GO GREEN SUMMIT

Abstracts Book of

GoGreen Summit



14th GoGreen Summit Malaysia 2026

29th & 30th May 2026 | Kuala Lumpur, Malaysia

Organized by

IFERP Life Sciences

Explore Your Research Journey...

IFERP Life Science - Formerly BioLegues

GO GREEN SUMMIT

14th GoGreen Summit-Malaysia 2026, Kuala Lumpur, Malaysia

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Conference Theme



Green Innovation and Sustainable Practices for Climate Resilience

Preface

We are delighted to extend a warm welcome to all participants attending 14th GoGreen Summit-Malaysia 2026 organized by IFERP Life Science Formerly BioLeagues on May 29th-30th, 2026 at Kuala Lumpur, Malaysia. This conference provides a vital platform for researchers, students, academicians, and industry professionals from all over the world to share their latest research results and development activities in the fields of green innovation, sustainable practices and climate resilience. It offers delegates an opportunity to exchange new ideas and experiences, establish business or research relationships, and explore global collaborations.

The proceedings for GoGreen Summit 2026 contain the most up-to-date, comprehensive, and globally relevant knowledge in the fields of Research Studies and Education. All submitted papers were subject to rigorous peerreviewing by 2–4 expert referees, and the papers included in these proceedings have been selected for their quality and relevance to the conference. We are confident that these proceedings will not only provide readers with a broad overview of the latest research results in green innovation, sustainable practices and climate resilience but also serve as a valuable summary and reference for further research in this field.

We are grateful for the support of many universities and research institutes, whose contributions were vital to the success of this conference. We extend our sincerest gratitude and highest respect to the many professors who played an important role in the review process, providing valuable feedback and suggestions to authors to improve their work.We also extend our appreciation to the external reviewers for providing additional support in the review process and to the authors for contributing their research results to the GoGreen Summit 2026.

We express our gratitude to the keynote and individual speakers and all participating authors for their dedication and hard work. We also sincerely appreciate the efforts of the technical program committee and all reviewers, whose contributions made this conference possible. Finally, we extend our thanks to all the referees for their constructive comments on all papers, and we express our deepest gratitude to the organizing committee for their tireless work in making this conference a reality.

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About **GoGreen Summit 2026**

The 14th GoGreen Summit-Malaysia 2026 (14th GGS) is a premier international forum dedicated to advancing green innovation, sustainable practices and climate resilience. With the theme "Green Innovation and Sustainable Practices for Climate Resilience", the summit emphasizes the urgent need to integrate science, technology, policy and community action to address global environmental challenges.

Building on the legacy of previous editions, the 14th GGS will bring together scientists, policymakers, industry leaders, entrepreneurs, educators and sustainability advocates from across the globe. The summit provides a platform to showcase breakthrough technologies, share best practices and foster partnerships that accelerate the transition toward a greener, more resilient world.

Vision

To position the GoGreen Summit as a global catalyst for climate-conscious innovation and sustainable development.

Purpose

- To highlight transformative green technologies that drive climate resilience.
- To promote sustainable practices across industries, communities and governments.
- To foster global collaboration for achieving the UN Sustainable Development Goals (SDGs).
- To empower youth and innovators to lead the green transition.

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About IFERP Life Sciences

IFERP Life Science is a globally recognized professional association meant for research, innovation and development in the field of life sciences and medical sciences . It serves to propel and fuel all innovative works of research with immense potential in the fields of Healthcare, Life Sciences, Pharmaceutical Sciences, Medical Sciences, Food & Nutrition, Environmental Science, Oncology, Cardiology, Nursing, Microbiology, Physiotherapy, Dentistry and many more. IFERP Life Science has been directly responsible for a significant amount of the revolutionary developments that have taken place in these fields over the past few decades.

IFERP Life Science is a specialized platform that supports life science and medical professionals in advancing their careers and research impact. Our tailored solutions include international conferences, Faculty Development Programs, Webinars, author services, membership and scientific communications, designed to foster collaboration and knowledge-sharing within the global medical community.

Our Mission

- Promote global research, innovation and development in life science, medical science, environmental science, pharmaceutical science and health care, to attain sustainable development goals (SDG's) for universal benefit.
- Advance Life Science & Medical Science for societal service.
- To facilitate knowledge exchange and growth through our professional activities and scientific conferences.

Our Vision

- An inclusive global scientific community promotes excellence in life science and medical events, author services, membership, informed decisions, and actions worldwide.

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Director's **Message, IFERP**



MR. SIDDTH KUMAR CHHAJER

Managing Director

IFERP, Technoarete Group,
India

On behalf of IFERP & the organizing Committee, I express my hearty gratitude to the Participants, Keynote Speakers, Delegates, Reviewers and Researchers.

The goal of the 14th GoGreen Summit-Malaysia 2026 is to provide knowledge enrichment and innovative technical exchange between international researchers or scholars and practitioners from the academia and industries in various fields of green innovation, sustainable practices and climate resilience.

This conference creates solutions in different ways and to share innovative ideas in the fields of green innovation, sustainable practices and climate resilience. 14th GoGreen Summit-Malaysia 2026 provides a world class stage to the Researchers, Professionals, Scientists, Academicians, and students to engage in very challenging conversations, assess the current body of research and determine knowledge and capability gaps.

