

# 12<sup>th</sup> GoGreen **Summit**

22<sup>nd</sup>-23<sup>rd</sup> May 2025 | Kuala Lumpur, Malaysia

"Sustainable Practices for a Greener Future"



#### **Organized by**

Mahatma Gandhi University, Meghalaya (MGU ), India SEGi University & Colleges, Malaysia, Association of Innovative Educational Research (AIER) & **IFERP Life Sciences - Formerly BioLEAGUES** 









FEERP<sup>®</sup> Life Sciences



12<sup>th</sup> GoGreen Summit 2025, Kuala Lumpur, Malaysia

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## "SUSTAINABLE PRACTICES FOR A GREENER FUTURE

CONFERENCE THEME





### Preface

This book reports the Proceedings of the "12<sup>th</sup> GoGreen Summit" held on 22<sup>nd</sup> & 23<sup>rd</sup> May 2025, organized by Mahatma Gandhi University, Meghalaya (MGU)-India, SEGi University & Colleges-Malaysia, Association of Innovative Educational Research (AIER) And IFERP Life Sciences-Formerly BioLEAGUES.

The publishing department has accepted more than 150 abstracts. After an initial review of the submitted abstracts, 30+ papers were presented at the conference and were accepted for publication in the Conference Proceedings. The topics that are covered in the conference include environmental sustainability, encompassing renewable energy, ecofriendly technologies, sustainable agriculture, waste management, conservation efforts, and initiatives promoting green infrastructure and practices. We would like to thank all the participants for their contributions to the conference and the proceedings.

Reviewing papers of 12<sup>th</sup> GoGreen Summit was a challenging process that relies on the good will of those people involved in the field. We were invited to the 12<sup>th</sup> GoGreen Summit Proceedings. We would like to thank all the reviewers for their time and effort in reviewing the documents.

Finally, we would like to thank all the proceeding team members who with much dedication have given their constant support and priceless time to bring out the proceedings in a grand and successful manner. I am sure the 12<sup>th</sup> GoGreen Summit will be a credit to a large group of people, and each one of us should be proud of its successful outcome.



### About 12<sup>th</sup> GoGreen Summit 2025

GoGreen Summit is a premier global platform dedicated to providing innovative environmental solutions to the pressing issues facing our world today.

As we celebrate our 12<sup>th</sup> series, the GoGreen Summit will convene in Kuala Lumpur, Malaysia on 22<sup>nd</sup> & 23<sup>rd</sup> May 2025. This milestone event continues the tradition of fostering collaboration among environmental experts, policymakers, businesses, and individuals from around the globe.

12<sup>th</sup> GoGreen Summit provides a unique strategic forum for academia, environmental activists, private sector, policymaker and scientists to come together to envision a healthier future, where the power of shared expertise and collective action is harnessed to overcome the most complex environmental solution facing humanity and the world.

Together with our distinguished partners, we are proud to be hosting the 12<sup>th</sup> GoGreen Summit world Meeting in Kuala Lumpur, Malaysia on 22<sup>nd</sup> & 23<sup>rd</sup> May 2025.

Over the years, the GoGreen Summit has brought together a diverse array of perspectives and expertise to develop actionable solutions. With renowned experts covering cutting-edge topics, attendees can anticipate insightful sessions, valuable networking opportunities, interactive panel discussions, and engaging workshops.

12<sup>th</sup> GoGreen Summit aims to explore cutting-edge strategies and solutions for advancing environmental sustainability across various sectors, fostering collaboration, and inspiring actionable initiatives for a greener future.

Sustainable Practices: Highlighting environmental conservation best practices

Policy and Regulation: Exploring government initiatives for sustainability.

Community Engagement: Discussing community involvement in sustainability.

Biodiversity Conservation: Addressing biodiversity preservation efforts.

Green Technologies: Showcasing eco-friendly technological advancements.

Corporate Responsibility: Addressing corporate environmental stewardship.

Climate Action: Focusing on combating climate change.

Renewable Energy: Showcasing innovations in renewables.

Sustainable Development Goals: Aligning with UN SDGs.



