malaysia)

Interactive Sustainable Development Goals (SDGs)

Today's world is driven by a rapid supply of energy across various sectors. To ensure continuous supply of clean and safe energy for the future, committed and consistent effort from different players and communities is required. The transition to sustainable energy supply is a challenging task which entails a great deal of rethinking. As such, sustainable programs must include the innovative contribution of players in the energy industry. The renewable energy industry is one of the key initiatives to realize Sustainable Development Goals (SDGs), based on targets under the 7th Goal (SDG-7: Clean and Affordable Energy) and the 13th Goal (SDG13: Climate Action). The United Nations (UN) has outlined 17 goals that should be attained by 2030 based on changes in people's lifestyle and resource-related practices. The urgency and magnitude of renewable energy must be appropriated to meet sustainable development while addressing the environmental impact; thus, it is important that the energy industry is actively involved in centralizing the SDGs.

A review of the effectiveness of long-term plans under the energy sector has sparked a second wave, known as "Decarbonize by Mid-Century, Roadmap 2050", as a new aspiration of "The World in 2050 (TWI2050)". The proposed effort to achieve TWI2050 has been discussed at several international meetings including the Science, Technology and Innovation Forum and the UN-Level Political Forum. In addition, direct involvement with volunteers from around the world has sparked the transformation agenda to ensure that SDGs 2030 plan adheres closely to key aims of providing more sustainable energy to meet future requirement. Written presentations by numerous experts and scientists around the world have identified six (6) core areas of SDGs that deserve the most global attention. The core areas presented include: (a) The use of carbon zero electricity, (b) Electrification to consumers, (c) Eco-friendly synthetic fuels, (d) Smart electric distribution grids, (e) Effective use of materials, and (f) sustainable land-use. These core elements focus on the most intensive / critical sectors, namely Energy, Industry, Transportation and Building. As such, aligning communities with the "Decarbonizing" initiative is a key agenda in all SDG indicators outlined in TWI 2050.

One of the key communities in the decarbonising initiative are the institutions of higher education. Universities can play an important role in reducing greenhouse gas emissions through efficient energy practices via an integrated and inclusive campus management. Universities continue to encourage green initiatives in campus, and this includes Universiti Teknologi Malaysia (UTM). Various initiatives have been undertaken to raise SDG awareness among campus community through sustainability related teaching, research, and innovation.

Interactive Sustainable Development Goals (SDGs)

The latest approaches to ensure a holistic implementation of SDGs at the grassroots level include the "Think Global! Act Locally!" and "Think Long-term! Act Now!" concepts. However, the localisation of SDGs can be very challenging. SDG related transformational agenda are generally misinterpreted as programs driven by political agenda, involving limited community participation at the policy level, guided by unreasonable targets and peppered with implementation issues. In addition, the lack of consistent data collection in some countries remains a major challenge for scientific input to effectively address these challenges. The confusion among grassroots and stakeholders have been addressed through the introduction of the "Localizing SDGs" initiative (known as Localization SDGs). The initiatives introduced are not new programs and remain within the SDG contexts but are realigned to local strategies for managing and implementing SDGs based on socio-cultural, economic and lifestyle activities. For example, some of the developing countries do not require technology as a prerequisite for the implementation of the indicators / elements within SDGs. Instead, implementation initiatives and transformations at the community level are required to meet local socio-economic needs. Finally, these indicators remain inter-dependent on value change, cumulative impact, and contribution of each SDG element.

The same is being developed through the involvement of higher education institutions, including UTM. The process of refining and integrating the SDGs at UTM campus is not only focused on justifying the development of environmental partnerships, but also incorporating the framework in the University Global Plan (I-III) and involving all stakeholders within the campus. UTM is assessing and debating the needs of the Key Focus Area (KFA) which incorporates university strategic plans that build on short-term needs in terms of organizational structure and empowerment. Each year, the university will re-examine the initiatives undertaken, especially involving quantitative value, impact and significance based on the current developments. These include policy, education, research, operation, community, and financial structure, which in turn include several procedures measured through the Key Amal Indicators (KAIs) index. Unlike the 2015 experiences, the inclusive approach to SDGs in the university strategic planning

will reinforce the medium and long-term needs, especially involving governance, finance and operation. Preliminary actions taken by UTM have added value to the strategic plan by using the SDGs framework throughout the selection of indicators, elements, values and impacts, and the constructive analysis by different sectors. Therefore, Malaysian higher education institutions should take proactive steps in culturing SDG initiatives – guided but not bounded by the specific measures set-out in the UN Conference.