14th GoGreen Summit will explore the new horizons of innovations from distinguished researchers, scientists and eminent authors in academia and industry working for the advancements in green innovation, sustainable practices and climate resilience from all over the world.

14th GoGreen Summit hopes to set the perfect platform for participants to establish careers as successful and globally renowned specialists in various fields of green innovation, sustainable practices and climate resilience.

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CEO's Message, IFERP



MR. RUDRA BHANU SATPATHY
Chief Executive Officer

IFERP, Technoarete Group,
India

IFERP is hosting the 14th GoGreen Summit-Malaysia 2026 this year in month of May. The main objective of 14th GoGreen Summit is to grant the amazing opportunity to learn about groundbreaking developments in modern industry, talk through difficult workplace scenarios with peers who experience the same pain points, and experience enormous growth and development as a professional.

There will be no shortage of continuous networking opportunities and informational sessions. The sessions serve as an excellent opportunity to soak up information from widely respected experts. Connecting with fellow professionals and sharing the success stories of your firm is an excellent way to build relations and become known as a thought leader.

I express my hearty gratitude to all my Colleagues, Staffs, Professors, Reviewers and Members of organizing committee for their hearty and dedicated support to make this conference successful.

I am also thankful to all our delegates for their pain staking effort to make this conference successful.

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About **Plenary Speaker**



DR. SEYED FATHOLLAH MIR MOHAMMADMAKKI

Founder

Mctough Group and Chairman of Mctough Day Rad, Distribution, Import,Export Medicine Company & Investment Company, Iran

Dr. Seyed Fathollah Mir Mohammadmakki is an entrepreneur, researcher, and healthcare industry professional based in Iran. He is the Founder of Mctough Group and Chairman of Mctough Day Rad, a company active in pharmaceutical distribution, import/export, and investment. He holds an MPH degree in Industrial Engineering from Amirkabir University of Technology (AUT) and has participated in scientific projects related to the pharmaceutical and food industries, AHP-based decision-making methodologies, public health, and sustainability. His research has been published in scientific journals and presented at specialized conferences. Dr. Mir Mohammadmakki is also active in international trade, scientific research, and healthcare business development, with collaborations in the fields of medical sciences, food safety, and health-related studies.

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About **Keynote Speaker**



DR. NORSIDA MAN
Professor

Universiti Putra Malaysia (UPM),
Malaysia

Professor Dr. Norsida Man born in September, 1970 and working as professor at Department of Agribusiness and Bioresources Economics, Faculty of Agriculture, Universiti Putra Malaysia (UPM), Malaysia. She was awarded the PhD (2003) and Master in Agricultural Economics and Management (1999) and Bachelor's degree in Agricultural System Engineering (1994) from Kagoshima University, Japan. Her fields of specialization are Agriculture Extension, Agriculture Development, Agriculture Economics and Management. 20 PhD and 23 Master students graduated under her supervision.

Her professional achievements are:

- Deputy Director at University Community Transformation Centre (UCTC), UPM (2023–current);
- President of Malaysia Forum for Rural Advisory Services Network (MAFRASN) (2023–current);
- Malaysia Chapter Advisor for Rural Advisory Services for South East Asia (RASSEA)(2023–current);
- Deputy President of Malaysia Agriculture Economics Association (MAEA) and many more (2023–current).
- Awardee of Professorial Chair Scholarship SEARCA (2020–2021);
- Member of Global Forum for Rural Advisory Services (GFRAS);
- Member of National Council of Professors (2022–current);
- Member of Australsia Agriculture Extension Network (APEN) (2018–current);
- Committee Member of International Society for South East Asian Agricultural Science (ISSAAS);
- Ex Head Department of Agriculture Technology (2012–2022);
- Ex Shipping Officer at Hitachi Transport System (M) Sdn. Bhd. (1994–1996);
- Ex Deputy Director of Centre for Extension, Entrepreneurship and Professional Advancement (APEEC), UPM (2005–2012);

She published 173 academic journal papers, three (3) books, ten (10) chapters of book, many newspaper articles and her current H-Index Scopus is 10.

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About **Keynote Speaker**



DR. VIKRAM KUMAR

Scientist

Scientist (Hydrology), BMSK,
Government of Bihar, India

Dr. Vikram Kumar is currently working as a Scientist in the Hydrology Division, Government of Bihar. Prior to this, he served for more than three years as Head of the Department of Civil Engineering at Government Engineering College, Gaya (Bihar). He has also held the position of Head of Department at Poornima Group of Institutions, Jaipur, for a period of around two years. Dr. Kumar completed his Bachelor's degree in Civil Engineering from Government Engineering College, Kota, affiliated with the RTU, Kota and subsequently obtained his Ph.D. from IIT Roorkee, specializing in Hydrology, with a focus on Himalayan hydrological processes. In addition to his academic roles, Dr. Kumar has professional industry experience, having worked as a Planning Engineer with a South Korea-based multinational company, where he demonstrated strong technical and managerial capabilities. Dr. Kumar is the author of 7–8 books on various subjects and has published over 30 research papers in reputed peer-reviewed journals and international conferences and has successfully completed two funded research projects. His achievements include prestigious recognitions such as the DST Young Scientist Award (Government of India), Young Faculty Award, and DAAD Fellowship from Germany. His broad research interests encompass field instrumentation, hydrological modeling, flood forecasting, and water resources management. He brings more than 10 years of teaching and research experience across various academic institutions and government organizations.

