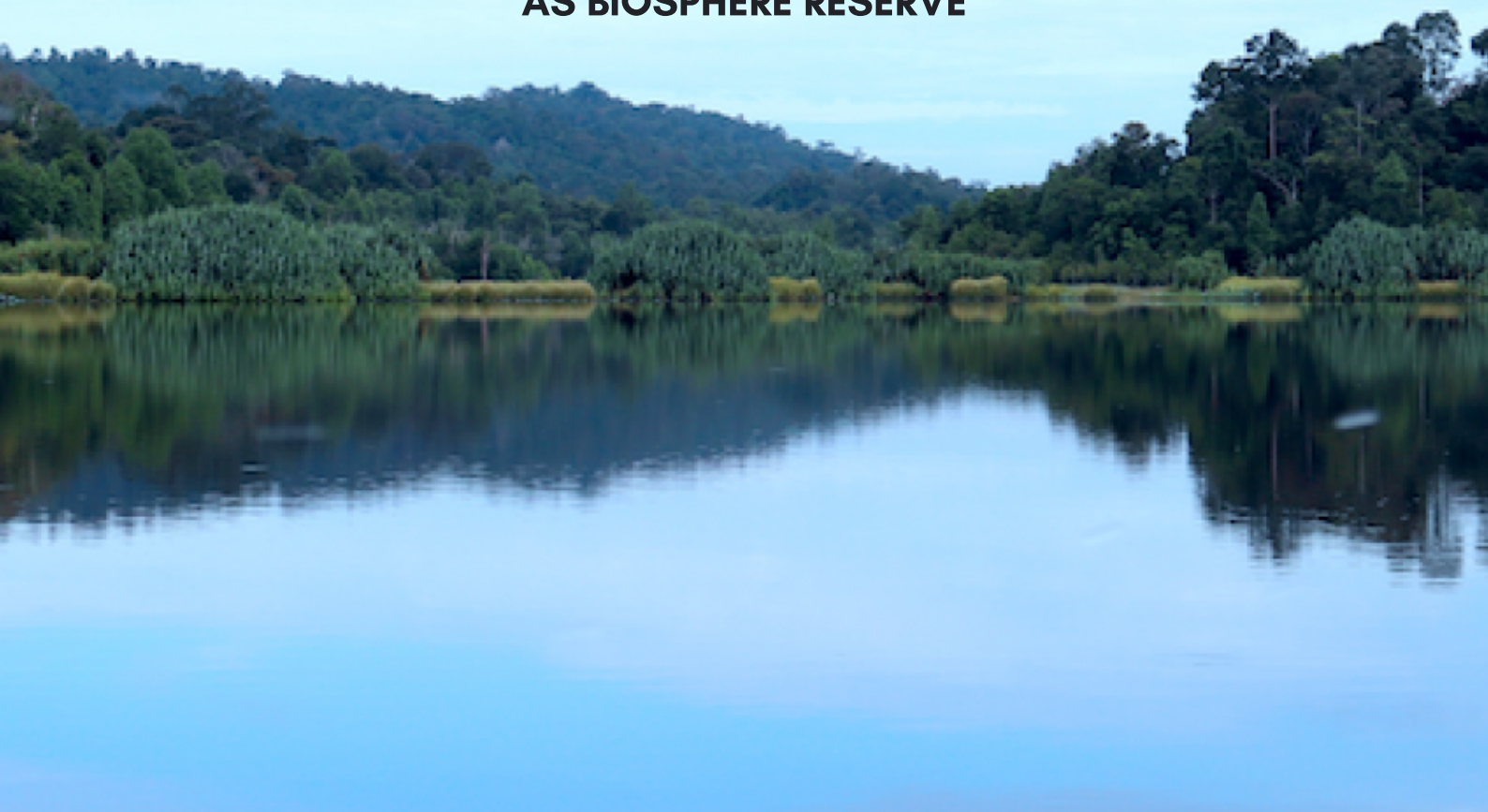




INTERNATIONAL E-CONFERENCE OF SCIENCE AND BIOSPHERE RESERVE (ICESBR) 2021

PROGRAM BOOK

**SUSTAINABILITY, INNOVATION AND MANAGEMENT OF TASIK CHINI
AS BIOSPHERE RESERVE**



A CONFERENCE BY



Malaysian National Commission
for UNESCO

CO-ORGANISED BY



HOSTED BY



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The International e-Conference of Science and Biosphere Reserve : Keynote Meeting (IECSBR 2021) is organized by Pusat Penyelidikan Tasik Chini (PPTC), Faculty of Science and Technology, Universiti Kebangsaan Malaysia (UKM) in collaboration with East Coast Economic Region Development Council (ECERDC) Malaysia. This conference is hosted by Agrifera Consultancy as our main partner.

IECSBR 2021 aims to provide a platform for academicians, scientists and researchers across the globe to discuss key issues pertinent to sustainability, innovation and management in line with the main theme:

"Sustainability, Innovation and Management of Tasik Chini as Biosphere Reserve"

The papers on original works are solicited on a variety of topics, including but not limited to the following tracks:

- Science & Biodiversity
- Community & Socioeconomic
- Science & Technology
- Bioenergy
- Green Technology
- Renewable Energy
- Enzyme Energy
- Biochemical Industry
- Natural Resource
- Commodity Plants
- Environmental Management



Welcome Message

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

Assalamualaikum w.b.t.

I would like to bid all of you a warm welcome to this International eConference of Science and Biosphere Reserve.

A big thank you to all the conference speakers, researchers, students who are willing to share their experiences and knowledge that benefits all of us especially the younger generation who will continue the legacy of the global challenges. It is hoped that your efforts and devotion will ensure the sustainability of this environment to be inherited by our children and grandchildren.

I would like to congratulate Tasik Chini Research Center, also known as Pusat Penyelidikan Tasik Chini (PPTC) in organizing its first international Conference of Science and Biosphere Reserve. Due to the pandemic, an e-conference seems the best alternative way of sharing and exchanging experiences among Biosphere Reserve under the MAB Program, in the context of both research and education.



Tasik Chini Biosphere Reserve (TCBR) is now 10 years old. Universiti Kebangsaan Malaysia as The National University of Malaysia has been a proud key player of this first Biosphere Reserve in Malaysia, since its inception in 2009. Being one of the main stakeholders of TCBR, UKM has supported the logistic functional role in ensuring that research and education is given a priority so that the aims of a UNESCO MAB site is achieved. In doing so, UKM has endorsed PPTC not just as a research center outside campus, but also as learning sites and a living laboratory for sustainable development between people and their environments.

Ladies and Gentlemen,

Pusat Penyelidikan Tasik Chini (PPTC) was established to promote research and education and ensuring that the biodiversity of the area is conserved and protected. The watershed is renowned for its lush tropical lowland dipterocarp forest. It is home to 138 species of flora, 300 species of non-aquatic life and 144 species of freshwater fish. Between August and September, the lake turns into a floating garden with thousands of white and pink lotus flowers covering its surface. The unique combination of tropical freshwater wetland ecosystems and dipterocarp lowland tropical rainforests makes the site a place for tourism. Due to this unique feature, Tasik Chini with its 5,000 hectare of watershed, was awarded as Biosphere Reserve.

With the new status as a Biosphere Reserve in 2009, PPTC has worked with the local community, the state government which involved the local and district authorities, the federal government under its many ministries and departments. Not forgetting GLC such as East Coast Economic Region Development Council (ECERDC) who has supported PPTC in undertaking our research findings and implement it as a green restoration program. It involves understand and manage all changes and interactions between social and ecological systems, including conflict prevention and biological diversity management.

PPTC has introduced not just eco-tourism, but a more sustainable educational tourism program that created awareness among tourists, visitors, and school children. Various activities to ensure a sustainable edu-tourism has brought in the local community especially the aborigines or the Orang Asli living at the site to show a green and eco-friendly approach to tourism. The community involvement is an important prerequisite in the activities of a Biosphere Reserve site.

Therefore, PPTC has integrated the local experience, through learning from the aborigines, The Jakuns, and incorporate their techniques of conservation and traditional development into our research, education, and leisure. This is an initiative towards Translational Research where the application of research knowledge, especially coming from PPTC and using some of these techniques and tools to address the environmental SDG needs. This is in line with achieving a better and more sustainable future for all by 2030.

PPTC conducts multidisciplinary and integrated research involving experts and researchers from FST, FKAB, FSSK, CITRA, FEP, FPER and other faculties in UKM. Besides, it also involves various state and federal government agencies for environmental conservation, green building, socio-economic and local culture efforts. The involvement of all these parties is very important in the effort to conserve and preserve this site to maintain the status of Biosphere Reserve in this lake. The involvement of researchers and students from local universities such as UMT, UPM, IUM, and UMP, also boosted the knowledge dissemination activities and produced high-impact research.

PPTC also succeeded in attracting corporate bodies to work together in ensuring the well-being of the environment and developing the socio-economy of the community here. In October 2018, Celcom Axiata entered into a joint venture with UKM in developing and implementing a sustainability framework for the Tasik Chini environment and the surrounding community especially in digital inclusion, data collection, and e-entrepreneurship. Through this effort, locals and indigenous communities have access to training and knowledge sharing sessions as well as platforms to participate in e-commerce by marketing local products through PribumiMall @ DesaMall, an online platform provided by Celcom and its partner, 11street. At the same time, PPTC has become a hub for disseminating information and as a reference source for Tasik Chini Orang Asli in obtaining any other information and facilities.

It is my hope, the PPTC can continue this noble on-going effort, especially to impart knowledge to stakeholders. I believe, with continuous efforts, the PPTC can become the coordinator that can connect expertise from universities, corporate parties, NGOs, residents and many more, locally and internationally, in an effort to develop and preserve the Chini Lake in particular.

With that, I hereby officiate International e-Conference of Science and Biosphere Reserve.

Thank you.

Mohd Ekhwan Hj. Toriman

Professor Dato' Ts. Dr. Mohd Ekhwan Hj. Toriman

السَّلَامُ عَلَيْكُمْ وَرَحْمَةُ اللَّهِ وَبَرَكَاتُهُ



To our respected vice-chancellor, YBhg. Prof. Dato' Dr Mohd Ekhwan Hj, Toriman, Co-organizer from Suruhanjaya Kebangsaan UNESCO Malaysia (SKUM) and East Coast Economic Region Development Council (ECERDC), Pejabat Setiausaha Kerajaan Negeri Pahang, YB Tasik Chini, organizing committee members, Key-notes speakers, Presenter and Spectators, I am delighted to welcome to this 1st International e-Conference of Science and Biosphere Reserve. It is a virtual platform to connect researchers with government and non-governmental organizations, local and international in sharing information related to environmental issues as well as the latest findings.