### 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.



### Message from Vice-Chancellor, MGU



#### Dr. Sagar O. Manjare

Vice-Chancellor, Mahatma Gandhi University, Meghalaya, India



The GoGreen Conference Proceedings emerge at a time when the natural world teeters on the precipice of irreversible change. As the 21st century unfolds, humanity faces compounding ecological disruptions—climate destabilization, biodiversity collapse, rampant pollution, and the fragmentation of once-resilient ecosystems. These proceedings, rooted in scientific inquiry and collective urgency, offer an interdisciplinary platform for knowledge, dialogue, and innovation in the realm of environmental science and pollution research. With contributions spanning the globe and reflecting a mosaic of scholarly and practical perspectives, this volume aims to deepen understanding while catalyzing action toward sustainable planetary stewardship.

Across the world, the signs of environmental distress are no longer speculative—they are empirical, measurable, and immediate. According to the Intergovernmental Panel on Climate Change (IPCC), anthropogenic greenhouse gas emissions have already warmed the planet by 1.1°C above pre-industrial levels, and the window to limit warming to 1.5°C is rapidly narrowing (IPCC, 2023). In tandem, the United Nations Environment Programme (UNEP) warns that over one million species face extinction, many within decades, due to habitat destruction, overexploitation, pollution, and invasive species (UNEP, 2023). These interconnected crises are not isolated anomalies—they are systemic, interwoven into the very fabric of human development, consumption patterns, and governance systems.



Within the Asia-Pacific region, environmental vulnerabilities are starkly magnified by demographic pressures, economic transitions, and climate exposure. The region houses more than 60% of the global population and is projected to experience the highest economic losses from climate-induced disasters by 2050 (ADB, 2023). Sea-level rise, intensified cyclones, glacial retreat in the Himalayas, and urban air toxicity in cities like Delhi, Jakarta, and Beijing present multifaceted risks to human health, water security, agriculture, and biodiversity. In India, a nation at the crossroads of development and environmental responsibility, the challenge is especially acute. According to the Central Pollution Control Board (CPCB, 2024), over 132 Indian cities consistently violate national air quality standards, while the country ranks third globally in plastic waste generation, with over 3.5 million tonnes produced annually (MoEFCC, 2023).

Yet, amid these daunting realities, the GoGreen conference has convened researchers, policymakers, scientists, and practitioners not merely to lament losses but to illuminate pathways of resilience and renewal. Each paper featured in this book contributes to an evolving body of evidence and thought—ranging from ecosystem-based climate adaptation and circular economy frameworks, to green innovations in pollution mitigation and strategies for achieving the United Nations Sustainable Development Goals (SDGs). These contributions do not simply diagnose; they design. They offer blueprints for transitions that are not only ecologically viable but also socially just and economically inclusive.

This compilation also embodies the principles of collaboration and inclusivity. It reflects a growing consensus that the solutions to environmental challenges must be both localized and globally coordinated. The inclusion of community-based models from India's tribal ecologies, cross-national climate cooperation in the Pacific Islands, and cutting-edge environmental technologies from East Asia testifies to the richness and relevance of multi-scalar responses. The proceedings champion not only science-based evidence but also indigenous knowledge systems, ethical paradigms, and equity-centered frameworks that widen the lens through which sustainability is viewed.

In its essence, the GoGreen Conference Proceedings are not merely a record of presentations they are a call to conscious action. They challenge readers to critically engage with data, disrupt entrenched assumptions, and imagine futures where the integrity of ecosystems is restored, where clean air and water are universal rights, and where human prosperity aligns harmoniously with planetary limits.

This volume is dedicated to the growing global alliance of environmental thinkers and doersthose who recognize that the current trajectory is unsustainable and that transformative change is not only possible, but imperative. May the insights within inspire continued inquiry, informed policy, and impactful practice. May they resonate beyond conference halls and printed pages, rippling into the very systems they seek to reform.

"In the silence of vanishing species and the haze of polluted skies lies a question not of survival, but of legacy—what future shall we craft when the Earth asks what we did with our moment of stewardship?"