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About **Keynote Speaker**



DR. SEOW TA WEE
Professor

Universiti Tun Hussein Onn Malaysia,
Malaysia

Seow Ta Wee is a professor in environmental management and solid waste management at the Department of Construction Management, Faculty of Technology Management and Business, UniversitimTun Hussein Onn Malaysia (UTHM). He joined UTHM in 2002. He has more than 21 years of teaching, research, and consultation experience. He obtained his PhD in Environmental Management from the National University of Malaysia under the scheme of National Science Fellowship (NSF), where he also received his Master's in Environmental Management and Bachelor's Degree in Arts (Geography).

Currently, he is the Senate Member of Universiti Tun Hussein Onn Malaysia and the Head of the Centre of Sustainable Infrastructure & Environmental Management (CSIEM). Prior to this, he was the Deputy Director of the International Office from 2014 to 2016, Deputy Dean (Research and Development) from 2012 to 2013, Head of Department of Construction & Real Estate Management from 2009 to 2011, andHead of Academic Quality Unit, Centre for Programme Development & Training from 2008 to 2009. Apart from that, he has been appointed as chairman of several international conferences since 2014. Moreover, he has contributed his diverse expertise to multiple projects carried out by UTHM and to the development of programmes in UTHM.

His transdisciplinary and interdisciplinary research covers aspects of the environment, geography, construction sociology, and social return on investment (SROI), which also touches on the current niche area of UTHM's research areas, especially in the fields of environmental and solid waste management. Besides having a broad range of teaching experience in UTHM, he was also appointed as the Guest lecturer by the Faculty of Engineering and Post Graduate Programme at Universitas Kepulauan Riau, Batam, Indonesia, Visiting Research Scholar at the Department of Geography, University of Sri Jayewardenepura, Sri Lanka, Visiting Professor Programme under Post Graduate Programme, Universitas Labuhanbatu, Indonesia. He was also involved in research consultation at the national level such as developing the National Occupational Safety, Health and Environment Policy under the Ministry of Human Resource, Perception of Bumiputera on Technical and Vocational Education and Training Provided by Majlis Amanah Rakyat (MARA), Committee member of amendment of University & University College Act 1971 (AUKU) 2012, Master Plan for Johore's Forestry Strategic Plan 2016–2025, reviewer of the master plan of solid waste management and knowledge transfer on Sustainable Development Goals (SDGs) at local authority's level. He

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was also appointed by the Malaysian Qualification Agency (MQA) as an expert programme quality assessor in his related field since 2014 and assessor for APEL.A and APEL.C since 2022, Panel for Ministry of Science, Technology and Innovation (MOSTI). He delivered more than 40 times as a keynote speaker and inaugural lecturer at the international level. He was also appointed as the head of the project for Knowledge Transfer on waste to energy in ASEAN granted by the Canadian Trade and Investment Facility for Development (CTIF). His total research and consulting funds have reached a value of more than 4.5 million Malaysian Ringgit. Many of his projects have significantly impacted the country's socio-economic development and at the level of the ASEAN region. Through these research works, he also managed to win several national and international awards. He was involved in the ASEAN Autism Mapping and Policy Development Project as one of the principal researchers and the programme facilitator from the Asia-Pacific Development Centre on Disability sponsored by the Japan International Cooperation Agency (JICA).

He has supervised post-doctoral students and more than 30 postgraduates. He has also been appointed as an internal and external examiner for PhD and Master's students from other universities including The Hong Kong Polytechnic University. He has also published more than 400 publications including books, conference articles, journals, and technical reports. He has served on the editorial board of international journals and is currently involved in several international bodies such as the International Council Monument and Sites (ICOMOS) Malaysia, Social Value UK, Malaysia Board of Technologists (MBOT), World Academic-Industry Research Collaboration Organisation, International Society for Development and Sustainability (ISDS) and The Global Academy. He is also actively involved in local community development programmes such as Sustainable Development Goals programmes, waste-to-energy awareness programmes, recycling programmes, environmental talks, and motivation and self- development programmes in collaboration with local authorities, schools, NGOs, and other higher education institutes.

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About **Keynote Speaker**



DR. JULIANA JALALUDIN

Professor

Universiti Putra Malaysia,
Malaysia

Prof Juliana Jalaludin is a Professor of Environmental Health at Universiti Putra Malaysia (UPM). She previously served as the Head of the Environmental and Occupational Health Department at UPM (2016–2020) and is currently the Head of the Research Team for Air Quality and Health Impact at UPM. She is a senior researcher and consultant, specialising in environmental and occupational health, with a particular focus on air quality, indoor air quality, and exposure assessment. Prof. Juliana has led numerous national and international research grants and served as a consultant for various governmental and private sector projects. With over 28 years of experience, She has received numerous honors and awards in recognition of her impactful contributions to the field. She also holds academic appointments as an Adjunct Professor at Universitas Airlangga (UNAIR), Indonesia, and as a Visiting Professor at Universitas Muhammadiyah Jakarta. Her active research interests include Environmental and Occupational Health, Public Health, and Air Quality. Her extensive expertise has led to appointments such as an Environmental Health Expert Panel member for the National Environmental Health Action Plan under the Ministry of Health Malaysia (MOH), and as Deputy President of the Malaysian Clean Air Society (MyCAS). She also serves as a board member of the Asian Aerosol Research Assembly (AARA), the Malaysian Environmental Health Association (MAEH), and the Malaysian Society of Environmental Epidemiology (MySEE)