Well done to Tasik Chini Research Centre or famously named as Pusat Penyelidikan Tasik Chini, abbreviated as PPTC and to all the members of the organizing committee who have successfully organized this event. The faculty is very proud of the initiative and effort from PPTC to provide a platform to discuss the importance of preserving the biosphere of Tasik Chini or Lake Chini.

Despite its distance of about 260 km from the main campus, PPTC is an affiliate of this faculty, Faculty of Science and Technology. Academic and non-academic staff from this faculty have long been involved in setting up of the research Centre since 2000 and established as a UKM entity in 2004. But research has been ongoing since 1986 which involved academic and non-academic staffs of the faculty, undergraduate and graduate students and a collaboration from the local community of the area.

PPTC main aim is an establishment of an integrated research hub that can be a platform for researchers from various faculties in UKM and also various fields to collaborate. This collaboration will enable various research to be conducted as well as the delivery of knowledge on environmental protection awareness. Indirectly, this cooperation is expected to connect the local community in developing, conserving and preserving Tasik Chini without neglecting the environment.

Currently, PPTC research group under funding from Dana Cabaran Perdana which is UKM exclusive premier research grant, is actively conducting research in Tasik Chini. This research group consists of representatives from three faculties, namely Faculty of Science and Technology, Faculty of Engineering and Built Environment and Pusat Citra UKM. The research work of this group aims to development an aquaculture system with the concept of zero waste discharge in Tasik Chini for the needs of the indigenous community and the sustainability of the lake biosphere reserve. This study involves four components of research namely

- Livestock in a sustainable aquaculture ecosystem,
- Biogas Production as an Alternative to Electricity Sources using Palm Oil Mill Effluent (POME) under Anaerobic Digestive System,
- Water and Effluent Treatment System from Anaerobic Digestion and Aquaculture System Through Physiotecchnology
- The Sustainability of Indigenous Life in Tasik Chini Through Fish and Shrimp Farming with the Concept of Zero Waste Release.

The involvement of 3 different research groups with different professional background allows the sharing of expertise to discuss the needs of the different MAB zonation's namely core zone, buffer zone and transition zone to be applied to TCBR. The results of these studies are expected to give a positive impact to the local community, especially the indigenous people in line with the role of biosphere reserves i.e., to promote new economic development while preserving the environment. This is also to keep with the existing documents of Man and Biosphere (MAB) program and World Network of Biosphere Reserve (WNBR), in particular the Seville Strategy and Statutory Framework of World Network, the MAB Strategy (2015-2025) and Lima action plan (2016-2025). With IECSBR-2021, it is hoped that the role of this research group and its findings can be shared and emulated by all parties in ensuring the management of Lake Chini Biosphere Reserve is as part of the World Network of Biosphere Reserve.

As the dean of the faculty, I am very proud of PPTC achievements and the organizers to gather all stakeholders, national and international participants in one platform to share on environmental conservation and the future of Tasik Chini Biosphere Reserve. I hope, this program can be an ongoing program that will benefit all parties.

Mohammad Kasim

Prof. Dr. Mohammad Bin Kasim

السَّلَامُ عَلَيْكُمْ وَرَحْمَةُ اللَّهِ وَبَرَكَاتُهُ

Assalamualaikum dan Salam Sejahtera,

Yang Berbahagia Vice Chancellor of Universiti Kebangsaan Malaysia, UKM, Prof. Dato' Dr Mohd Ekhwan Hj. Toriman, Yang Berbahagia Dean of Faculty Science and Technology, Prof. Dr. Mohammad Kassim. Yang Berusaha, Our co-organiser of this conference, Suruhanjaya Kebangsaan UNESCO Malaysia or the Malaysian National Commission for UNESCO, The East Coast Economic Region Development Council, ECERDC and The Malaysia Society of Applied Biology.

Respected and beloved organizing members, honored Key-notes speakers and respected participants.

This is a glorious moment to extend my warm wishes on behalf of Tasik Chini Research Center of UKM. I would also like to use this opportunity to thank all of you, the participants, sponsors and team members and all who have been supportive in making this meeting a success.

The Tasik Chini Research Center or locally known as Pusat Penyelidikan Tasik Chini or PPTC, is one of UKM's living lab. Bless with the opportunity to be located within Tasik Chini Biosphere, this unique living lab setting allow the research center to grow, co-exist, and conducting social as well as scientific activities with the local community and authority bodies around it.

Example of such activities are :

1. Phytoremediation research
2. Research on Tasik Chini Biosphere sensitive area management
3. Freshwater turtle or tuntung conservation program with Department of Wildlife and National Parks Peninsular Malaysia
4. Water monitoring activities with the national Department of Environment
5. Lotus Restoration Program with Forest Research Institute of Malaysia with support from ECERDC
6. Fish population assessment
7. Varies community activities
8. And also edu-tourism of the biosphere area

Bridging between the people around the vicinity, PPTC has help tackling and monitoring issues that surround the lake with support with all the stakeholders, government and non-government bodies. One prime example, during the recent flood event that happen around Tasik Chini, PPTC has mobilized to assist people in need by distributing emergency and food supplies to the effected locals with our own assemblyman, Yang Berhormat Mohd Sharim Md Zain. I sincerely applaud the PPTC team who selflessly help their brothers and sisters in their times in need.

Ladies and gentlemen,

This is the very spirit that led to the organisation of this meeting. Scientists, communities, local industries, government, non-government and corporate bodies must all start talking, listening, communicating, sharing ideas, presenting facts, take responsibilities and be aware to make our beautiful biosphere a utopia which we all can be proud of.

Assalamualaikum, Peace be upon you.

Mohd Shazrul Fazry

Dr. Mohd Shazrul Fazry Bin Sa'ariwijaya





Organizing Committee

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Prof. Dato' Ts. Dr. Mohd Ekhwan Hj. Toriman
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Agrifera is a combination of the word Agriculture and Sphere (sfera in Bahasa Melayu), which explained our consultation, strategy, branding and operational focuses. We centring our existence and professional knowledge in improving the livelihood of the communities through agricultural developments while strategically factor in the social and environmental influences in life.



MALAYSIAN SOCIETY OF APPLIED BIOLOGY

<http://ukm.edu.my/msab>

Malaysian Society of Applied Biology (MSAB) is a society that assembles members who focus on application or using a biological approach in research, industry, commercialisation, education and other related fields. To date, MSAB has more than 230 members who come from various background including students, researchers and industries.

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YB MOHD SHARIM BIN HJ MD ZAIN

Member of State Assembly for Chini.

Mohd Sharim bin Md Zain is a Malaysian politician and currently serves as member of State Assembly for Chini.

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As the CHINI DUN assemblyman, within 8 months of being the people's representative, I continue the legacy of the late Dato' Abu Bakar as the previous leader and mentor from Barisan Nasional, I will continue to bring voice and raise all community problems, improve the development structure and foresee all community needs to ensure the community benefits and continues to the legacy to the future.

In 2035, 14 more years under Malaysia's development plan, for DUN CHINI there will be Paloh Hinai town and Simpang Chini town under the framework of Malaysia Development Plan 2035. It will benefit the surrounding areas. I hope the support from the community and the agencies together to help in terms of infrastructure development.





Social Network

SOCIAL MEDIA



CONFERENCE WEBSITE

<https://iecsbr.lodopagevconference.com/>



YOUTUBE CHANNEL

<http://bit.ly/IECSBR2021>



FACEBOOK - PUSAT PENYELIDIKAN TASIK CHINI

<https://www.facebook.com/pptcukm>

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General Information

Registration

Joining of IECSBR Community is FREE to everyone. IECSBR Community will act as a platform for participant interaction. Once successfully joined the IECSBR Community, you can start taking part in the community. The LIVE conference contents are only accessible to paying participants. Paid participants will be able to login using their IECSBR Community username and password, and have full access to conference sessions during conference days. Abstract and pre-recorded presentation video submission is only open to paid Participants, except Spectator.

Conference Hours

The conference will consist of 8 sessions for two days. A morning session starts at 9 a.m. and an afternoon session will start at 2 p.m. The conference will be broadcast on both Wednesday, March 3, and Thursday, March 4 (Malaysian Standard Time). Please refer to Program Schedule (Page 30) for details on the conference sessions.

Coffee Break / Lunch

There will be Coffee Break / Lunch Break between the session. The participant may refer to the tentative in the official website for details.

E-Certificate of Attendance

E-Certificate of Attendance will be given to all registered delegates upon request within 10 working days after the Conference via email (soft-copy). To request for E-certificates, kindly write your full name, your organization and email address, and you may email to: iecsbr2020@gmail.com.

For Keynote & Presenter

- 1) You are required to check-in at the Standby Room at least ONE (1) hour prior to your presentation day to prepare for any question that will be asked during the conference.
- 2) The staff on duty will reconfirm your presentation timing and location.
- 3) Please be present at your session room / at least 15 minutes prior to the start of the session.



Keynote Speakers



Professor Shahbaz Khan
Director of UNESCO,
Regional Science Bureau for Asia and The Pacific and
UNESCO Representative for Brunei Darussalam,
Indonesia, Malaysia, the Philippines, and Timor-Leste

Professor Shahbaz Khan joined UNESCO in 2008 as Chief of Water and Sustainable Development Section at UNESCO Division of Water Sciences based at Paris. His key leadership and management areas at UNESCO include science capacity building and policy advice across the region. He has also coordinated key programs such as Water Education for Sustainable Development, Hydrology for Environment, Life and Policy (HELP), Ecohydrology, MAB and Water and Energy Nexus. He was previously Research Leader of Irrigated Systems and Rural Water Use areas of CSIRO Australia and Professor of Hydrology and Director of International Centre of Water at the Charles Sturt University.

Dr. Hans Thulstrup
Senior Programme, Specialist for Water and Environmental Sciences,
UNESCO Cluster Office in Jakarta

Based at UNESCO's Regional Sciences Bureau for Asia and the Pacific in Jakarta, Indonesia, since June 2017, Hans is responsible for regional coordination of the International Hydrological Programme (IHP) and the Man and the Biosphere (MAB) programme. He also supports the recently established International Geosciences and Geoparks Programme (IGGP) and works on natural heritage issues relating to the World Heritage Convention. Hans has worked with UNESCO's natural sciences programmes for two decades, previously based at the Organization's offices in Apia (Samoa), Bangkok, Beijing and Paris. He has worked extensively with the Man and the Biosphere programme in Asia and the Pacific, contributing the establishment of the Southeast Asian Biosphere Reserve Network (SeabRnet) and the Pacific MAB Network (PacMAB), as well as coordinating the secretariat of the East Asian Biosphere Reserve Network (EABRN). He has a PhD in Scientific Communication and an MSc in International Development, and a particular interest in the role of communications in international science cooperation and networking.