### Message from President, AIER



#### Dr. Olivia Tan Swee Leng

President, Association of Innovative Educational Research (AIER)



It is with great humility, profound respect, and immense pleasure that I, on behalf of the Association of Innovative Educational Research (AIER), extend our warmest welcome to you. We are truly honored to have you join us today at the 12th GoGreen Summit, a prestigious event that has become a beacon of hope, innovation, and collective action in the realm of environmental sustainability. This summit is hosted by IFERP Life Sciences and takes place on the 22nd and 23rd of May, 2025, a momentous occasion that marks yet another milestone in our ongoing journey to foster sustainable development through education, research, and collaboration.

As we gather here today, I wish to emphasize the importance of this summit in the broader context of our global environmental and societal challenges. The theme for this year, "Sustainable Solutions for a Greener Tomorrow,", could not be more relevant or urgent. Humanity stands at a crossroads, confronting unprecedented environmental issues that threaten the very fabric of life on Earth. Climate change, pollution, loss of biodiversity, resource depletion, and ecological imbalances are not distant problems—they are immediate crises that demand our urgent attention and action.

The GoGreen Summit has grown over the years into a dynamic platform where policymakers, scientists, educators, industry leaders, students, and community activists come together to share ideas, innovations, and strategies that can make a tangible difference. It embodies our collective commitment to fostering a sustainable future, grounded in scientific research, innovative



technologies, and societal change.

It is noteworthy that this summit is co-organized by esteemed institutions such as Mahatma Gandhi University, Meghalaya (MGU) – India, SEGi University & Colleges – Malaysia, AIER, and IFERP Life Sciences This international collaboration underscores the global nature of our challenges and the united front we must present to address them.

Special mention must be made of IFERP Life Sciences, which has once again exemplified leadership by coordinating and organizing this remarkable gathering. Their unwavering commitment to environmental education and research has played a pivotal role in shaping the agenda of this summit and in fostering a global community dedicated to sustainable development.

The Association of Innovative Educational Research (AIER) has long been at the forefront of promoting innovative educational practices, safe research, and policy development in the realm of sustainability and security. AIER's mission aligns perfectly with the objectives of this summit—to bridge the gap between research and practice, to inspire educational institutions and communities to adopt greener practices, and to cultivate a new generation of environmentally conscious leaders.

As we reflect on the achievements of this summit, it is also imperative to look toward the future. AIER envisions a world where sustainability is seamlessly integrated into every facet of life– education, industry, governance, and community. We aim to be a catalyst for change by fostering innovative research, promoting sustainable practices, and nurturing global partnerships.

This summit is just one step in a long journey. The knowledge shared here, the networks formed, and the commitments made will serve as a foundation for future initiatives. AIER remains dedicated to advancing the cause of sustainability through education, research, and advocacy.

In closing, I wish to extend my deepest appreciation to all those who have contributed to the success of this summit. To the organizing committees, sponsors, and partners, your unwavering support and dedication have made this event possible. To the authors and presenter, your innovative research and passionate advocacy inspire us all. To the participants and attendees, your engagement and commitment are vital to driving change.

Your presence here underscores the importance of collective effort and shared responsibility in addressing our planet's most pressing challenges.

With Warm Regards and Best Wishes,

Dr. Olivia Tan Swee Leng



### Message from Managing Director, IFERP



#### Mr. A. Siddth Kumar Chhajer

Managing Director & Founder, IFERP, Technoarete Group.



On behalf of Institute For Educational Research and Publications (IFERP) & the organizing Committee, I express my hearty gratitude to the Participants, Keynote Speakers, Delegates, Reviewers and Researchers.

The goal of the 12<sup>th</sup> GoGreen Summit is to provide knowledge enrichment and innovative technical exchange between international researchers or scholars and practitioners from the academia and industries of related fields.

This conference creates solutions in different ways and to share innovative ideas in the releted fields. 12<sup>th</sup> GoGreen Summit 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.

12<sup>th</sup> 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 related fields from all over the world. 12<sup>th</sup> GoGreen Summit hopes to set the perfect platform for participants to establish careers as successful and globally renowned specialists in the related fields.



### Message from CEO, IFERP



#### Mr. Rudra Bhanu Satpathy

CEO & Founder, IFERP, Technoarete Group.