Readiness and Preparation for SDG Localisation

The second wave (2020 - 2030) of SDGs in UTM is among the most recent thoughts towards meeting sustainability requirements in the education system and administration. Based on the TWI 2050 redefinition, the planning framework opens-up opportunities for any university-level initiatives to meet the established indicators known as the Low Carbon Campus Plan Initiative. Various instruments have been used to evaluate the effectiveness of the implementation especially in the energy and infrastructure sectors. In the past, measurements using the Low Carbon City Framework (LCCF) and MyCarbon databases have helped to gauge the energy sector's contribution to carbon reduction and energy saving programs in campus. Another instrument introduced by the Malaysia Green Tech Corporation (MGTC) is the Building Consumption Input System (BCiS) which is among the advances made to ensure consistent data collection at various levels in the public or government sector and to further enhanced the attainment of the Decarbonization Community.

These instruments are fundamental to the data collection process and require little change in terms of mentality-attitude and legacy. Based on previous experiences and campaigns implemented over the years, UTM Sustainable Campus has identified several key initiatives that can be realised through the Living Laboratory. Thus, a single instrument incorporating all elements of the SDGs was included in the rating system known as UTM GreenLeaf ® and categorized based on Office / Division / Unit, Residential College and Faculty / School. The incorporation of these rating system has enabled the adjustment of instruments

Initiatives Mapping in UTM

at the university level through the PMI (Pool-Monitoring-Improvement) method. In addition, through the UTM Transformation Plan, a preparation phase will be implemented using the SDGs governance structures. One of the initial phases will involve utilising the SDG-based indicator policy for all administrative and service sectors to assist global reporting such as the Global Report Initiative (GRI) and THE Impact Rankings - SDGs. The next phase is to build unbiased structural programs involving all stakeholders who are not solely focused on the environment. Various initiatives have been planned under UTM Sustainable Campus Framework's High Impact Program throughout 2020 to ensure the involvement of all UTM community, leaving no one behind. The initiatives will cover three main foci, namely (1) enhancing the localisation of SDGs in campus; (2) implementing the Zero Waste Society concept; and (3) embedding elements of SDGs in sustainability programs.

In conclusion, institutions of higher education in Malaysia that are truly serious about sustainability should show commitment in advocating SDG related initiatives not only as a sustainability benchmark but as a distinct hallmark of a world class institution!

Waqf: Agent To Combat Inequality And Facilitate Economic Development

By Hazriah Hasan (Universiti Malaysia Kelantan)

… too often we overlook the financial sector, which can also have a profound and long-lasting positive or negative effect on inequality..
-IMF Managing Director, January 17, 2020

Interactive Sustainable Development Goals (SDGs)

Waqf refers to the perpetual Islamic trust that serves as an economic and financial medium in the third sector of the economic system. Waqf (plural:Awqaf) is an agent that fixes the disparities in society and develops social improvements via education facilities, healthcare funding, infrastructures, and many more. The Sustainable Development Goals (SDGs) have imposed mutual responsibility among countries worldwide to uphold 17 significant goals including no poverty, zero hunger, and good health, to name a few. This is how we want to incorporate into Waqf-based offerings as the agent of change in society, and eliminate the disparities related to income, wealth, ownerships, and regional development in our nation. Hence, Waqf may possess the quality to determine the development in the economic system while maintaining its position as a financial catalyst in the country. The concept of perpetuity in Waqf marks the beauty of the system. No other similar characteristics can be found in gifting, philanthropy, and charity or even *sadaqa* in Islam.

Waqf symbolises the charitable endowment trust, which involves the binding of properties to abide by the *Shariah* to help society in terms of services (schools, hospitals, and mosques), infrastructure (roads, bridges or railway), and social services (orphanages, old folks' homes, and shelters). Additionally, Waqf represents a financial instrument that alleviates poverty and provides facilities for the community. Besides, both Muslims and non-Muslims can benefit from Waqf.

Therefore, Waqf is highly diverse and has special beneficiaries that cannot be found in Zakat, another Islamic financial instrument that focuses on the process of poverty eradication. Waqf and Zakat are categorised in different sectors of the Islamic philanthropy. Waqf depicts voluntary contribution whereas Zakat is compulsory and commonly known as Islamic taxation. The Al-Quran clearly outlines the Zakat beneficiaries, specifically the eight *asnaf* or categories of recipients. On the contrary, the Waqf beneficiaries are not highlighted in the Quran. Therefore, Waqf takes into account individuals with pious purposes, and those who abide by the *Shariah* rulings. All in all, Waqf benefits society regardless of ethnicity and religion.