Professor Dato' Sri Dr. Mushrifah Idris
Advisor of Tasik Chini Research Centre

A former researcher of Tasik Chini Research Centre and also pioneer that work together with stakeholders to award the Tasik Chini as Biosphere Reserve. She involved in many research associated with Tasik Chini such as unpacking the experience of the biosphere reserve tourism from the academic tourist's perspective: A case of Tasik Chini. Now, she is an advisor of Tasik Chini Research Centre and also a chief executive of Agrifera Consultancy.

Dr. Jurgenne H. Primavera
International Advisory Committee for Biosphere
Reserve, UNESCO

Jurgenne Primavera has BS Zoology, PhD Marine Science (University of the Philippines Diliman) and MA Zoology (Indiana University) degrees. She has around 130 scientific papers, reviews, manuals, books and other publications and serves as board member and scientific adviser of various organizations. Among her recent activities are leading a survey team that assessed post-Haiyan mangrove damage and recovery in Eastern Samar-Leyte; lead authoring two manuals on mangrove rehabilitation and pond-mangrove reversion.

She was elected to the Swedish Royal Academy on Agriculture and Forestry, Royal Belgian Academy for Overseas Sciences, Phi Kappa Phi, and other honor societies. She was named Scientist Emerita of SEAFDEC/AQD upon retirement in 2007, one of 30 Time Magazine Heroes of the Environment and 50 DOST Men and Women of Science in 2008, and a University of the Philippines Distinguished Alumni Awardee in Environmental Conservation and Sustainable Development in 2009. Presently she is Chief Mangrove Scientific Advisor of the Zoological Society of London and Co-Chair of the recently established Mangrove Specialist Group of the IUCN.



Dato' Sri Dr. Sallehuddin Bin Ishak
Pahang State Secretary



Dato' Dr. Sallehuddin Ishak who holds a doctorate (Ph.D) from the University of Glasgow (petroleum industrial land development) and a Master from the University of Aberdeen, United Kingdom, has more than 25 years of service in all Federal, State and District land administration. He is currently the Deputy Director General of Federal Lands and Mines and is also the Chairman of the Property Management Fraud Prevention Committee, as well as the Chairman of the Strata Titles Settlement Committee at the national level. In addition, he is also the Co-Chairman of Focus Group Registering Property, one of the PEMUDAH sub-committees.

YB Mohd Sharim bin Hj Md Zain
Member of State Assembly for Chini

Mohd Sharim bin Md Zain is a Malaysian politician and currently serves as a member of the State Assembly for Chini.

In July 2020, Mohd Sharim first contested to become a Member of the Legislative Assembly (MLA) in Chini by-election. The election was held following the death of the incumbent Member of the Legislative Assembly (MLA) from United Malays National Organisation (UMNO), Abu Bakar Harun on 7 May who held the seat since 2004.

On 18 June, Barisan Nasional decided to nominate Mohd Sharim, who is Felda resident as its candidate for the by-election. He won the by-election after defeating two other Independent candidates, Tengku Zainul Hisham Tengku Hussin (former Deputy Division Chief of BERSATU Pekan) and Mohd Shukri Mohd Ramli (Social Activist)





Mr. Baidzawi Che Mat
Chief Executive Officer (CEO), The East Coast
Economic Region Development Council (ECERDC)

Mr. Baidzawi Che Mat is the Chief Executive Officer (CEO) for The East Coast Economic Region Development Council (ECERDC). ECERDC was formed with the mandate to spur socio-economic development of the East Coast Economic Region (ECER). The goal is to achieve balanced regional development and improve the Rakyat's standard of living and close the rural-urban gap. ECERDC's role is to accelerate the implementation of strategic high-impact projects and programs. This is done by complementing existing Federal and State Government efforts through a consultative and collaborative approach to ensure all stakeholder issues are addressed and the particular regional needs are met. The aim is to enable all Rakyat to enjoy the fruits of the Region's economic growth, and that no community is left behind specifically the B40, youth, women, and Orang Asli communities.

Dato' Ragu Sampasivam
Chief Operating Officer (COO), The East Coast
Economic Region Development Council (ECERDC)

Dato' Ragu Sampasivam is the Chief Operating Officer (COO) for The East Coast Economic Region Development Council (ECERDC). ECERDC was formed with the mandate to spur socio-economic development of the East Coast Economic Region (ECER). The goal is to achieve balanced regional development and improve the Rakyat's standard of living and close the rural-urban gap. ECERDC's role is to accelerate the implementation of strategic high-impact projects and programs. This is done by complementing existing Federal and State Government efforts through a consultative and collaborative approach to ensure all stakeholder issues are addressed and the particular regional needs are met. The aim is to enable all Rakyat to enjoy the fruits of the Region's economic growth, and that no community is left behind specifically the B40, youth, women, and Orang Asli communities.





Dato' Dr. Mohd Hizamri Bin Mohd Yasin
Director of Jabatan Perhutanan Negeri Pahang

The Pahang State Forestry Department (Jabatan Perhutanan Negeri Pahang, JPNP) has been established since the early 1900s to manage and administer all the forest treasures found in the State of Pahang Darul Makmur. The role and duties of JPNP have become increasingly complex in line with the needs and aspirations of the community who want optimal benefits from forest resources.

JPNP is responsible for managing the Permanent Forest Reserve perfectly in line with the concept of sustainable forest management. To achieve this objective, JPNP implements forestry law policies and enforcement, controls and coordinates the licensing of all types of wood-based industries, and advises the State Authority in all aspects related to the administration and management of forest resources to bring maximum benefits to development state socio-economy. Apart from that, JPNP also implements development, conservation and reforestation efforts through perfect silvicultural practices in order to be able to produce high forest yields from Permanent Forest Reserve areas.

Mr. Abdullah Bin Jaafar
Director of Perikanan Negeri Pahang

Jabatan Perikanan Malaysia (Department of Fisheries Malaysia) is under the Ministry of Agriculture and Food Industry. This department strives to achieve development and modernization in the fisheries sector. Their mission is to manage and develop fisheries sustainability dynamically and competitively based on scientific information and to provide the best service. Hence, the Department focused more to develop a dynamic market-based fisheries industry through creative and innovative approaches, manage the national fishery resources in an efficient, innovative and environmentally friendly manner based on scientific information and good governance and enhance the delivery system through skillful, knowledgeable and professional human capital





Professor Dr. Ahmad Abas Kutty
Researcher of Tasik Chini Research Centre

Prof. Dr. AHMAD BIN ABAS KUTTY is a professor from Faculty of Science and Technology, Universiti Kebangsaan Malaysia. He obtain both BSc and MSc in Aquatic Ecology and Aquatic Pollution respectively from Universiti Kebangsaan Malaysia and Phd in Biological Monitoring from Loughborough University, UK. He is currently working on Aquatic Ecology, Freshwater Biological Indicator, and Lakes and River Assessment and Management, and actively involved in consultation and publication. He is an environmental consultant registered with the Department of Environment and has completed more than 100 EIA reports at the national and international levels. He published more than 90 scientific journal articles and attended various national and international conferences

Professor Madya Dr. Habibah Ahmad
Jabatan Sains Bumi & Alam Sekitar, Fakulti Sains dan Teknologi
Universiti Kebangsaan Malaysia

Assoc. Prof. Dr. Habibah is currently attached to the Research Centre for Development, Social and Environment, Faculty of Social Sciences and Humanities, Universiti Kebangsaan Malaysia. As an expert in tourism development, she teaches courses such as Tourism & Product Development, and Tourism Development & Impacts. She contributes to the development of Asean Youth Volunteer Program that concentrates on the tourism and community engagement for two consequences years. Apart from that, she also referred by the Putrajaya Corporation in several attempts of Tourism Action plan and Blueprint Masyarakat Madani.





Dr. Mohd Shazrul Fazry bin Sa'ariwijaya
Head, Pusat Penyelidikan Tasik Chini, Fakulti Sains dan Teknologi
Universiti Kebangsaan Malaysia

Mohd Shazrul Fazry Bin Sa'ariwijaya is a senior lecturer from Faculty of Science and Technology, Universiti Kebangsaan Malaysia. He obtains both BSc and MSc in Biochemistry and Molecular Biology from Universiti Kebangsaan Malaysia and PhD in Carcinogenesis from The University of Queensland, Australia. Currently he holds the position as the Head of Tasik Chini Research Center (Pusat Penyelidikan Tasik Chini). He is currently working on cell toxicology and development of food security system via biotechnology

Professor Ir. Dr. Siti Rozaimah Bt. Sheikh Abdullah
Researcher of Tasik Chini Research Centre

Prof. Ir. Dr. Siti Rozaimah Sheikh Abdullah earned M.Eng degree from University of Nottingham and Ph.D from the Universiti Kebangsaan Malaysia (UKM). She specialized in water and wastewater treatment system, phytoremediation, waste audit and management, and artificial intelligence-based control in wastewater treatment. She has been a highly productive researcher who has co-authored hundreds of research articles published in highly reputable scientific journals.

She has been the Project Leader in consultation projects with companies in Malaysia, including Petronas and Malaysia Newsprint Industry. For her excellent contributions in research and teaching, she has won numerous awards, including UKM Excellence Service Award 2017, MSTF Science and Technology Award 2015 for outstanding achievements in the field of Nanofiltration and Ultrafiltration Technologies for Water and Wastewater Treatment, Gold Medal Award in Innovative Practices in Higher Education Expo 2014, Bronze medal in 32nd International Exhibition of Inventions of Geneva 2004, UKM Excellent Service Award 2004, 2008 & 2011, and UKM Excellent Lecturer Awards 2006, 2007 & 2011. Currently, she is actively involved in Research Center for Sustainable Process Technology (CESPRO) under Faculty of Engineering and Built Environment, UKM.



Assoc. Prof. Ir. Dr. Hassimi bin Hassan
Researcher of Tasik Chini Research Centre

Ir. Dr. Hassimi Abu Hasan is the Head of Research Centre for Sustainable Process Technology (CESPRO) in the Faculty of Engineering and Built Environment, Universiti Kebangsaan Malaysia (UKM).