IFERP is hosting the 12<sup>th</sup> GoGreen Summit this year in month of May, 2025.

The main objective of 12<sup>th</sup> 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.





#### Dr. Sagar Onkarrao Manjare

Vice-Chancellor, Mahatma Gandhi University, Meghalaya, India

Prof. (Dr.) Sagar Onkarrao Manjare, the distinguished Vice-Chancellor of Mahatma Gandhi University, Meghalaya, epitomizes an illustrious career marked by a stellar academic journey and extensive industrial expertise. His formidable qualifications, including B.Pharm, DLL, MBA, M.Com, M.A. (Bus Eco.), M.Phil, Ph.D, and UGC-NET, underscore his commitment to scholarly excellence. Dr.

Manjare's accolades include the ESF & Gov. of Maharashtra – Best Vice-Chancellor Award -2023, Outstanding Vice Chancellor in India 2024 by Indian Education Network, SEF Teachers' Day - Academic Leadership Excellence Award – 2023, 2020 Academic Excellence Award for Best Professor in Sales & Marketing and the 2019 Rashtriys Shiksha Gaurav Puraskar for Best Academician. A globally recognized figure, he serves as a Research Thesis Evaluator and examiner for esteemed national and international universities. Notably, Dr. Manjare's intellectual footprint extends across 7 book publications, 7 patents, 52 journal papers, 4 edited book chapters, and 7 conference proceedings. His mentorship has guided four scholars to successful Ph.D. completion. Renowned as an industrial consultancy expert, he is a sought-after figure as a Resource Person, Keynote Speaker, and Session Chair for national and international conferences, seminars, FDPs, STTPs, workshops, and symposiums. Actively contributing to the academic community, he holds memberships in various prestigious national and international professional bodies. Furthermore, Dr. Manjare's role as a Mentor of Change at 'Atal Innovation Mission,' NITI Aayog, Government of India, underscores his commitment to shaping the future of education. Notably, he has been interviewed twice by UPSC, a testament to his standing in the academic realm. Dr. Sagar Onkarrao Manjare's multifaceted accomplishments position him as an influential and visionary leader, poised for continued success in shaping the landscape of higher education.





#### Dr. Ni Luh Suriani

Profesor, Master Program in Sustainable Finance and Development, Udayana University Bali, Indonesia

Dr. Ni Luh Suriani is Professor in Biopesticide, lecturer in Biology Study Program, Mathematics and Natural Sciences Faculty, Udayana University, Bali, Indonesia. She as a consultant organic farm at back2nature society 2020 until now, Malaysia and at Dewandaru flora organic farm, Bali, Indonesia. She Have 7 innovation products, 1 paten granted. She got awarded outstanding women researcher

in7th Asian PGPR 2022 in Malaysia. She Awarded as the winner of the most innovative products at Udayana University 2022, she was Chairman of PGPR conference Indonesia chapter 1 Sept 2021. She as invite/keynote speaker in international conference 2019 until now, she was guest lecture in Nepal, US, India and Malaysia 2022- now, she was visiting professor in Universiti Technology Malaysia December 2024, she has developed research in the field of organic and she has organic farm concept for ecotourism in Tabanan, Bali.





#### Ts. Dr. Goh Kai Chen

Associate Professor of Construction Management, Faculty of Technology Management and Business, Universiti Tun Hussein Onn Malaysia, Malaysia

Dr. GOH Kai Chen is an Associate Professor of Construction Management at the Faculty of Technology Management and Business, Universiti Tun Hussein Onn Malaysia. He is now the Head of Department of Entrepreneurship and Business at General Studies and Co-Curricular Centre, Universiti Tun Hussein Onn Malaysia. He was also the Head of Program for Master of Science Construction Technology

Management back in 2015. Dr. Goh has a B.Sc in Construction and M.Sc in Construction Management from Universiti Teknologi Malaysia and a Ph.D from Queensland University of Technology. During his academic career, he has been awarded the Outstanding Contribution to the University Award. He is also active on research and publication involvement, where he manages to. Dr. Goh has a recipient of research grants from Ministry of Education Malaysia, Universiti Tun Hussein Onn Malaysia and Ministry of Science, Technology and Innovation Malaysia. In addition, he has published more than 60 scholarly research papers in the field of construction management, infrastructure management, information systems/ technology and renewable energy. Dr. Goh retains close links with industry and has a wide range of industry experience, which he gained in Malaysia that working as consultant on several government –working committees and private expert in green building accreditation. To date, he has three Intellectual Property (IP) patents and 15 Medals in national and international research and innovation exhibitions.