She is an Editorial Advisory Board Member for the International Journal of Environmental Health Research and an Editorial Board Member for BMC Public Health, Pediatrics, and Environmental Science. She also serves as a Guest Editor for Aerosol and Air Quality Research and Aerosol Science & Technology. Her academic contributions are prolific, comprising over 600 publications, including refereed journal articles, conference proceedings, books, and newspaper articles. Prof. Dr. Juliana is also a former Head of the Centre for Quality Assurance (CQA) at the Faculty of Medicine and Health Sciences, UPM. Currently, she serves as a Panel Assessor for the Malaysian Qualifications Agency (MQA), a Program Assessor at UPM, and an Auditor for academic programs. At the national level, she has been appointed as a Board Member and External Examiner for the assessment of Environmental Health, Occupational Health, and Public Health program curriculum at universities and colleges across Malaysia, including UiTM, UniKL, UKM, UMT, UTAR, UNIMAP, UMK, MAHSA, International College Imperia, and SEGi University. In addition, Prof. Juliana is an assessor for grants from the Ministry of Higher Education, Putra Grants under UPM,

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MOSTI, the Qatar National Research Fund, and the Kuwait National Grant. She also provides consultancy services for public and private ministries and companies. She serves as the Director of the Summer Crash Course at the Faculty of Medicine and Health Sciences, UPM, and is actively involved in organizing conferences and training sessions worldwide. At the international level, Prof. Juliana serves as an Ambassador for Green Hands Kuwait on Environmental Sustainability and as an International Expert Advisor for the Global IAQ Standard and the Global Commission on Healthy Indoor Air. She is an International Scientific Committee of the World Clean Air Congress (WCAC) and Conference on Applications of Air Quality in Science and Engineering (ICAAQSE 2026), as well as an Advisor for the Asian Aerosol Conference 2025 (AAC 2025). She also serves as Co-Chairperson of BAQ 2028, the Asian Aerosol Conference 2024 (AAC 2024), and the T&T International Aerosol Conference 2025. Additionally, she is a voting member of the Chartered Institute of Environmental Health (CIEH), United Kingdom, and a member of the International Society of Environmental Epidemiology (ISEE) and the International Society of Indoor Air Quality and Climate (ISIAQ).

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About **Keynote Speaker**



DR. AMIN BEIRANVAND POUR
Associate Professor

University Malaysia Terengganu (UMT),
Malaysia

Associate Professor Amin Beiranvand Pour is a leading scientist and internationally established researcher in the field of geological remote sensing and mineral exploration. He was listed among the World's Top 2% Scientists by Stanford University for the years 2019–2024. He is Co- Founder and Team Lead in ScanMiner Solutions. He is one of the highly cited researchers in the field of geological remote sensing in the world (ranked 2 in Google Scholar). He has ranked 1 among Top Scientists for years 2023 and 2024 in Earth Science in Malaysia. He has a full academic background in applied geology, economic geology, remote sensing and mineral exploration. He was project Leader of numerous mineral exploration research projects using multispectral and hyperspectral sensors for geological mapping and mineral exploration in arid and semi-arid regions, Antarctica, Arctic and tropical areas. His experience ranges widely, from geological mapping to environmental issues such as lithological and structural mapping, mineral exploration, environmental monitoring and modelling, geo-hazard, geothermal mapping, geomorphic and coastal geology investigations. He has published more than 200 research papers and 5 edited books in the field of geological remote sensing, mineral exploration and geohazard modeling.

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About **Session Speaker**



DR. DARWIN H. PANGARIBUAN

Associate Professor

Lampung University,
Indonesia

Assoc. Prof. Darwin H. Pangaribuan, Ph.D, is an Associate Professor of Horticultural Crop Physiology in the Department of Agronomy and Horticulture, Faculty of Agriculture, University of Lampung, Indonesia. He earned his Ph.D. in Horticultural Sciences from the University of Queensland, Australia. His research focuses on horticulture, crop ecology, soil fertility, organic farming, plant nutrition, sustainable agriculture, and postharvest physiology of tropical vegetable crops. He has extensive international research experience and supervises M.Sc. and Ph.D. students.

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About **Session Speaker**



DR. H.M. SAMAN K. HERATH
Senior Professor

Uva Wellassa University,
Sri Lanka

Faculty of Animal Science and Export Agriculture, Uva Wellassa University of Sri Lanka Senior Professor Saman Herath has been graduated in 2003 with BSc degree in Agricultural Sciences with a Second Class Upper Division from the Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka. In 2006, he was able to complete his MSc degree in Physical Land Resources majoring in Soil Science with a Distinction from the Ghent University and VUB University, Belgium (A collaborative programme). Thereafter, he earned his PhD in Soil Science from the Massey University, New Zealand in 2012. Also, he has obtained a postdoctoral training as a Visiting Research Fellow attached to the Lanzhou University, China in the year 2018.

Senior Professor Herath possesses numerous scientific publications at well recognized high impacted indexed journals in his field of interest, and overall, his contribution to different types of research publications accounts more than 160. Moreover, he has been the author for two books published related to the discipline of Soil Science.