He is an Associate Professor in the Department of Chemical and Professor Engineering, UKM. He graduated from UKM with Bachelor of Biochemical Engineering in August 2007 and completed his PhD degree in the same university in February 2012.

He is expertise in biofiltration and pyhtoremediation for water, wastewater, and soil treatment. He is a managing committee for the 2019 IWA specialize Small Water and Wastewater System (SWWS). He has been awarded UKM Excellent Young Academician 2018, UKM Excellent Young Researcher 2017, and Most Valued Reviewers for Bioresource Technology-Elsevier in the year of 2017 and 2018. He has conductor many water treatment projects related to industry and community.

He has published more than 90 article journals and attended more than 15 national and international conferences

Dr. Rozita binti Ibrahim
Researcher of Tasik Chini Research Centre

Rozita Ibrahim is a senior lecturer from Pusat Citra Universiti (Centre for Liberal Studies), Universiti Kebangsaan Malaysia. She obtained her BSc(Hons) from University Malaya in Ecology and later pursued Masters in Environment from Universiti Putra Malaysia; and MLitt in Religious Studies and PhD in Islamic Studies from University of Aberdeen, Scotland. She is currently the Head of Industry and Community Partnerships for Pusat Citra Universiti. She first joined Pusat Penyelidikan Tasik Chini (PPTC) as a community researcher in 2013 and since then has been actively involved in many community engagement programmes with the Orang Asli of Tasik Chini.





Tok Batin Awang Alok
Jakun Leader

Community Leader of an Orang Asli Village since 1968, He lives in Kg Gumum Tasik Chini and become the voice and representative of Orang Asli Tasik Chini.

Tok Batin is important in upholding all matters pertaining to rules , culture, the traditional way of life for the Orang Asli under his care

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Program Schedule

DAY 1

Wednesday, March 03, 9:00am – 5:00pm
All times shown are Malaysian Standard Time (MYT)

All Day

REGISTRATION

Scan QR Code in the conference website

9:00 am - Session 1 (Opening Ceremony)**WELCOMING SPEECH**

DR. MOHD SHAZRUL FAZRY SA'ARIWIJAYA
Head, Pusat Penyelidikan Tasik Chini (PPTC)
Faculty of Science and Technology
Universiti Kebangsaan Malaysia



PROF. IR. DR. SITI ROZAIMAH SHEIKH ABDULLAH
Project Leader of Dana Cabaran Perdana
Universiti Kebangsaan Malaysia



PROF. DR. MOHAMMAD BIN KASIM
Dean, Faculty of Science and Technology
Universiti Kebangsaan Malaysia



YH PROF. DATO TS DR. MOHD EKHWAN HJ. TORIMAN
Vice Chancellor
Universiti Kebangsaan Malaysia

OFFICIAL OPENING CEREMONY**MONTAGE**

Introduction to Tasik Chini Biosphere Reserve

VOICE OF LOCALS

An Interview with Residents of Tasik Chini – Part 1

YOUTH PLATFORM #1

Muhammad Zulfadzli Bin Azmi

10:00 am - Session 2**KEYNOTE SPEECH****KEYNOTE SPEECH 1**

PROFESSOR SHAHBAZ KHAN

Director of the UNESCO Regional Science Bureau for Asia and the Pacific and UNESCO Representative for Brunei Darussalam, Indonesia, Malaysia, the Philippines, and Timor-Leste

Title: An overview of UNESCO's work on the key elements towards environmental justice in the Biosphere Reserve area.

YOUTH PLATFORM #2

Kumaleshree

PRESENTER 1

DR. VIRGINIA PANIZZO

University of Nottingham, United Kingdom

Title: Supply and Transformation of Organic Matter in Tasik Chini and its Role in Underpinning Lake Ecosystem Functioning

**KEYNOTE SPEECH 2**

DR. HANS THULSTRUP

Senior Programme, Specialist for Water and Environmental Sciences, UNESCO Cluster Office in Jakarta

Title: Technical Part of UNESCO's Work on The Key Elements Towards Environmental Justice in The Biosphere Reserve Area

YOUTH PLATFORM #3

Nurul Adlina Bt Anua

PRESENTER 2

DR. ZATI SHARIP

National Water Research Institute of Malaysia (NAHRIM)

Title: Monitoring Lake Water Quality Using National Lake Water Quality Criteria and Standards Towards Sustainable Management

**KEYNOTE SPEECH 3**

PROF. DATO SRI DR. MUSHRIFAH IDRIS
Advisor of Tasik Chini Research Centre

Title: The need for coordinated research in Tasik Chini Biosphere Reserve.

YOUTH PLATFORM #4

Nurul Azzah Fazwiyah Binti Zulkipli & Dini Qistina

**KEYNOTE SPEECH 4**

DR. JURGENNE H. PRIMAVERA
International Advisory Committee for Biosphere Reserve The
United Nations Educational, Scientific and Cultural
Organization

Title: Case study of mangrove rehabilitation and conservation

02:00 pm - Session 3

YOUTH PLATFORM #5

Izzah Jalal

KEYNOTE SPEECH 5

DATO' SRI DR. SALLEHUDDIN BIN ISHAK
Pahang State Secretary

Title: Peranan kerajaan negeri dalam mengekalkan tapak Rizab Biosfera
(The Role of The State Government in Maintaining The Biosphere Reserve Site)

**YOUTH PLATFORM #6**

Muhammad Nurul Syawal Bin Ismail & Muhammad Lutfi Bin Abdullah

PRESENTER 3

NUR AFRINA BATRISYIA
Universiti Kebangsaan Malaysia

Title: Chlorella sp and Moina Macrocopa as Feeds for Sustainable Aquaculture in Tasik Chini

**KEYNOTE SPEECH 6**

YH MOHD SHARIM HJ MD ZAIN

Member of State Assembly for Chini

Title: Isu-isu Masyarakat Setempat dan Harapan
(Local Community Issues and Expectation)

YOUTH PLATFORM #7

Dashine A/P Gothandapani

PRESENTER 4

DR. RANJETTA POOBATHY

Quest International University, Malaysia

Title: Induction of Protocorm-like Bodies (PLBs) from Thin Cell Layers (TCLs) of *Ludisia Discolor*

**KEYNOTE SPEECH 7**

MR BAIDZAWI CHE MAT

Chief Executive Officer (CEO) The East Coast Economic Region Development Council (ECERDC)

Title: The strategic implementation towards soaring upwards the socioeconomic status of Tasik Chini community

04:00 pm - Session 4

YOUTH PLATFORM #8

Nur Shahirah Binti Amirzudin

PRESENTER 5

DR. SHAIRAH ABDUL RAZAK

Universiti Kebangsaan Malaysia

Title: Length-Weight Relationship Analysis: Comparisons of *Tor spp.* from selected Wild and Cultured Populations

**KEYNOTE SPEECH 8**

DATO' RAGU SAMPASIVAM

Chief Operating Officer (COO) The East Coast Economic Region Development Council (ECERDC)

Title: The element of promoting the culture and heritage of Orang Asli in Tasik Chini as a new in-sight for socioeconomic development.

YOUTH PLATFORM #9

Syaza Safia Binti Fouzi

PRESENTER 6

SITI MAISARAH ZAKARIA

International Islamic University of Malaysia

Title: Leaf Anatomy and Micromorphology of Potential Medicinal Weed *Ruellia repens* L. (*Acanthaceae*) from Tasik Chini, Pahang

**KEYNOTE SPEECH 9**

DATO' DR. MOHD HIZAMRI BIN MOHD YASIN

Director of The State Forestry, State of Pahang

Title: Pewartaan Tasik Chini sebagai hutan simpan kekal dan implikasi kepada masyarakat setempat
(The Gazette of Tasik Chini as A Permanent Forest Reserve and It's Implications for The Local Community)

YOUTH PLATFORM #10

Mohamad Azirul Hanif Bin Mohamad Sri

DAY 2

Thursday, December 04, 9:00am – 5:00pm

All times shown are Malaysian Standard Time (MYT)

9:00 am - Session 5

VOICE OF LOCALS

An Interview with Residents of Tasik Chini – Part 2

KEYNOTE SPEECH 10

MR. ABDULLAH BIN JAAFAR

Director of Department of Fisheries, State of Pahang

Title: Potensi Tasik Chini sebagai tapak perindustrian perikanan
(Tasik Chini as Potential Fishing Industry)**YOUTH PLATFORM #11**

Nadrah Binti Sarafi

PRESENTER 7

URIDNA MARWAH LUFTHANSA

Institut Teknologi Sepuluh Nopember, Indonesi

Title: The Ability of Mangrove in *Lead (Pb)* Phytoremediation at
Wonorejo Estuary**KEYNOTE SPEECH 11**

PROF. DR. AHMAD ABAS KUTTY

Researcher of Tasik Chini Research Centre, UKM

Title: Kepelbagaian Ikan Tasik Chini: Dulu, Kini dan Masa
Hadapan

(Tasik Chini Fish Diversity: Previous, Current and Future)

**YOUTH PLATFORM #12**

Vishnu Dev

PRESENTER 8

SHEIKH KAMRAN ABID

Universiti Tun Hussein Onn, Malaysia

Title: Vulnerability and Resilience: A Study of Factors that
Influence Flooding in Sarawak state, Malaysia

**KEYNOTE SPEECH 12**

PROF. MADYA DR. HABIBAH AHMAD
Researcher of Tasik Chini Research Centre, UKM

Title: Biosphere Reserve Tourism: Engaging the Locals

YOUTH PLATFORM #13

Siti Ruqaiyah Binti Morshidi

PRESENTER 9

MAHA TAHA
University of Baghdad Iraq

Title: Statistical Analysis to Variation of Nickel Concentrations
and Mass of Ceratophyllum in Phytoremediation

**KEYNOTE SPEECH 13**

DR. MOHD SHAZRUL FAZRY SA'ARIWIJAYA
Researcher of Tasik Chini Research Centre, UKM

Title: Novel Food and Economic Security for Tasik Chini

11:00 am - Session 6

YOUTH PLATFORM #14

Abdulrofar Bin Jahari & Sheikh Muhammad Raziq Bin Abdul Yassir

PRESENTER 10

DR. JACK LACEY
British Geological Survey, Nottingham, UK

Title: Understanding the Drivers of Ecosystem Change at Tasik
Chini to Inform Sustainable Management