#### Ts. Dr. Ahmad Naim Ahmad Yahaya

Professor Universiti Kuala Lumpur (UniKL) Malaysian Institute of Chemical and Bioengineering Technology (MICET), Malaysia

Prof. Ts. Dr. Ahmad Naim Ahmad Yahaya is a distinguished academic and researcher in environmental engineering technology, currently serving as a Professor at Universiti Kuala Lumpur (UniKL) Malaysian Institute of Chemical and Bioengineering Technology (MICET). With over two decades of service at UniKL since December 2002, he has held key leadership roles, including Dean of the Institute of Postgraduate Studies, Head of Campus, and Head of the

Environmental Engineering Technology Section. Ahmad Naim earned his PhD and MSc in Chemical and Biological Engineering from the University of Sheffield, UK, and holds a BTech in Environmental Technology from Universiti Sains Malaysia (USM). His academic excellence is complemented by executive training from Harvard Business School's ASEAN Senior Management Development Programme. He is a registered Professional Engineering Technologist (MySET) and holds memberships in prestigious bodies such as the Institution of Engineering and Technology (MIET), Chartered Institute of Logistics and Transport (CILT), and Institute of Chemical Engineers (AMIChemE). His research focuses on sustainable environmental solutions, including biomass valorization, wastewater treatment, biofuels, membrane technology, and supercritical fluid extraction. He has secured over RM 1.2 million in research grants as principal investigator and collaborator, leading projects on lipid extraction from sewage sludge, peat fire prevention, and nanocomposite materials for environmental applications. His scholarly output includes 50+ Scopus/ ISI-indexed publications in Q1/Q2 journals, such as Polymers and Journal of Supercritical Fluids, with an h-index of 17 (Google Scholar). A dedicated mentor, Ahmad Naim has supervised 15+ PhD and Master's students to completion, with research spanning biodiesel production, heavy metal removal, and waste recycling. He fosters global collaboration through cotutelle agreements with Prince Songkla University (Thailand) and Erasmus+ partnerships with Polytechnic University of Catalonia (Spain). Recognized for his contributions, he received UniKL's President's Award for outstanding student supervision (2023-2024), the MARA ICON Award (2015), and a gold medal at the 34th International Geneva Invention Fair (2006) for his odor-removal innovation, ODOREQ. He also holds copyrights for antimicrobial nanocomposite technologies. Committed to community service, Ahmad Naim has led flood relief initiatives, eco-school programs, and national occupational safety standards development. His expertise extends to editorial roles, grant evaluation for Malaysia's Ministry of Higher Education, and keynote addresses on sustainable biomass utilization. Ahmad Naim's career exemplifies a blend of academic rigor, innovative research, and leadership, driving advancements in environmental engineering and nurturing future technologists.





#### Dr. Olivia Tan Swee Leng

President Association of Innovative Educational Research (AIER), Malaysia

Dr. Olivia Tan Swee Leng was a Legal Counsel of Kuala Lumpur Regional Centre for Arbitration (KLRCA) and in charge of the Domain Name Dispute Resolution for both .com from Asian Domain Name Dispute Resolution Centre and .my cases at KLRCA, as well as Mediation/Arbitration case management. She obtained her Bachelor of Law Degree with honours from University of London. She

obtained her Masters and Ph.D in Law from National University of Malaysia (UKM). She was the book prize winner for the Civil Procedure Paper and General Paper awarded by the Certificate of Legal Practise Board (Malaysia) in 1996. She practised as an advocate and solicitor in Malaysia in the area of Corporate Litigation, Intellectual Property (Trademark), Banking and Conveyancing. At present, she serves as the Director for Technology Transfer Office in Multimedia University (MMU). Dr Olivia Tan Swee Leng also led the "rights of the vulnerable" group in Phase 1 development of the National Human Rights Action Plan in Malaysia (NHRAP) in 2015. In 2017 to 2018 she was the lead researcher for Reviewing Adoption Act 1952 and Registration of Adoptions Act 1952 sponsored by the Legal Affairs Division (BHEUU) under the Prime Minister's Office of Malaysia. In 2018, she was appointed by the Department of Social Welfare, Kuala Lumpur as the assessor of strategic development for the Activity Centers for the Elderly (PAWE) in Kuala Lumpur. Dr Olivia Tan is also an Honorary member and Committee member of the Activity Centre for the Elderly at Putrajaya (PAWE).