Senior Professor Herath has won several awards. Among them, the main ones are "President's Award" in 2014 and 2015; "NRC Merit Award" in 2012, 2013, 2016 and 2017; and "Vice Chancellor's Award" for the Most Outstanding Senior Researcher 2017 in Uva Wellassa University. His PhD thesis was recognized as an 'Exceptional PhD Thesis' and included in the 'Dean's List' in Massey University, New Zealand in the year 2013. Further, Senior Professor Herath has received "UWU Research Awards" for Scientific Publications in Indexed Journals in 2013, 2014, 2015, 2016 and 2017. He is recognized as a 'Tier 04* Researcher' in the Sri Lankan University System as per the h-index and, his scientific contribution has been cited more than 2,300 times, so far.

Senior Professor Herath mainly works on soil carbon dynamics and plant nutrients management. He has involved in conducting many research projects with both local and foreign peer researchers. Also, he contributes for postgraduate supervision in the field of Soil Science. Having graduated from the Sabaragamuwa University, Senior Professor Saman Herath started his carrier as an Academic Demonstrator in the year 2003 attached to the Department of Export Agriculture, Faculty of Agricultural Sciences. In 2004, he received 'VLIR Scholarship' granted by the Belgium Government for his postgraduate studies. After completing MSc degree in 2006, he rejoined with the Faculty of Agricultural Sciences, Sabaragamuwa University and served for nearly another year. In 2007, Senior Professor Herath was recruited to Academic Demonstrator position by the Uva Wellassa University. He became a Lecturer (Probationary) on July 15, 2008 and promoted to the Senior Lecturer (Gr. II) on July

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15, 2013, after completing his PhD, in the same university. In 2017, he was able to reach to the Post of Professor in Soil Science on merit basis at his age of 40. Then he became a Senior Professor in 2025.

Currently, Senior Professor Herath serves at the capacity of Dean, Faculty of Animal Science and Export Agriculture, Uva Wellassa University. Senior Professor Herath is the founder Editor- in-Chief of the Journal of Agriculture and Value Addition which is published biannually by the Faculty of Animal Science and Export Agriculture, Uva Wellassa University. Overall, he has provided his service to the Uva Wellassa University and external entities with his capacity in numerous ways with the aim of contributing to the national development of the country and beyond.

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About **IFERP Professional Ambassador**



DR. KALYANI RAO

Climate Reality Leader & Green Key Volunteer

Blue Consultant & Eco-Tourism Trainer,
Global Educator & Entrepreneur, India

Dr. Kalyani Rao is a distinguished Global Edu Entrepreneur, Sustainability Consultant, and SDG Advocate with 18+ years of cross-sector experience. A multilingual management professional and honorary doctorate holder, she specializes in high-impact global educational initiatives, climate action programs, and sustainable business development. Her expertise encompasses:

- Global educational programs & international student/faculty exchanges
- SDG & Climate Action education and training
- Sustainable tourism and green business development
- Beach-Cleanup Drives, Ocean Conference & Green Summit

Dr. Rao holds key leadership roles, including Indian Coordinator for the United National Students Conferences of New York office, Vice-President of the GOAEC Foundation, Founder of EventsKart, President & Country Ambassador for IELTA India.

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About **Committee**

Conference Convenor

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Conference Convenor, India

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Mr. Paulino A Oñal Jr
Director, Research Extension and Innovations, Catholic Ming Yuan College, Philippines

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Sustainable Depolymerization of Bottled Plastic Waste Using Green Catalysts: PET Glycolysis over Waste-Derived CaO

Isti Yunita
Independent Researcher, India

Abstract:

Poly(ethylene terephthalate) (PET) bottle waste remains a major environmental challenge, as plastic consumption is extremely high and recycling rates are still limited. For instance, reported figures indicate that 2.5 million plastic bottles are used every hour, PET production exceeds 45 million metric tons annually, and recycling rates reach only around 31%. Chemical recycling via glycolysis offers a simple route with relatively low energy demand and produces valuable monomers such as bis(2–hydroxyethyl terephthalate) (BHET). This work highlights the use of green, waste-derived CaO catalysts prepared from various shells/eggshells (mussel, oyster, geloina, chicken, ostrich) through thermal decomposition, leveraging the strong basic sites of Ca^{2+}–O^{2-} that are known to be effective for transesterification and relevant for PET glycolysis.

The optimum glycolysis condition reported for ostrich-eggshell-derived CaO (calcined at 1000 °C) was achieved at 192 °C for 2 h with catalyst:PET of 1:10 and PET:EG of 1:15, producing 76.41% BHET—comparable to commercial zinc acetate (75.47% BHET).

Catalyst characterization (XRD, FTIR, XPS, FE-SEM) and BHET verification ($^{1}H/^{13}C$ NMR, GC–MS, ESI–MS) support the performance and product formation. A transesterification-driven mechanism is proposed where ethylene glycol interacts with basic sites while the ester carbonyl coordinates to acidic sites, facilitating nucleophilic attack and BHET formation. Overall, shell-derived CaO provides a low-cost, circular-economy catalyst option for PET upcycling aligned with green chemistry and GoGreen Summit sustainability goals.