Economic scholars stated that it is important to promote human well-being to enhance development. In Islam, the *Maqasid Shariah* framework provides pillars of protection for human intellect, dignity, faith, property, and lineage. The concept of well-being in mainstream economics is the separation between economic and non-economic valuations. In Islam however, the concept of well-being teaches us to integrate the mundane and spiritual aspects of human personality, which is termed *al-Falah*. *Al-Falah* elaborates on the vital and mutual role of worldly and hereafter gains and rewards. Besides, Islam considers *al-Falah* or success accomplished in life on Earth will contribute to the hereafter as long as the worldly gained success is guided by God. Additionally, the *Hisbah* system in Islam had been developed to regulate and supervise activities related to the Islamic economy to ensure the flowering of Islamic norms and behaviour. Moreover, *Hisbah* arouses social consciousness and educates society on good conduct and governance.

Contemporary Waqf-based Intermediaries

The intermediaries must uphold the vision of development in Islam to align the functions of *Maqasid Shariah* and Waqf-based development programmes. Besides, it is necessary to include moral and spiritual dimensions that will encourage significant accomplishments in terms of measurable and immeasurable materials and spiritual desires of humankind in life. *Maqasid Shariah* was envisaged to establish basic needs, fulfill necessities, and eliminate poverty and deprivation. This vision was also fathomed in the mission of Waqf-based development goals and SDGs. The visualised Waqf-based projects provide financial inclusion for certain segments of the community's economic needs. Moreover, Waqf is also a tool to redistribute income and ensure that the wealth of the state will not be governed by one hand. Waqf-based intermediaries are offered in terms of microfinancing, investments, infrastructures, and other benefits for the vulnerable and for the needy. Hence, Waqf rationally corrects the imbalance and disparities in society. Waqf provides the mechanism for economic and social improvements and consequently locates equality in the nation. Equality is materialised when the needy are given the same chance and opportunity to live. For example, they have a school to attend, a hospital to get treatment, and a park for recreation. As such, Waqf-based projects may also facilitate fiscal facilities and infrastructures.

Nevertheless, Waqf-based intermediaries must be located correctly to gain maximum impact in the community. If the rate of poverty is intense in society, the manager of Waqf must conduct Waqf-based projects that satisfy the needs of the community at large. For example, luxury is prohibited, especially when the poor are in dire need of safe accommodation, clean and healthy food, and water supply. If the real practice of Waqf-based intermediaries neglects the needs of a community the vision of implementing Waqf would be negated. As a result, the disparities might not be eliminated. Additionally, wage gaps in society would not reduce. Therefore, the Waqf-based intermediaries must uphold a Maqasid Shariah hierarchy to evaluate the necessities, needs, and luxurious demands in the state.

Revitalizing Waqf as for social demands and needs

Waqf is not a modern concept of Islamic economic offering. Waqf was first practised during the time of the Prophet when the first mosque was developed. Until today, the Waqf system is used to maintain the Quba' Mosque, the second largest mosque in Medina after the Prophet's Mosque (Mosque Nabawiyy). Nowadays, Waqf exhibits drastic improvement because of the changes in societal demands. Therefore, Waqf is comprehensively diversified from fixed assets to cash Waqf, Sukuk Waqf, corporate Waqf, and book Waqf. This proves that societal demands have reformed Waqf in the wake of a modern lifestyle.

Islam views the creation and accumulation of wealth as an integral episode of human life and discerns its significance as a means for contentment and compliments. Besides, Islam computes individuals' wealth not only based on physical possessions but also on their morality and ethics that result in a good life in this world and in the hereafter. The *Shariah* requires

Muslims to preserve wealth. This has been specifically mentioned in the Quran and Hadith. The Quran and its verses proscribe profligacy, overindulgence, and reckless management of money. On the other hand, the Quran expects Muslims to feed their families on Earth and even after their demise. Therefore, humans have control over a specific kind of wealth, which epitomises the trust of Allah with regards to morality and virtues in life. This is therefore related to the social demands and needs to fulfil one's life via Waqf, gifts, and *sadaqa*. The Hadith below admonishes Muslims to feed their families even after their death:

> ***It is better to leave your heirs rich than to leave them poor begging from people.***
> *- Sahih Muslim*

The contemporary dimension of Waqf has evolved. Corporate Waqf has been successfully traded on the board of commodities. Cash Waqf has evolved into e-Waqf facilities via crowdfunding and blockchain technology. Besides, Waqf shares are flexible and simple for anyone who is interested. Last but not least, corporate Waqf has managed pooled funds and established social services in society.