**KEYNOTE SPEECH 14**

PROF. IR. DR. SITI ROZAIMAH BT. SHEIKH ABDULLAH
Researcher of Tasik Chini Research Centre, UKM

Title: Transforming Wastes to Resources

YOUTH PLATFORM #15

Nura Shahida Binti Mohamad Rozlan

PRESENTER 11

DR. NOR ASNIZA ISHAK
Universiti Sains Malaysia

Title: Measuring Undergraduates' Attitude Towards Biodiversity at Waterfronts: A Rasch Model Analysis

**KEYNOTE SPEECH 15**

ASSOC. PROF. IR. DR. HASSIMI BIN HASSAN
Researcher of Tasik Chini Research Centre, UKM

Title: Challenges of Biogas Production and its Conversion to Electrical Energy

YOUTH PLATFORM #16

Muhammad Iemanuddin Bin Muhammad Sha'ari

PRESENTER 12

DR. MUAZ MOHD ZAINI MAKHTAR
Universiti Sains Malaysia

Title: The Future Promising Alternative Renewable Energy from Microbial Fuel Cell

02:00 pm - Session 7

**KEYNOTE SPEECH 16**

DR. ROZITA BINTI IBRAHIM
Researcher of Tasik Chini Research Centre, UKM

Title: Looking Back to Look Ahead: Reflections on Community Engagement in Tasik Chini

YOUTH PLATFORM #17

Sunatrah Binti Abdullahyi

PRESENTER 13

DR. AHMAD RAZI OTHMAN

Researcher of Tasik Chini Research Centre, UKM

Title: Malaysia Indigenous Bacteria Strain for Hexavalent Chromium Reduction

**KEYNOTE SPEECH 17**

TOK BATIN AWANG BIN ALOK

Head of Orang Asli Jakun Community

Title: The History of Tasik Chini: An Overview from the Aborigines

YOUTH PLATFORM #18

Ahmad Syahaziq Fitri Bin Ahmad Safarudin & Petra Danish Muqhyr Bin Ahmad

PRESENTER 14

DR. HASLAWATI BAHARUDDIN

Fisheries Research Institute (FRI), Glami Lemi,, Negeri Sembilan, Malaysia

Title: Water Quality Variability in Tasik Chini: A Review

YOUTH PLATFORM #19

Nur Hidayah Koh

PRESENTER 15

DR. MUJAZ MOHD ZAINI MAKHTAR

Universiti Sains Malaysia

Title: Effect of Different Type of Soil Area, Soil Depth and Pretreatment on Electricity Generation Using Membrane-less Microbial Fuel Cell

04:00 pm - Session 8

Award Presentation and Closing Ceremony**Best Youth Platform Awards****Closing Speech**

Dr. Mohd Shazrul Fazry Sa'ariwijaya



Abstract For Keynote

THE NEED FOR COORDINATED RESEARCH IN TASIK CHINI BIOSPHERE RESERVE

Mushrifah Idris
Honorary Advisor
Tasik Chini Research Centre
Faculty of Science and Technology
Universiti Kebangsaan Malaysia

ABSTRACT

As part of one the three functions of the biosphere reserve, the logistic support, laid a strong foundation in development through research, monitoring, education and training. Like most biosphere reserves under the MAB programme, research has helped boost objectives of Tasik Chini Biosphere Reserve (TCBR), in terms of sustainable activities towards green development, sustainable tourism, training towards green jobs. Tasik Chini Research Centre or locally called PPTC has initiated several projects via research to ensure that it provides projects that are eco-friendly and get support from the locals. Some examples of projects on the restoration and rehabilitation of TCBR are discussed showcasing the application of research and its implementation. By doing so PPTC found a partner that provides the funding and vision of a learning site for sustainable development. However, there is a lack of coordination within the stakeholders in the management of TCBR. Some proposals and recommendations have been made to ensure that a coordinated and integrated programme and activities for the two Malaysian Biosphere Reserves.

NOVEL FOOD AND ECONOMIC SECURITY FOR TASIK CHINI

Shazrul Fazry

Department of Food Sciences, Faculty of Science and Technology, Universiti Kebangsaan Malaysia, Malaysia
Tasik Chini Research Centre, Faculty of Science and Technology, Universiti Kebangsaan Malaysia, Bangi, Malaysia

ABSTRACT

Tasik Chini is one of the largest natural freshwater lake in Malaysia Peninsular where inhabited by megadiversity of species as well as local and native community such as the Jakuns and Malays. Most of the locals depends on the fertile and rich land around them for food and economical purposes. Unfortunately the land and water usage around the area has put a lot of stress to the natural biodiversity of Tasik Chini. This unfortunate conundrum between environmental stress and economical needs of the nation and community has been debated continuously and almost always favoured the latter needs. But to further exploit this rich resources will further damage Tasik Chini megadiversity and natural beauty and will one day damage the biosphere at a point of no return. Looking for long term and sustainable economical gain for the nation, we should look at a different view on how to turned other resources which were deemed insignificant before into a new economical opportunities. Tapping into latest social trends and nature-experience deficiency in younger generation could be a key to revitalise and open a new economic possibilities for the biosphere and community who live around them.



Abstract For Sustainability Track

MONITORING LAKE WATER QUALITY USING NATIONAL LAKE WATER QUALITY CRITERIA AND STANDARDS TOWARDS SUSTAINABLE MANAGEMENT

Zati Sharip(1*), Salmah Zakaria (2), Md Nasir Md Noh(1)

(1) National Water Research Institute of Malaysia (NAHRIM)

(2) Akademi Sains Malaysia

*Corresponding author: zati@nahrim.gov.my

ABSTRACT

In the past, the quality of water resources in Malaysia including lakes were monitored and assessed using the interim national water quality standards which were developed for the river. However, a specific water quality standard for the lake has been approved for application in Malaysia since 2017. This study attempted to investigate the water quality of different types of lentic water bodies in the country using the National Lake Water Quality Criteria and Standards (NLWQS). The studied lakes include natural lakes, flood detention pond, ex-mining pool, and reservoirs. The study assessed about 20 environmental variables prescribed by the standards. Our results showed different water bodies exhibit different water quality and trophic status. Puteri lake and Dayang Bunting Lake were oligotrophic, Chini Lake, Bukit Merah, and Chenderoh reservoirs were meso-eutrophic while Sembrong and Intan Baiduri were hypereutrophic. Hyper-eutrophic lakes contain high cyanobacterial density and fecal bacteria concentration. Despite oligotrophic, the water in Puteri Lake was acidic and not suitable for recreational purposes. Assessing the water quality based on NLWQS provides a better understanding of the overall characteristics of lakes concerning their uses for recreational purposes.

Keywords: eutrophication, Malaysian Lake Water Quality Standards, recreation, trophic state

LENGTH-WEIGHT RELATIONSHIP ANALYSIS AND COMPARISON OF TOR SPP. FROM SELECTED WILD AND CULTURED POPULATION

Noor Haliza Mohamed Ibrahim (1), Nur Farhana Mohd Yusoff(1), Simon Kumar Das(2), Shairah Abdul Razak (3*)

1) Department of Biological Sciences & Biotechnology, Faculty of Science Technology, UKM

2) Department of Earth Sciences & Environment, , Faculty of Science Technology, UKM

3) Department of Applied Physics, , Faculty of Science Technology, UKM

*Corresponding Author: shairah@ukm.edu.my

ABSTRACT

Overexploitation of fish under the genus *Tor* and anthropogenic activities have impacted their natural habitats causing the rapid decline of these fish populations, especially in wild. Although conservation is warranted, much scientific information either from taxonomic or biological aspects regarding mahseer's in Malaysia is still lacking and incomplete. Analyses on biometric data related to fish length and weight are required as the growth records is crucial for effective fisheries management and monitoring programs. Here, we describe a study focusing on biometric data inventories and determination of the mahseer's length-weight relationship as well as their CF values using *Tor* spp. from different populations. Analyses involved 29 cultured specimens ranging from 18.50 - 41.30 cm for total length and 63.71 - 435.50 g for bodyweight, while 24 wild specimens ranging from 12.00 - 46.00 cm for total length and body weight of 22.00 - 1060.00 g. Regression analysis was conducted separately for both populations, as there is a significant interaction detected between the length variables and population factor ($p \leq 0.05$, $R^2 = 0.847$) indicated by Analyses of covariances (ANCOVA). The growth parameter (b) of the length-weight relationship obtained through analysis regression was less than three, wild ($b = 2.6137$) and cultured ($b = 1.7789$), suggested that both populations have a hypoallometry growth pattern. Result also indicates that both fish populations grow faster in length compared to weight. The mean Fulton Condition (CF) obtained is higher in the cultured population ($K_n = 1.890$) than in the wild population ($K_n = 1.159$) probably influenced by various factors including the fullness of gut, amount of fat reserve and type of food consumed. Findings have contributed to the understanding of the growth pattern in studied fish populations. The available data will be useful for the management and conservation of *Tor* spp. in Peninsular Malaysia.

MALAYSIA INDIGENOUS BACTERIA STRAIN FOR HEXAVALENT CHROMIUM REDUCTION

Nur Nadhirah Ramli (1), Siti Rozaimah Sheikh Abdullah (1), Hassimi Abu Hasan (1,2), Ahmad Razi Othman (1*)

1)Department of Chemical and Process Engineering, Faculty of Engineering and Built Environment, Universiti Kebangsaan Malaysi, 43600 UKM Bangi, Selangor, Malaysia.

2)Research Centre for Sustainable Process Technology, Faculty of Engineering and Built Environment, Universiti Kebangsaan Malaysia, 43600 UKM Bangi, Selangor, Malaysia.

ABSTRACT

The presence of hexavalent chromium (Cr^{6+}) in Malaysia's environment has been reported previously. Hexavalent chromium was detected in the aquatic ecosystem and Malaysia's water catchment with some of the cases reported exceeding the minimum allowable limit. This scenario mainly due to numerous factors such as anthropogenic activity and leachate from the environment. Hexavalent chromium is known for its toxic effect on animals and humans. Therefore, treatment for chromium from hexavalent to trivalent state is in urgent need to prevent toxicity incident. A green and sustainable treatment using locally isolated bacteria was proposed for this analysis. Screening for bacteria resilient to chromium was conducted using soil samples taken from Tasik Cempaka. One resilient bacterium that withstands maximum Cr^{6+} concentration (1000 mg/L) was chosen for this analysis. *Bacillus* sp isolate S1 was identified. Accession number was deposited to Genbank. Selected bacteria isolate undergoes optimization analysis for chromium reduction using Response Surface Methodology (RSM) approach. Three parameters were chosen (Cr^{6+} concentration, pH and exposure time) with optimum condition obtained. From these analyses, can we conclude that *Bacillus* sp isolate S1 can be potentially used in bio-reduction of Cr^{6+} from the environment. However, further analysis on the *Bacillus* sp isolates S1 performance needs to be addressed before can be fully applied in the actual condition.