Index Terms:

PET Glycolysis; Chemical Recycling; CaO Catalyst; Eggshell Waste; BHET; Green Catalyst; Circular Economy

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Digital Marketing Strategies in Tourism Sustainability: A Comprehensive Bibliometric Approach to Emerging Trends and Research Gaps

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Universitas Negeri Yogyakarta, Indonesia

James, D
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Abstract:

This study explores the role of digital marketing in promoting sustainable tourism, utilizing a bibliometric analysis to identify trends, influential contributors, and thematic developments within the literature. Sustainable tourism, increasingly central to industry practices and policy discussions, requires effective communication strategies to attract environmentally conscious travellers. Digital marketing, through social media, SEO, content marketing, and emerging technologies like AI and VR, provides essential tools for increasing awareness of sustainable practices, influencing tourist behaviour, and supporting local economies. The bibliometric analysis conducted in this study reveals rapid growth in publications focused on sustainable tourism and digital marketing, highlighting significant contributions from key authors and journals, particularly in the areas of social media's influence on sustainable behaviours, AI-driven personalized marketing, and VR potential to deliver immersive destination experiences with minimal environmental impact. Findings show that digital marketing not only facilitates the spread of eco-friendly travel messages but also plays a vital role in fostering consumer engagement with sustainability practices. However, gaps remain, particularly concerning the long-term effects of digital marketing on tourist behaviour and the specific impact of advanced technologies on sustainability perceptions. The study's insights have implications for both industry and policy, suggesting that integrating digital marketing with sustainability initiatives can enhance destination branding while promoting responsible tourism. Future research should focus on longitudinal studies to evaluate sustained behavioural impacts, investigate cross-platform strategies, and explore cultural nuances in sustainability messaging. Overall, this study contributes a comprehensive overview of digital marketing's influence on sustainable tourism, offering a foundation for further inquiry and practical applications in promoting eco-conscious travel.

Index Terms:

Sustainable Tourism, Digital Marketing, Social Media, Bibliometric Analysis, Customer Behaviour in Tourism

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Fixed Income Mutual Fund Performance: Pre, During, and Post COVID-19 and Sovereign Debt Crisis in Sri Lanka

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Abstract:

This study empirically assessed the performance of fixed-income mutual funds, highlighting the pre-, during, and post- COVID-19 and sovereign debt crisis periods of Sri Lanka to fill the gap arising from the lack of focus on fixed-income mutual fund performance in emerging markets. This study collected data covering the entire Sri Lankan fixed-income mutual fund market from the Unit Trust Association Sri Lanka (UTASL) for a sample period of seven years, from 2017 to 2024, on a monthly basis. A quantitative approach was used to collect secondary data from the Unit Trust Association Sri Lanka (UTASL) and the Central Bank of Sri Lanka. Fund returns and net asset value, reflecting specific fund characteristics; the three-month Treasury bill yield and the ten-year bond yield, as proxies for short-term and long-term interest rates; and the ASPI Index, reflecting the macroeconomic condition, were used as explanatory variables to evaluate fixed-income fund performance. Fund flow was used to measure the performance of fixed-income mutual funds. The generalized estimating equation (GEE) was used in this study to analyses the data following the violation of linear regression assumptions. As per the results, during stable economic conditions, reflecting risk aversion, investors prioritized safety when considering fixed-income mutual fund investments and focused on short-term instruments. Liquidity concerns dominate in volatile economic conditions, underscoring the importance of fund-level and market-level stability. When the economy is recovering, investors become cautious, with a performance-driven investor mindset. The findings of the study have practical implications for investors to adopt period-specific investment strategies and for fund managers to diversify offerings based on the economic context by introducing short-term, low-risk investment products to attract risk-averse investors in stable recovery stages and to enhance performance metrics in stable periods to attract more investors.

Index Terms:

Fixed-Income Mutual Funds, Fund Flow, Fund Performance, Economic Crises, Sovereign Debt Crisis

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Design and Implementation of a Small-Scale Greenhouse for Hydroponically Grown Lettuce with Arduino-based Vapor Pressure Deficit Control

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Abstract:

This study presents the design and implementation of a small-scale greenhouse utilizing an Arduino-based Vapor Pressure Deficit (VPD) control system for hydroponically grown lettuce. With continuous urbanization reducing available agricultural spaces in the Philippines, controlled-environment agriculture like hydroponics offers a viable solution for food security. The research aimed to construct two Nutrient-Film Technique (NFT) hydroponic setups—one with active VPD control and one without (ambient control)—to compare lettuce yield and growth uniformity. Utilizing an Arduino microcontroller, DHT22 sensors, and MLX90614 infrared sensors, the experimental greenhouse maintained a target VPD within 0.25 kPa through automated humidification. Results demonstrated a statistically significant improvement in the VPD-controlled environment, yielding an average of 200.0 g per lettuce head compared to 120.0 g in the non-VPD setup. Furthermore, the controlled environment produced highly uniform crops, effectively mitigating the midday heat stress observed in the ambient greenhouse. The study concludes that active VPD management is a highly effective method for maximizing agricultural productivity in small spaces.