#### Dr. Sarika Dixit

Registrar & Dean Mahatma Gandhi University, Meghalaya, India

Prof . Dr. Sarika Dixit is an accomplished academic leader with over 16 years of experience in higher education. Since March 2023, she has served as the Registrar, Dean, and Professor of Sociology at Mahatma Gandhi University, Meghalaya. Her expertise lies in academic administration, curriculum development, faculty management, and student engagement. Dr. Sarika Dixit is known for her

strategic leadership in accreditation processes, policy formulation, and enhancing institutional performance. A passionate advocate for academic excellence, diversity, and inclusivity, she excels in fostering a researchdriven culture and mentoring both faculty and students in sociological research and theory. In her current role, Dr. Sarika Dixit oversees both academic and administrative functions, ensuring alignment with the university's goals. She is also an active contributor to the academic community as the Editor for the International Journal of Multidisciplinary Research and Technology and as a reviewer for the International Journal of Research and Innovation in Social Science. Furthermore, she organizes seminars, conferences, and workshops aimed at advancing research and educational quality. Dr. Sarika Dixit's career prior to Mahatma Gandhi University includes faculty roles at Siddhant College, Pune, and Devi Ahilya University, Indore, where she taught sociology and social work. She has also been deeply involved in social work through positions at Kothari College of Science, Management, and Technology, Kasturba Gram Rural Institute, and several programs under the Women and Child Development Department. Her dedication to educational development has been recognized with several accolades, including the CV Raman Prize 2024 in Research, the Rising Women of India Award, and the Mother Teresa Foundation Award. Dr. Sarika Dixit has led initiatives such as the implementation of the New Education Policy (NEP) and the introduction of vocational courses aligned with skill-based education trends. Dr. Sarika Dixit holds a Ph.D. in Sociology, a UGC-NET qualification, an M.A. in Women's Studies, an MSW, an M.A. in Sociology, and a PGDHRM. She is deeply invested in advancing research and education, having led an ICSSRfunded project on Menstrual Health & Hygiene and developed MOOCs on research methods and sociology. Dr. Sarika Dixit's work reflects her unwavering commitment to driving innovation in education and fostering the holistic development of students and staff.





#### **Dr. Gopal Krishan**

Scientist E Hydrological Investigations Division, National Institute of Hydrology (NIH), India

Dr. Gopal Krishan, Scientist-E at the National Institute of Hydrology, Roorkee, specializes in isotope hydrology, hydro-geochemistry, and water quality studies. With 24 years of research experience, he has led major hydrological projects nationally and internationally, collaborating with institutions like BGS (UK), IAEA (Vienna), and HTWD (Germany). He has supervised four PhD theses, published

over 100 journal articles, and received multiple awards, including the Professional Excellence Award (2021). A recognized expert, he serves on national committees for groundwater management and conservation. He is a fellow of several prestigious scientific societies and continues impactful research on global water sustainability.





#### Dr. Vikneswaran Nair

Professor (Sustainable Tourism) Wawasan Open University, Chief Operating Officer -Cornell Leadership Academy, Vice President - Malaysian Ecotourism Association, Malaysia