Keywords: hexavalent chromium, bio-reduction, *Bacillus* sp., response surface methodology

TASIK CHINI WATER QUALITY VARIABILITY: A REVIEW

Haslawati Baharuddin (1), Mohamad-Sufiyan Salmi (1), Wan Maisarah Wan Muhamad (2), Hani Kartini Agustar (2), A.K. Ahmad (2)

1) Freshwater Division, Fisheries Research Institute (FRI), Glami Lemi, 71650 Jelebu, Negeri Sembilan, Malaysia

2) Department of Earth Science and Environment, Faculty of Science and Technology, National University of Malaysia (UKM), 43600 Bangi, Selangor

ABSTRACT

Tasik Chini, Malaysian's second-largest natural lake, was recognised as UNESCO Biosphere Reserve in 2009; for providing a wide range of ecosystem services, including fisheries as a source of revenue for local people and eco-tourism. However, vigorous developments, especially over the last 20 years has caused environmental changes to the lake, transforming from a gorgeous and productive lake to a homogenous and poor lake. High sedimentation rates have made the lake very unhealthy and altered plant community and aquatic life. As a consequence, the quality of lake water was depleted, fish diversity decreased significantly and tourism activities were declined dramatically. Natural fish genetic restocking has been restricted due to the presence of a dam, that inhibited genetic exchange between Sungai Pahang and Tasik Chini. This study has integrated information from various sources on water quality in Tasik Chini, revealed that many of these studies discussed water quality, heavy metals and anthropogenic impacts. In general, the lake reported to have a class II water quality (DOE-WQI) and varies temporally and spatially. While serious consideration has been given on the impact of changes in water quality, particularly during the wet season when the lake receives flooded water from Sungai Pahang, that causes high metal precipitation, however, no attempt was undertaken to determine the impacts of water physico-chemical parameters reduction to fish diversity, abundance and survival. Such an unhealthy ecosystem could affect fish health, biological functions and surveillance. Some important parameters discussed in this paper are Dissolved Oxygen (DO), pH, conductivity, turbidity, Total Suspended Solids (TSS), chlorophyll-a, sulphate, and ammonia-N.

Keywords: Lake Ecosystem, Natural Lake, Water Pollution, Sedimentation, Seasonal Pattern



Abstract For Management Track

SUPPLY AND TRANSFORMATION OF ORGANIC MATTER IN TASIK CHINI AND ITS ROLE IN UNDERPINNING LAKE ECOSYSTEM FUNCTIONING

Authors: Virginia N. Panizzo(1*), Ryan Pereira(2*), Juliane Bischoff(2), Suzanne McGowan(1), Jack Lacey(3), Heather Moorhouse(4), Shazrul Fazry(5), Muhammad Shafiq Ruslan(5)

* Joint first authorship, in alphabetical order

(1) School of Geography and Centre for Environmental Geochemistry, University of Nottingham, University Park, Nottingham, NG7 2RD, UK (2) The Lyell Centre, Heriot-Watt University, Edinburgh, EH14 4AP, UK

(3) National Environmental Isotope Facility, Centre for Environmental Geochemistry, British Geological Survey, Nottingham NG12 5GG, UK (4) Lancaster Environment Centre, Lancaster University, Lancaster, LA1 4YQ, UK

(5) Faculty of Science and Technology, Universiti Kebangsaan Malaysia, Kuala Lumpur, 43600, Malaysia

Corresponding author: virginia.panizzo@nottingham.ac.uk

ABSTRACT

In tropical wetlands, seasonal connectivity with upstream river systems leads to large transformations in limnological characteristics, differences in Dissolved Organic Matter (DOM) sources and the succession of aquatic communities. These are all important factors in global carbon cycling. This is particularly relevant for the tropical flood pulse wetland of Tasik Chini, which is seasonally inundated by the Sg. Pahang, thereby sustaining the aquatic life cycle of the wetland including the iconic, native aquatic lotus (*Nelumbo nucifera*).

For the first time, we combine advanced geochemical analyses of DOM (liquid chromatography organic carbon and nitrogen detection) with algal pigment biomarkers and calculations of algal biomass (Chl a) in Tasik Chini. These data were collected on a monthly basis (January to November) for the year 2017, in conjunction with lake physio-chemical characteristics, total suspended solids (TSS), inorganic nutrient concentrations, and the oxygen isotope composition ($\delta^{18}\text{O}$) of lake waters. Together, these measurements identify key ecological phases, over the year, in the transport of DOM and its transformation via primary producers. The first phase coincides with the transition from the wet to dry season (January to May 2017) and captures the high nutrient influx and pedogenic (allochthonous) sources of DOM following the monsoon (high TSS, lower $\delta^{18}\text{O}$). This leads to a peak phytoplankton response between March and April, dominated by siliceous (fucoxanthin) algae. Between the months June to October, the second ecological phase in Tasik Chini is characterised by aquagenic (autochthonous) DOM, coincident with the peak dry season (higher $\delta^{18}\text{O}$) and a second peak in algal productivity. Due to nutrient exhaustion in phase 1, mixotrophic phytoplankton communities (cryptophytes [alloxanthin]) dominate phase 2, highlighting the importance of the internal cycling of DOM as a result of the reduction in pedogenic supply, peak in algal productivity (e.g. phytoplankton and macrophytes) with a shift to heterotrophy.

Here we show that studies on aquatic biomass and communities in seasonal flood pulse wetlands provide a valuable tool to explore changes in DOM transport, as well as its processing and burial, as a function of primary productivity. Forming the building blocks of aquatic foodwebs, these key components and their interactions have to date been undervalued in conceptual models of basin scale river connectivity which our paper explores (e.g. The River Continuum Concept, River Productivity Model and Flood Pulse Concept).

CHLORELLA SP AND MOINA MACROCOPA AS FEEDS FOR SUSTAINABLE AQUACULTURE IN TASIK CHINI

Afrina Batrisyia, Shazrul Fazry, Azwan Mat Lazim, Herryawan Ryadi Eziwar Dyari, Nur Hidayah Jamar, Babul Airianah Othman, Seng Joe Lim

Department of Food Sciences, Faculty of Science and Technology, Universiti Kebangsaan Malaysia, Malaysia

ABSTRACT

Fresh and live feeds have always been favored due to their nutritional values compared to formulated food palletted. However, culturing them economically and sustainably have always been a challenge. Here, our study proposed to use water flea, *Moina macrocopa* and green microalgae, *Chlorella sp* as cheap, sustainable, fresh and live food source for the sustainable aquaculture development in Tasik Chini. Microalgae specifically *Chlorella sp* is cultured in lab by using three types of medium; Bristol, modified BG-11 and commercial medium, KW21. *M. macrocopa* is grown by being fed by *Chlorella sp* as main diet. Reproduction, fecundity and growth of *M. macrocopa* was evaluated, individually by continuous feeding and one time feeding. It is discovered that individually and constant feeding, *M. macrocopa* took as early as four days to grow mature and reproduce the first generation and subsequent generation took 24 to 48 hours. The lowest number of brood size produced is 1 neonate while the largest is 30. The highest number of broods produced is at 10 broods per female. However, brood size and number of broods produced is depending on the diet. Concentration of *chlorella* biomass is at the highest peak at fifth day of cultivation and gradually become lower after being fed to *M. macrocopa*. It is shown by ninth and tenth day, the concentration of *chlorella sp* is much lower after *M. macrocopa* inoculated in the fifth day. Final weight of *M. macrocopa* is much higher than initial weight *M. macrocopa* inoculated into *chlorella* biomass.

VULNERABILITY AND RESILIENCE: A STUDY OF FACTORS THAT INFLUENCE FLOODING IN SARAWAK STATE, MALAYSIA

Authors:

Sheikh Kamran Abid (1), Noralfishah Sulaiman (2), Chan Shiau Wei(3), Umber Nazir (4)

Affiliations:

KANZU Research: Resilient Built Environment (RBE), Department of Real Estate, Faculty of Technology Management & Business, University Tun Hussein Onn Malaysia, 86400, Johor Malaysia

Corresponding Author Email:

shkamrnabide@gmail.com

ABSTRACT

Flooding is the most common natural disaster in Malaysia, resulting in chaos in affected areas in terms of disruptions to daily and economic activities, damage to roads and railway tracks, vehicles, causing the level of properties, loss of lives and vulnerability to rise. In addition to natural causes, floods are mainly attributed to continuous heavy rainfall, rapid development, unplanned urbanization, poor drainage system and environmental degradation. This annual occurrence of floods has given a big impact on lives of humans and other living being. Due to the negative impact of floods, we need to pay serious attention and take alternatives way to reduce this disaster. This study aimed to investigate the vulnerability factors and understand the concept of vulnerability and resilience to managing flood in Sarawak. The researcher primarily focused on reviewing the printed and documented material of disasters in order to find the vulnerability factors. Based on the findings, it can be concluded that the Natural, Human and Governance factors, contributed most of the flood. The present study shows that vulnerability reduction along with the emergency preparedness can reduce the flood damages and fatalities. The innovative technologies must have to be considered in the phases of human vulnerability reduction, which would help to reduce human vulnerability and build resilience to flood disaster urges sustainable disaster risk reduction in Sarawak.

Key Words: Vulnerability, Resilience, Flood, Disaster, Malaysia

MEASURING UNDERGRADUATES' ATTITUDE TOWARDS BIODIVERSITY AT WATERFRONTS: A RASCH MODEL ANALYSIS

Ahmad Zamri Khairani, Nor Asniza Ishak
School of Educational Studies, Universiti Sains Malaysia, 11800, USM, Penang, Malaysia

Corresponding author: asnizaishak@usm.my

ABSTRACT

Waterfront is defined as the zone of interaction between urban development and water. Unfortunately, development always has the upper hand in this interaction, and human is identified as the main culprit that resulted in the loss of biodiversity. Therefore, it is essential to create awareness to address this issue. As such, the purpose of this study is to measure undergraduates' attitudes towards biodiversity at waterfronts. This study is essential since the information will help in creating awareness towards the loss of biodiversity among the undergraduates. The sample consisted of 145 male and 202 female university undergraduates. This study employed WINSTEPS 3.74 to provide statistics and other information regarding the calibration of the items. In general, we reported some positive results, particularly with regards to their acceptance of the right of animals and plants to co-exist with humans at waterfronts. Nevertheless, we also found that the undergraduates were also in support of the use of motor vehicles such as motorboats at waterfronts that may cause water pollution. We also discuss how the finding might help to create awareness towards loss of biodiversity such as through campaigns and by helping preserving beaches, banks, and forests where plants and animals live.