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Strategies of Shallot Farmers in Kretek Subdistrict, Bantul District in Facing Climate Change

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Abstract:

Kretek Subdistrict has the largest harvested area of shallots compared to other districts, reaching 816 hectares. Climate change, characterized by extreme rainfall and high temperatures, greatly affects shallot productivity and increases the risk of crop failure. This study aims to analyze the strategies of shallot farmers in Kretek Subdistrict in dealing with climate change, particularly in terms of irrigation water supply and land management according to land morphology. This research uses a descriptive method. The results show that irrigation water supply in the Opak–Oyo alluvial plain is fulfilled by 75% of farmers using dug wells; in the denudational hill area, 75% of farmers use drilled wells; in the fluviomarine plain area, 80% of farmers use dug wells; in the sand dune area, 100% of farmers use drilled wells; and in the former backswamp area, 80% of farmers use drilled wells. Land management in the Opak–Oyo alluvial plain includes ridge sizes of 3–5 meters × 30 meters, drainage ditch sizes of 30 cm × 30 cm, with ditches parallel to the ridges. In the denudational hill area, ridge sizes are 2–3 meters × 10 meters, ditch sizes are 15 cm × 30 cm, and the ditches surround the ridges. In the fluviomarine plain area, ridge sizes are 3–5 meters × 30 meters, ditch sizes are 30 cm × 30 cm, and the ditches are adjusted to the land area and made parallel to the ridges. In the sand dune area, ridge sizes are 1–2 meters × 20 meters with ditch sizes of 15 cm × 30 cm along the ridges. In the former backswamp area, ridge sizes are 3–5 meters × 30 meters with ditch sizes of 30 cm × 30 cm parallel to the ridges.

Index Terms:

Strategy, Shallot Farmers, Irrigation, Land Morphology, Climate Changes

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Combustion Performance of Uncarbonized Durian and Jackfruit Peel Briquettes Toward Sustainable Biofuel Applications

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Abstract:

The use of agricultural waste as a renewable biofuel feedstock supports Sustainable Development Goal (SDG) 9, which encourages innovation and sustainable infrastructure through the development of alternative energy technologies. This study evaluated the combustion performance of carbon-free briquettes produced from durian peel, jackfruit peel, and their mixtures at weight ratios of 1:1, 1:2, and 2:1. The objective was to analyze how the feedstock composition affects density, combustion time, and combustion rate as indicators of fuel efficiency. All briquettes were prepared under identical conditions using a fixed mass and kerosene fuel. The results showed that the briquette density ranged from 0.95 to 1.07 g/cm^3, with the highest value obtained in the pure jackfruit peel briquette and the lowest in the pure durian peel briquette. The increase in density due to the addition of jackfruit peel indicates an increase in structural compactness that contributes to more stable combustion but slightly decreases the reaction rate. The combustion time was recorded between 2480 and 2540 seconds, while the combustion rate varied between 1.7582×10^{-3} and 2.2008×10^{-3} g/s. The blended briquettes with a higher proportion of jackfruit peel showed the highest combustion rate of 2.2008×10^{-3} g/s, indicating greater reactivity and more complete combustion. These findings indicate that biomass blending effectively improves combustion stability and thermal performance. Overall, durian peel and jackfruit peel exhibit strong potential as low-cost renewable materials for producing sustainable solid biofuels that can support innovations in clean energy systems and small-scale industrial applications.

Index Terms:

Durian Peel, Biomass Briquette, Renewable Energy, Innovation, Combustion

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UNY's Attention to Energy and Climate Change Issues: Sustainable Practices Supporting UI GreenMetric Rankings

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Abstract:

The UI GreenMetric World University Rankings is a globally recognized framework that evaluates higher education institutions based on their commitment to environmental sustainability across six key dimensions, with Energy and Climate Change being the most heavily weighted indicator. This study presents a comprehensive overview of Universitas Negeri Yogyakarta (UNY)'s strategic initiatives and sustainable practices that contribute to its performance in this critical category. Drawing on institutional data and practices, the paper highlights four major areas of intervention: (1) adoption of energy-efficient appliances and compliance with national building energy standards, (2) implementation of smart and automated building systems such as SCADA-based monitoring and centralized air-conditioning control, (3) development and utilization of renewable energy sources including solar, wind, pico-hydro, and biogas systems, and (4) comprehensive energy conservation programs promoting low-emission transportation and environmentally responsible campus behavior. These initiatives demonstrate measurable impacts, including reduced energy consumption through VRV/VRF air-conditioning systems and increasing renewable energy contributions, with a target of reaching 5% of total energy demand by 2030. The findings indicate that UNY's integrated approach of combining policy, technology, and behavioral change that aligns strongly with global sustainability benchmarks and supports continuous improvement in GreenMetric rankings. Furthermore, this paper underscores the role of universities as living laboratories for climate action, contributing not only to institutional performance but also to broader Sustainable Development Goals (SDGs).

Index Terms:

Universitas Negeri Yogyakarta, Energy, Climate Change, Sustainable Practices

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Beyond Conventional *Bacillus thuringiensis:* A Native Spore-forming Strain with Promising Activity Against *Tuta absoluta*

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Abstract:

The growing demand for sustainable pest management in agriculturally intensive countries underscores the urgent need to identify novel and locally adapted alternatives to conventional *Bacillus thuringiensis* (Bt)-based bioinsecticides, whose efficacy may be limited by resistance development and environmental variability. In this context, the exploration of native spore-forming strains represents a strategic approach to enhance biocontrol performance and regional applicability. This study investigates the biocontrol potential of a native spore-forming strain (B071) against *Tuta absoluta*, a highly destructive pest of *Solanum lycopersicum*. A lyophilized spore–crystal bioinsecticide was produced via submerged fermentation and broadly characterized. Despite exhibiting a lower protein yield (50 mg/g) than the reference strain *Bacillus thuringiensis* subsp. *israelensis* (B045) (64 mg/g), B071 achieved a higher viable spore concentration (1.07×10^6 CFU/mL), highlighting a decoupling between protein synthesis and sporulation. Greenhouse bioassays demonstrated a notably high larval mortality of 92 % for B071 compared to 83 % for B045 at equivalent concentrations, with no statistically significant differences ($p > 0.05$). The observed efficacy is likely driven by the presence of *cry1* and *cry2* genes, suggesting potential synergistic activity. Collectively, these findings position strain B071 as a strong candidate for developing efficient, locally tailored biopesticides.