Centre for Sustainability and Serenity (C4SS) at Universiti Sains Islam Malaysia (USIM)

By Mohd Zin Kandar (Universiti Sains Islam Malaysia)

In September 2015, Malaysia together with other member countries of the United Nations expressed their readiness to commit to the success of the Sustainable Development Agenda 2030. Later, in 2018, the 11th Malaysia Plan was drafted in line with the SDG (Sustainable Development Goals) led by the Department of Statistics as a focal point to ensure the progress of the development of SDG indicators for the ASEAN Working Group, locally and internationally. United Nations 2030 Sustainable Development Agenda and its 17 Sustainable Development Goals (SDGs) were agreed in September 2015 as a resolution of the United Nations General Assembly (UNGA) in New York City covering sustainable socio-economic and environmental development that should be achieved by member countries.

Institutions such as Universities can play important roles in the success of the SDGs. Universiti Sains Islam Malaysia (USIM) came forward with its Islamic foundations based on *Maqasid Syariah* (legal objective) to plan various forms of advocacy in accordance with The OIC-2025: Programme of Action (OIC POA 2025), especially through the framework of the Islamic World Educational, Scientific and Cultural Organization (ISESCO) to extend its benefits to Islamic countries, the ummah, and the world at large together with the world community.

USIM has placed the 2030 Sustainable Development Agenda based on Maqasid Syariah in the framework of Islamic worldview, in line with the Action Plan 2025 (for SDG) and the OIC POA 2025 to assume the trust and responsibility as a servant of Allah and caliph on earth as said by God:

> ***Remember when your Lord said to the angels: "Verily I want to make a caliph on earth."***
> *- Al-Baqarah 2:30*

Front view of the main administration building in USIM (left) and C4SS Logo (right)



Sustainability activities at USIM

This is very much in line with USIM's intention to lead the integration of Naqli (revealed) and Aqli (acquired) knowledge not only in terms of academics, research and administration, but also through good practices as a manifestation of devotion to Allah SWT. Human development is the key aspect that should be given priority to in this sustainable development agenda to realize the balance of social, economic, and environmental development, honoring MIZAN (balance) as USIM's trademark.

According to USIM Strategic Plan (PSUSIM2025), Strategy 1 aims to enliven the *Barakah* (bestowed with abundant good or blessing) Campus by making USIM a Sustainable and Green Campus based on Islamic principles. USIM recognizes the importance of culture and agenda in ensuring that USIM Barakah Campus remains relevant as a sustainable campus that is holistic and cross-disciplinary within the campus community as well as the community outside and surrounding USIM.

The Centre for Sustainability and Serenity (C4SS) serves to monitor effectively the given objectives and to plan and execute programmes and projects aimed to bring USIM as a sustainable campus, with a centralized reporting system presented to the USIM Sustainable Development Steering Committee (JPPL) involving the management of USIM and stakeholders. One of the primary tasks is to develop USIM Sustainable Blueprint – which is a set of USIM policy statements on ten (10) sustainable and serenity scopes aimed to be complied with and implemented in the USIM campus towards achieving a sustainable and serene campus.

C4SS also serves as a One-Stop Center for all sustainability and serenity issues and initiatives carried out by all campus communities and stakeholders. The UI Green Metrics: World University Rankings and The Times Higher Education University Impact Ranking on Sustainability have been set as the benchmarks for USIM's commitment to the Green Campus Agenda and Sustainability Development. The C4SS also focuses on the implementation of educational programs and outreach through experience-based learning, research, and development.

Located at MIZAN Park in the main campus in Nilai, Negeri Sembilan, C4SS has started several activities in promoting sustainable and serenity culture among USIM campus community. Among the programmes and initiatives are Eco-Riadah, Al-Khidir Circle, Pre-Loved Bazaar, Eco-Café, Eco Fun Ride, Edible Garden, Kobun Pokan (Hydroponic), KitaR3Cycle, PTj Lestari (Green Office) and other projects involving local communities.

Sustainability activities at USIM

C4SS is also involved in projects at national and international levels including Hari Lanskap Negara program and being the Co-organiser of Sambutan Hari Alam Sekitar Negara (HASN2020) with Jabatan Alam Sekitar Negeri Sembilan and Co-Organiser of International Eco Nature Virtual Run 2020 (#IENVR2020).