Keywords: Attitude, biodiversity, Rasch Model, university undergraduates, waterfronts

PHYTOREMEDIATION OF ACETAMINOPHEN BY USING ORNAMENTAL PLANT AT SUBSURFACE-BATCH MESOCOSMS

Zahraa Hassan Mutara (a,c), Israa Abdul Wahab Al-Baldawi (b), Ahmed A Mohammed (a),
Siti Rozaimah Sheikh Abdullah (d), Nur 'Izzati Ismail (d)

(a) Department of Environmental Engineering, College of Engineering, University of Baghdad, Baghdad, Iraq.

(b) Department of Biochemical Engineering, Al-Khwarizmi College of Engineering, University of Baghdad, Baghdad, Iraq.

(c) Department of Architecture Engineering, College of Engineering, University of Wasit, Wasit, Iraq.

(d) Department of Chemical and Process, Faculty of Engineering and Built Environment, Universiti Kebangsaan Malaysia, 43600 UKM Bangi, Selangor, Malaysia

(a) Email: zahraa90911@gmail.com; israa@kecbu.uobaghdad.edu.iq

ABSTRACT

The excessive consumption of pharmaceutical and personal care products contributed to the alarming spread of these pollutants in the aquatic environment. In this study, sustainable method of phytoremediation has emerged. The experimental setup consisted of 14 mesocosms subsurface constructed wetlands (SSCWLs) in total, 8 planted and 6 unplanted controls. Different initial concentrations (0, 20, 60 and 100 mg/L) were observed for 35-days to investigate the removal of acetaminophen and to assess its potential toxic effects. At the end of the batch experiments, *Chlorophytum comosum* significantly removed about 94.7%, 98% and 98.73% of acetaminophen, whereas only 52.5%, 35.64% and 34.75% were removed at control mesocosms for the initial concentrations of 20, 60 and 100 mg/L, respectively. The results indicated a significant difference in the term of removal efficiency between the planted and unplanted mesocosms. Accordingly, the high efficiency demonstrated by the *Chlorophytum comosum* qualifies it to be used on a larger scale in treating AC-contaminated wastewater.

SEASONAL GROWTH TRENDS AND BIOMASS ALLOCATION OF OVERGROWTH AQUATIC MACROPHYTES (POTAMOGETON PUSSILUS L.) IN A BRACKISH LAKE ENVIRONMENT IN JAPAN

Nur Amelia binti Abas (1)[1]
1) Universiti Kebangsaan Malaysia

[1]Author to whom all correspondence should be addressed: E-mail: amelia@ukm.edu.my

ABSTRACT

Field observation on seasonal growth, biomass and rhizome elongation was undertaken to understand the rapid expansion of *Potamogeton pusillus* L. in a brackish environment of Lake Shinji, Japan. The plants were collected at Tenjin River, an artificial tributary of brackish Lake Shinji from May 2015 until October 2016. Seasonal growth trend of *P. pusillus* was measured based on biomass, shoot height, shoot density, total shoot length, and total rhizome length. Maximum growth was recorded in June 2016 with total biomass (340 g dw/m²), shoot height (61.1cm), shoot density (16667 shoots m⁻²), total shoot length (10261.6 m m⁻²) and total rhizome length (667 m m⁻²). Whereas its highest turion density at 24700 turions m⁻² was observed in October 2015. Biomass distribution of the plants showed high aboveground allocation during its peak in summer dominating 84% of total distribution, and during winter only turion was presented. The plant rapid expansion was due to its reproduction through rhizome elongation and turion germination. Its wide dispersal in Tenjin River and adjacent water bodies was due to the massive turion production during overwintering propagules process.

Keywords: Seasonal growth, biomass, life cycle, phenology, turion germination



Abstract For Innovation Track

INDUCTION OF PROTOCORM-LIKE BODIES (PLBS) FROM THIN CELL LAYERS (TCLS) OF LUDISIA DISCOLOR

Ranjetta Poobathy (a*), Thenmoli Shanmugam (a), Sreeramanan Subramaniam (b,c)

(a) School of Biological Sciences, Faculty of Science and Technology, Qwest International University Perak, 30250, Ipoh, Perak, Malaysia

(b) School of Biological Sciences, Universiti Sains Malaysia (USM), 11800, Gelugor, Penang, Malaysia

(c) School of Bioprocess Engineering, Universiti Malaysia Perlis (UNIMAP), 02600 Arau, Perlis, Malaysia

* Corresponding author: ranjetta.poobathy@qiup.edu.my

ABSTRACT

Ludisia discolor, known as a jewel orchid, is a terrestrial and perennial plant prized for the medicinal quality of its leaves. It faces slow growth and low germination rates through conventional propagation techniques. In this study, attempts were made to induce protocorm-like bodies (PLBs) from in vitro stem and leaf of *L. discolor* through transverse thin cell layers (tTCLs) of *L. discolor* in order to develop a mass-scale propagation method within a short period of time. Parameters assessed include the type of medium as well as plant growth regulators and their concentration. Among the medium tested, the Mitra basal medium, supplemented with 1.0 mg L-1 benzyladenine, was found to be the most effective in inducing PLBs from in vitro stem tTCLs of *L. discolor* (20%) after six weeks of culture. Leaf tTCLs did not produce results in this study. Histological observations indicated that PLB induction occurred on the cut surface of the stem tTCLs without an intermediate callus formation. The globular PLBs were clearly visible after four weeks of culture, after which they developed into matured PLBs.

LEAF ANATOMY AND MICROMORPHOLOGY OF POTENTIAL MEDICINAL WEED *RUELLIA REPENS* L. (ACANTHACEAE) FROM TASIK CHINI, PAHANG

Siti Maisarah Zakaria(1), Che Nurul Aini Che Amri(1*), Noraini Talip(2), Amirul Aiman Ahmad Juhari(3), Mohd Ruzi Abdul Rahman(2), Ahmad Fitri Zohari(2) and Rozilawati Shahari(1)

(1) Department of Plant Science, Kulliyah of Science, International Islamic University of Malaysia, Jalan Sultan Ahmad Shah, 25200 Kuantan, Pahang.

(2) School of Environment and Natural Resource Sciences, Faculty of Science and Technology, Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor.

(3) Department of Environment, Faculty of Forestry and Environment, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor.

*E-mail: chenurulainicheamri@iiu.edu.my

ABSTRACT

Weeds are commonly known as a type of plant that grows in an area where it is not wanted. However, these undesirable plants might give benefits to humans especially as a traditional medicine in some rural areas. *Ruellia repens* L. belongs to the Acanthaceae family is one of the common weeds in Peninsular Malaysia. This species is believed to become a potential medicinal weed that might be utilized in the pharmaceutical field. But, lack of attempt is yet reported in the taxonomic study of this species. By keeping this point, the present study was carried out to provide the leaf anatomical and micromorphological characteristics of *R. repens* obtained from Tasik Chini, Pahang. This detailed information will be helpful for the botanist and pharmacologist to avoid misidentification of the species. Several methods involved such as cross-sectioning on petiole, midrib, lamina and margin parts, leaf epidermal peeling, leaf clearing, observation under a light microscope and observation under a scanning electron microscope. Results revealed some important leaf anatomical and micromorphological structures such as petiole and midrib outlines, presence and type of cystoliths, presence and type of trichomes, type of stomata, presence of wax and cuticular ornamentation. In conclusion, the leaf anatomical and micromorphological structures in *R. repens* have taxonomic significance and might be used as additional data to identify and classify the species. Also, the present study might be a good starting point that leads to extensive future works on the medicinal weeds, especially from Tasik Chini, Pahang.

THE ABILITY OF MANGROVE IN LEAD (PB) PHYTOREMEDIATION AT WONOREJO ESTUARY

Uridna Marwah Lufthansa (#1), Harmin Sulistiyaning Titah (#2)

(1,2) Department of Environmental Engineering, Faculty of Civil, Planning and Geo Engineering, Institut Teknologi Sepuluh Nopember - ITS, Keputih, Sukolilo 60111, Indonesia

uridnamarwah@gmail.com, harminsulis@gmail.com, harmin_st@its.ac.id

ABSTRACT

Lead (Pb) is a heavy metal that is often found polluting the water areas. Pb can enter water bodies as a result of industrial waste disposal. Heavy metals such as Pb that enter in estuary will settle and accumulate in the sediment. One of the efforts to overcome heavy metal pollution in estuaries is phytoremediation technique using mangroves as phytoremediation agents. Wonorejo River is one of the rivers that receives industrial waste loads in Surabaya City. The Wonorejo River empties into the east coast of Surabaya City and is a place for heavy metal accumulation of Pb. At the estuary of the Wonorejo River, there are various types of mangrove plant species such as *A. Marina*, *A. Alba*, *A. Lanata*, *R. Stylosa*, *S. Caseolaris* and each mangrove species has a different ability to accumulate heavy metals. The location of this research is divided into 3 monitoring stations, Station A is directly adjacent to estuary, station C is located farthest from estuary and directly adjacent to the sea, while station B is between stations A and C. This study aims to determine the ability of mangrove plants in remediating Pb and illustrating the distribution of Pb at the Wonorejo River estuary.

The values of Bioconcentration Factor (BCF) and Translocation Factor (TF) to determine the ability of *A. alba*, *A. marina*, *S. caseolaris*, *A. lanata* and *R. stylosa* mangroves in accumulating Pb metal at the Wonorejo estuary has been analyzed. The supporting parameters, such as pH, temperature, salinity, BOD, and COD were also analyzed. To determine the sampling point, the author uses the transect method. The samples are the roots, stems, and leaves of mangroves, as well as the water and sediment at the Wonorejo estuary. These samples were then taken to be analyzed for their heavy metal content. The obtained data were analyzed descriptively. The data is processed using SPSS to find the correlation value and map using the Surfer application with the gridding method. The study results showed that the highest average Pb concentration was in the waters of station C with a concentration of 0.069 mg / L, while the highest concentration for sediment was at station A with a value of 4.22 mg/kg. Pb metal content in the water is lower than in sediment. This indicates the Pb metal accumulation in the sediment. The mangrove which was most effective in accumulating Pb metal based on the BCF value was *A. alba*. The highest Pb TF value exists from the root to stem in *A. lanata* mangrove, while the highest Pb TF value from the root to leaf was found in *A. alba* mangrove. Based on the mapping of Pb metal distribution, it showed the concentration of Pb increased as the research location gets further from the estuary. In conclusion, each type of mangrove has a different ability to accumulate and translocate Pb in its body.