Index Terms:

Universitas Negeri Yogyakarta, Energy, Climate Change, Sustainable Practices

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Low-Carbon Calcium Sulfoaluminate (CSA) Mortars for Sustainable Structural Strengthening

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Abstract:

Nowadays, ordinary Portland cement (OPC) production accounts for more than 7% of total global CO2 emissions. Thus, alternative materials are being considered for the replacement of cement in the construction sector. Calcium Sulfoaluminate (CSA) cement constitutes an eco-friendly alternative to OPC, with up to 35% lower production-associated CO2 emissions. This paper deals with the performance assessment of different CSA mixes, aiming to be used as matrices in innovative composites materials suitable for strengthening substandard structural members. For this purpose, a series of tests were conducted to determine the mechanical properties (compressive and flexural strength), the physical properties (fresh and hardened density) and the fresh performance (consistency) of eight different CSA mixes. Test parameters included: (a) the water-to-cement (W/C) ratio, (b) the content of micro-fibers added in the mix and (c) the binder-to-aggregate (B/A) ratio. From the results of this pilot study, it can be concluded that CSA cementitious mortars can reach very high compressive and flexural strengths at 28 days (almost up to 116 MPa and 12 MPa, respectively), while exhibiting excellent levels of flowability.

Index Terms:

Calcium Sulfualuminate Cement (CSA), Mechanical Properties, Fresh Properties, Physical Properties, Strengthening

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Doing Well by Doing Good? Evidence on the Risk-Adjusted Returns of ESG ETFs in the Asia-Pacific Market

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Abstract:

With the rapidly growing popularity of Exchange-Traded Funds (ETFs) and the rising interest in Environment, Social and Governance (ESG) criteria, the performance nexus between ESG-focused and traditional ETFs remains a subject of intense empirical debate. This study conducts a comparative performance analysis of ESG ETFs versus traditional counterparts, specifically focusing on the Asia Pacific (APAC) region context. Utilizing a matched-pair methodology, the research evaluates US-listed ETFs with significant APAC exposure, pairing ESG funds with traditional benchmarks based on asset composition and expense ratios. The analysis spans daily returns from 2017 to 2024, employing Sharpe ratios and Information ratios to assess risk-adjusted performance. Statistical significance was determined using the Wilcoxon Signed Rank Test. Findings indicate that while nominal returns generally follow a synchronized trend, descriptive statistics reveal inconsistent outperformance across the matched pairs. Nevertheless, the Wilcoxon Signed Rank Test confirms that there is no statistically significant difference in either nominal or risk-adjusted returns between ESG and traditional ETFs. These results provide significant practical implications for institutional investors and portfolio managers in the APAC region, suggesting that the integration of ethical mandates does not necessitate a financial penalty. The study supports the "doing well by doing good" hypothesis, affirming that ESG integration remains a viable strategy for risk-adjusted wealth accumulation.

Index Terms:

Exchange Traded Funds (ETFs), ESG Investing, Risk-Adjusted Returns, Comparative Analysis, APAC Region

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Evaluating the Climate Impact of Used Commuter Vehicles: Strategies for Sustainable Campus Transportation

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Abstract:

This study examines the climate impact of used commuter vehicles at Universiti Teknikal Malaysia Melaka (UTeM), focusing on CO_2 emissions within a campus environment. Using a mixed-methods approach, real-time emissions were measured with Portable Emission Measurement Systems (PEMS) and On-Board Diagnostics (OBD), alongside surveys capturing vehicle characteristics and driving behavior. Results show significant variation in emissions across vehicle types, with older vehicles, larger engine capacities, and poor maintenance linked to higher CO_2 output. Fuel type also influenced emission patterns, while urban driving conditions, such as frequent stopping and idling, further increased emissions. The findings highlight key factors driving emissions from older vehicles and emphasize the importance of targeted interventions. Promoting low-emission vehicles, improving maintenance practices, and encouraging sustainable commuting behaviors are identified as effective strategies to reduce the carbon footprint of campus transportation systems.

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Demonstrating Clear Quantum Advantage in Multi-Species Leaf Classification Using Quantum Enhanced Random Forests Classifier

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Abstract:

Quantum Machine Learning (QML) offers a promising paradigm for pattern recognition in high-dimensional, complex data such as images, where classical models often struggle. This study implements full quantum feature map classification bypassing conventional feature extraction using a Quantum Random Forest (QRF) on a synthetic leaf image dataset comprising 1,920 samples across eight species. QRF performance was benchmarked against classical Random Forest, Support Vector Machines (linear and RBF), and k-Nearest Neighbors. The QRF achieved a top accuracy of 90%, surpassing the best classical model (Random Forest at 81%). Bloch sphere visualizations revealed improved class separation in the quantum feature space, indicating that QML may offer distinct advantages for challenging image classification tasks. These findings suggest that quantum-enhanced algorithms can effectively leverage high-dimensional feature spaces where classical approaches reach fundamental performance limits.

Index Terms:

Image Classification, Hilbert Space, Bloch Sphere, Quantum Advantage

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