Professor Dr. Vikneswaran Nair is a distinguished academic and leader in sustainable tourism, currently serving as a Professor of Sustainable Tourism at Wawasan Open University, Malaysia. He was formerly the President of DISTED College, Penang (2021–2025), where he played a pivotal role in expanding academic programmes and industry collaborations and stabilising the College out of

the COVID-19 pandemic. Before returning to Malaysia in 2021, he spent five years in The Bahamas as a Professor and Dean of Graduate Studies and Research at the University of The Bahamas, where he was also a consultant to the Tourism Development Corporation and the Government of The Bahamas. With nearly three decades of experience, he was previously the Director of Research and Development and a Professor of Sustainable Tourism at Taylor's University, Malaysia, for 19 years. His extensive research in sustainable tourism has led to over 400 publications and the successful supervision of 30 Master's and PhD students. His consultancy work spans national and international projects, particularly in Southeast Asia and the Caribbean. A highly decorated academic with numerous awards, Professor Nair recently was named Personality of the Year under the National Sustainability and CSR Malaysia Leadership Award (2023). He also received the National Outstanding Educator Award in the College Category at the Private Education Excellence Awards 2023. His expertise in ecotourism has made him a sought-after speaker, researcher, and consultant. He is currently the Chief Operating Officer of Cornell Leadership Academy, Malaysia, the Director of Business Development of King's Park, Genting Highlands and the Vice President of the Malaysian Ecotourism Association (MEA). His research interests include Sustainable and Responsible Tourism, Rural Tourism, and Community-Based Tourism, with a strong focus on policy impact, resilience, and adaptation strategies for climate change in tourism.





#### **Dr. Amin Beiranvand Pour**

Institute of Oceanography & Environment (INOS) Higher Institution Center of Excellence (HICoE) in Marine Science, 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 modelling.





#### **Dr. Ting Ho**

President Back2Nature, Malaysia

Dr. Ho has a doctoral degree in Economics from the University of Pennsylvania. He is president of Back2Nature NGO in Malaysia, go green concept in research and practice. He is also President of SATA foundation, an NGO in promoting clean safe food and the founder of two other companies in Hong Kong: Global Agro Innovation Limited to introduce Innovative Agro Technologies for food

farming. He has also participated actively in the development of the Danube Macro Region in collaboration with a number of business organizations based in Vienna and Eastern Europe. Through this participation, he is well exposed to the current developments in Euro Zone, including Western Europe, Eastern Europe and Central Asia region. There are growth opportunities in that part of the world waiting to be developed. He travels extensively to forge strategic partnerships and to build cross-cultural bridges for peace, brotherly love, and global prosperity of the Pacific nations in the 21 st Century. Team Leader, National Food Security ,Academy of Tropical Agricultural Sciences, Visiting Professor, HELP University, Kuala Lumpur, Putra Business School, UPM, Putrajaya, Malaysia. He was for many years, an executive of a Global OEM shoe manufacturing concerned headquartered in Hong Kong with business focus on product development, manufacturing, distribution, licensing, brand acquisition, and brand management, outlet mall development, and strategic cross border investments as well as retail partnership with Mitsubishi Mall and US brand owners. For several years, Dr. He was an advisor to the Guangdong Provincial government on logistics planning, information revolution, Big Data, Industrial 4.0, Automation and deployment of robots and intelligent drones for civilian and industrial use, and supply chain management through the IOT (Internet of Things) advisory committee. He is instrumental in setting up the Southern China Logistics Platform for tracing and tracking the flows of cargoes in and out of China. He was the first Chief Economist of FedEx Corp headquartered in Memphis, Tenn. During his tenure, he played a crucial role in developing the FedEx global logistics networks, including Asia One Networks, China and Southeast Asia market developments. He forged close relationships with key global logistics service providers. He is the founder of Ting Ho Aquaculture, a project targeted at showing the symbiosis relationship between plant life and animal life on a commercial scale.



### About Plenary Speaker



#### Dr. M.G.H.Zaidi

Professor, Department of Chemistry C E.O - Intellectual Property Management Center, G.B.Pant University of Agriculture and Technology, Pantnagar, Uttarakhand, India

Dr.M.G.H.Zaidi is a full professor at the Department of Chemistry, College of Basic Science and Humanities, and Chief Executive Officer at the Intellectual Property Management Center, Govind Ballabh Pant University of Agriculture & Technology, Pantnagar, Uttarakhand, India. Dr. Zaidi is an academically dedicated physical chemist, academic administrator, and entrepreneurship mentor.