Announcement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• For CGPA of 2.00 - 2.49, a degree as stated above is required with an additional minimum five years research experience/five years working experience AND one academic publication in related field/Grade B for major/elective courses/Grade B+ for final year project; OR
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*Applicable for International Applicants Only

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- A minimum score of 5.0 in IELTS (International English Language Testing System); or
- A minimum score of 154 in Cambridge English Advance (CAE); or
- A minimum score of 154 in Cambridge Proficiency Advance (CPE); or
- A minimum score of 36 in Pearson Test of English (PTE); or
- English is the candidate's mother tongue or National Language; or
- The candidate graduated from an Institution of Higher Learning in which the medium of instruction at Bachelor and Master level is English; or
- English courses offered by British Council (The level of qualification and the relevant courses are to be identified by the University Postgraduate Studies Council); or
- English courses from selected Malaysian public/private University or institution (The level of qualification and the relevant courses are to be identified by the University Postgraduate Studies Council).

FEES

Type of Candidate	Tuition Fees	Registration Fees	Convocation Fees	Personal Bond
Malaysian	RM 25,652	RM 340	RM 120	-
Non-Malaysian	USD 9,625	USD 227.50	USD 30	USD 475

WHY MALAYSIA?

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In collaboration with the Earth Institute at Columbia University, New York, USA

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WHY MSDP AT USM?

MSDP graduates of USM are not generalists, but specialists in integrated approaches to sustainable development. Obtaining MSDP will facilitate your path towards career opportunities at NGOs, private sector companies, social enterprises, UN agencies, development banks, philanthropic organizations, academic research institutions, government departments and international aid agencies.

INTERNATIONAL RECOGNITION

The MSDP program at USM is offered in collaboration with the Earth Institute at Columbia University, New York, USA. Universiti Sains Malaysia (USM) is also ranked no. 49 overall in the world, and no. 1 in Malaysia in Times Higher Education (THE) University Global Impact Rankings.

PROGRAMME STRUCTURE

Core Courses (38 Units)

1. General Cluster
- Global Classroom: Integrated Approaches to Sustainable Development
- Research Methods for Sustainable Development
- Project Design Evaluation and Management
- MSDP Project

2. Global Health Cluster
- Health Policy and Management

3. Science & Engineering Cluster
- Energy Infrastructure Planning
- Human Ecology and Sustainable Development

4. Management Cluster
- Budget Planning and Financial Management
- Information Technology for Development

5. Social Science Cluster
- Economic Analysis for Sustainable Development
- Law and Governance in Development
- Social Services Management

Electives (6 Units)*

1. General Cluster
- Sustainable Cities and Communities

2. Global Health Cluster
- Global Health, Nutrition, and Food Insecurity

3. Science & Engineering Cluster
- Application of Environmental Science

4. Management Cluster
- Human Resource Management
- Green Business and Performance Assessment
- Corporate Social Responsibility & Social Enterprise

* Electives: Availability is based on the number of student enrolment.

DURATION

- **Full Time**: Minimum 4 semesters / Maximum 8 semesters
- **Part Time**: Minimum 6 semesters / Maximum 10 semesters

VENUE

- All classes are held in Kuala Lumpur.

ADMISSION REQUIREMENTS

I. Qualification: Bachelor Degree

A) CGPA of at least 2.75 OR

B) CGPA of 2.5 - 2.74
- Research experience – 1 year; OR,
- Professional experience in related field – 1 year; OR,
- One (1) academic publications in related field; OR,
- Grade B for major/elective courses; OR,
- Grade B+ for final year project; OR,

C) CGPA of 2.00 - 2.49
- Research experience – 5 years or professional experience in related field – 5 years, AND
- One (1) academic publications in related field; OR,
- Grade B for major/elective courses; OR,
- Grade B+ for final year project.

II. APEL A Certificate (APEL T-7)
www2.mqa.gov.my/APEL/

Scholarship for Master and Ph.D. Studies

Regarding the membership of Prince of Songkla University collaborated with wellknown partner universities in South East Asia Sustainability Network (SEASN), SEASN provides a platform to support higher education institutions in teaching, research, community engagement and institutional arrangement in South East Asia countries focusing on Water, Energy, Health, Agriculture, Biodiversity, Climate Change, Disaster Risk Management. Furthermore, SEASN realizes the important of study and research towards future sustainability. For this reason, all study programs in Faculty of Environmental Management has been designed to promote this commitment so far.

In this regards, Faculty of Environmental Management is announcing the South East Asia Sustainability Network (SEASN) scholarships for Master's and Ph.D. studies.

To find out more about the scholarship and access the application form, please visit https://www.envi.psu.ac.th/wwwfem/News/Detail/569.

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