STATISTICAL ANALYSIS TO VARIATION IN NICKEL CONCENTRATIONS AND MASS OF CERATOPHYLLUM IN PHYTOREMEDIATION

Maha Taha(a), Israa Al-Baldawi(a), Siti Rozaimah Sheikh Abdullah(b), Nur 'Izzati Ismail(b)

(a) Department of Biochemical Engineering, Al-khwarizmi College of Engineering, University of Baghdad, Baghdad, Iraq.

(b) Department of Chemical and Process Engineering, Faculty of Engineering and Built Environment, Universiti Kebangsaan Malaysia, 43600 UKM Bangi, Selangor, Malaysia

(a) E-mail: mahairaq700@gmail.com; or israa@kecbu.uobaghdad.edu.iq

ABSTRACT

Industrial wastewater contaminated with heavy metals when discharge to water surface is a global concern to ecosystem. phytoremediation of pollutants using naturally sources like submerged plant of *Ceratophyllum* has significant advantages which is tacked from Tigris River in Iraq. That is available in large amount. In this test, plant was exposed to different concentrations of Nickel (Ni) (2, 5, and 10 mg/L), and different masses (M) (2, 4.2, and 8 g) for 21 days. Twelve Backers of 400 mL volume were used and filled up to 250 mL of synthetic contaminated water with Ni. The results showed there are correlation between removal of Ni with concentrations (-0.367), mass (+0.351), and time (+0.606). The best removal was 100% with 5 and 10 mg/L Ni concentrations and 4.2 and 8 g of mass after 6 day of operation. These findings are highly valuable for heavy metal removal with local plant of *Ceratophyllum* from Tigris River.

UNDERSTANDING THE DRIVERS OF ECOSYSTEM CHANGE AT TASIK CHINI TO INFORM SUSTAINABLE MANAGEMENT

Jack Lacey(1), Melanie Leng(1), Suzanne McGowan(2), Virginia Panizzo(2), Ryan Pereira(3), John Boyle(4), Stefan Engels(5), Mushrifah Idris(6), Keely Mills(1), David Ryves(7), Muhammad Shafiq(6), Christopher Vane(1)*

(1) British Geological Survey, Nottingham, UK

(2) School of Geography, University of Nottingham, Nottingham, UK

(3) The Lyell Centre, Heriot-Watt University, Edinburgh, EH14 4AP, UK

(4) Department of Geography and Planning, University of Liverpool, Liverpool, UK

(5) Department of Geography, Birkbeck, University of London, London, UK

(6) Tasik Chini Research Centre, Faculty of Science and Technology, Universiti Kebangsaan Malaysia, Bangi, Malaysia

(7) Centre for Ecological and Hydrological Science, Department of Geography, Loughborough University, Loughborough, UK,

** Corresponding author (jackl@bgs.ac.uk)*

ABSTRACT

Tropical areas are subject to increasing environmental pressures as a combined result of climate change and human impact on the landscape, which threaten significantly the quality and biodiversity of freshwater ecosystems. Recent economic development in Malaysia has resulted in widespread forest clearance for logging and oil palm plantations, increased mining activity, and pollution from industrial and urban growth. These have impacted directly on Tasik Chini and its surrounding area in recent decades, and conservation of this rare wetland is of great importance due to its ecological and cultural significance. The implementation of sustainable management strategies can help protect the site into the future, however a large proportion of limnological studies and monitoring surveys these plans will be based on were conducted after the start of rapid development in the late 20th century. Therefore, determining how the ecosystem functioned before the influence of major human activity and what effect environmental changes had on Tasik Chini is important for understanding the natural baseline conditions of the lake-catchment system and for generating robust approaches to conservation. Here, we use palaeolimnological techniques to investigate multiple sediment cores from Tasik Chini to study environmental conditions since the lake's formation around 5000 years ago, which will help to identify the key drivers of ecosystem change and provide a longer-term context for the influence of human activity at the site. A combination of elemental, stable isotope, diatom, and pigment analyses indicate substantial shifts in sedimentation, hydrology, and water quality, in particular since the mid-20th century. The palaeorecord confirms recent environmental variability to exceed that of natural changes in the past, where major shifts in the lake ecosystem were principally initiated by land use changes and hydrological impoundment.

EFFECT OF DIFFERENT TYPE OF SOIL AREA, SOIL DEPTH AND PRETREATMENT ON ELECTRICITY GENERATION USING MEMBRANE-LESS MICROBIAL FUEL CELL

Muaz Mohd Zaini Makhtar (1), Husnul Azan Tajarudin (1), Nor Asniza Ishak (2), Salwa Mohd Zaini Makhtar (3), Muhammad Najib Ikmal Mohd Sabri (1), Thiruventhan Karunakaran (4,5),*

- 1) School of Industrial Technology, Bioprocess Technology Division, Universiti Sains Malaysia, 11800 Penang, Malaysia
- 2) School of Educational Studies, Universiti Sains Malaysia, 11800 Penang, Malaysia
- 3) Faculty of Civil Engineering Technology, Universiti Malaysia Perlis, 01000 Kangar, Perlis
- 4) Centre for Drug Research, Universiti Sains Malaysia
- 5) School of Chemical Sciences, Universiti Sains Malaysia

*Corresponding Author: muazzaini@usm.my

ABSTRACT

The microbial fuel cell (MFC) is an innovative renewable energy technology that can overcome the global energy crisis by generating electricity, mitigating greenhouse gas emissions, and bioremediating pollutant through utilization of plentiful renewable resources such as soil organic carbon. The MFC-based soil is inexpensive to construct and maintain. In this study, soil that was collected at random from five different places around Parit Buntar areas acted as an organic substrate. These areas were chosen based on different community activities: residential (A & B), non-residential (C & D) and agricultural areas (E). The effect of different soil pretreatment (supplemented with tap water or POME sludge) and soil depth (1 to 5 inch) were also analyzed. Results showed that power generated from palm oil plantation soil (agricultural areas) of depth 5 inches with the addition of palm oil mill activated sludge produced the highest in power density and total substrate degradation with 158 mW/m² and 75.9 %, respectively, with the depth of soil extraction was at 5 inch. The deeper the soil depth, the lower was the power generated. The generation of power produced was also proportional to the growth of bacteria.

Keywords: Membrane-less microbial fuel cell; bioremediation; bioconversion; electricity; renewable energy

THE FUTURE PROMISING ALTERNATIVE RENEWABLE ENERGY FROM MICROBIAL FUEL CELL

Muaz Mohd Zaini Makhtar (1*), Husnul Azan Tajarudin (1), Nor Asniza Ishak (2), Salwa Mohd Zaini Makhtar (3), Muhammad Najib Ikmal Mohd Sabri (1), Nurul Atiqah Shamsudin (1),

1)School of Industrial Technology, Bioprocess Technology Division, Universiti Sains Malaysia, 11800 Penang, Malaysia

2)School of Educational Studies, Universiti Sains Malaysia, 11800 Penang, Malaysia

3)Faculty of Civil Engineering Technology, Universiti Malaysia Perlis, 01000 Kangar, Perlis

*Corresponding Author: muazzaini@usm.my

ABSTRACT

The increase concern over pollution, resource depletion, and climate change implications of continuing use of conventional fossil and nuclear fuels has prompted a growing interest in renewable energy sources. The energy policies were made to enhance for the sustainable energy. It is estimated that by 2030 about 15-20 % of the energy needs will be met by renewable energy. Therefore, there is a strict need for development of new technologies that can make renewable resources accessible to supply this increasing demand. These technologies need to be developed to conserve non-renewable energy reserves and at the same time to make more sustainable technologies in the next decade. Microbial Fuel Cells (MFCs) are bio-electrochemical devices that work by harnessing the power of respiring microbes and converting organic substrates directly into electrical energy. The device is consisted of MFC reactor, external circuit and voltage measurement system. To fuel the MFCs many kinds of organic material can be used such as; domestic, poultry, agricultural, palm oil mill effluent (POME) wastewater, as the carbon source. A diversified kinds of electrogenic bacteria broke down the carbons present in the organic fuel and produced proton, electron, carbon dioxide and electricity. This paper presents the principle and current development in the domain of MFC and gives an idea of potential future applications include the bioremediation process for sustainable development in Tasik Chini which simultaneously generates the electricity.

Keywords: Membrane-less microbial fuel cell; bioremediation; bioconversion; electricity; renewable energy

SEASONAL GROWTH TRENDS AND BIOMASS ALLOCATION OF OVERGROWTH AQUATIC MACROPHYTES (POTAMOGETON PUSSILUS L.) IN A BRACKISH LAKE ENVIRONMENT IN JAPAN

Nur Amelia binti Abas (1)[1]
1) Universiti Kebangsaan Malaysia

[1]Author to whom all correspondence should be addressed: E-mail: amelia@ukm.edu.my

ABSTRACT

Field observation on seasonal growth, biomass and rhizome elongation was undertaken to understand the rapid expansion of *Potamogeton pusillus* L. in a brackish environment of Lake Shinji, Japan. The plants were collected at Tenjin River, an artificial tributary of brackish Lake Shinji from May 2015 until October 2016. Seasonal growth trend of *P. pusillus* was measured based on biomass, shoot height, shoot density, total shoot length, and total rhizome length. Maximum growth was recorded in June 2016 with total biomass (340 g dw/m²), shoot height (61.1cm), shoot density (16667 shoots m⁻²), total shoot length (10261.6 m m⁻²) and total rhizome length (667 m m⁻²). Whereas its highest turion density at 24700 turions m⁻² was observed in October 2015. Biomass distribution of the plants showed high aboveground allocation during its peak in summer dominating 84% of total distribution, and during winter only turion was presented. The plant rapid expansion was due to its reproduction through rhizome elongation and turion germination. Its wide dispersal in Tenjin River and adjacent water bodies was due to the massive turion production during overwintering propagules process.

Keywords: Seasonal growth, biomass, life cycle, phenology, turion germination



Thank You