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## Navigating Livelihoods: Impact of Ecotourism on Rural Households in Chilika Wetland

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cotourism seeks to enhance the conservation of biodiversity, and prioritizes education regarding ecosystems, wildlife, and local cultures. It aims to elevate the welfare of local communities through economic advantages and the promotion of cultural heritage. The ecotourism sector has currently been evolving in Chilika wetland in India given its unique characteristics of biodiversity and local livelihood. It is the largest coastal lagoon in India's east coast and has been designated a Ramsar Wetland of International Importance since 1981. It is imperative to thoroughly examine the impact of ecotourism on the various livelihood capitals and its effect on the resilience and long-term sustainability of local communities. Therefore, the objective of the study is to analyze the effects of ecotourism development on the livelihoods of the Chilika wetland. To address the objective, the SL (Sustainable Livelihood) method has been used that foster key attributes of sustainability. The assets of SL framework primarily consist of natural capital (biodiversity quality, water quality, and proximity to ecotourism sites), social capital (social networks, skill training, membership, and community engagement), human capital (health, education, and family size), physical capital (housing area, access to water, electricity, public transport, and tourism infrastructure such as boats and fishing equipment), and financial capital (average annual income, income sources, and access to loans).

In the case of methodology, stratified random sampling has been employed to identify the locations, followed by basic random sampling to choose the respondents. Cochran's formula has been utilized to determine the sample size (385). All responders are thereafter categorized based on their participation in ecotourism activities. The first category comprises respondents who are not engaged in ecotourism activities, the second category includes those who are partially engaged, and the third category consists of individuals who are fully engaged in ecotourism activities. The entropy method is employed to ascertain weights and compute the Livelihood Capital Index (LCI). Multinomial logistic regression is employed to ascertain the impact of livelihood capital on livelihood types. When comparing LCI values, households engaged in ecotourism – whether fully or partially – exhibit an increase in natural, financial, and social capital, while experiencing a decline in human and physical capital, in contrast to households not involved in tourism. The data indicate that individuals completely engaged in ecotourism have experienced improvements in biodiversity and water quality, access to essential livelihood amenities, income, social networking, and skills relative to traditional households. Households partially engaged in tourism exhibit statistically significant improvements in biodiversity quality, family labour, tourism infrastructure, and income compared to those entirely uninvolved in ecotourism.

The study recommends that local governments and communities should explore alternative tourism resources and ecotourism activities to address the inherent seasonality issue in ecotourism. Diversifying the ecotourism sector will offer multiple livelihoods, especially for conventional and partially engaged households in ecotourism. Moreover, all household types can collaborate to enhance the scale, elevate service quality, and improve tourism infrastructure quality. Enhancing the ecotourism monitoring and



management system, together with refining the laws and regulations, will further augment the sector's administration.

Key words: Ecotourism, Livelihood, Biodiversity, Sustainability, Wetland



## Implementation of the Green Architecture Concept in the Traditional Wantilan Building of Taman Ayun Temple, Mengwi District, Badung Regency, Bali Province, Indonesia

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he concept of the Traditional wantilan building has been known by the Balinese people starting in the Royal era, where the first wantilan concept found has reached the age of fifty years. The concept of a wantilan structure system is still maintained by the Balinese people to this day because it is seen as a being able to provides thermal comfort in a wide span room without using an artificial air conditioning system. The concept of the wantilan building uses a traditional conception that called "baong capung" with overlapping roofs. Wantilan in the Taman Ayun Temple is one of the heritage buildings of the Mengwi Kingdom which until now is still functioned for various activities. This study examines the extent to which the concept of green architecture is applied to traditional wantilan buildings. What are the basic structural principles used by the ancestors of the Balinese people in the manufacture of wantilan buildings so that they can make natural air circulation flow throughout the building. The research method includes direct observation, interviews with temple leaders, literature studies, and assessments of green architectural principles applied to the wantilan building of Taman Ayun Temple. The extent of the use of natural energy sources, how the building responds to the site, the source and cycle of materials in the building, health and comfort in the space and environmental management. The results of this study show that green architecture has been implemented very well, the thermal comfort in this building is very comfortable. The air humidity varies due to the geographical location of Taman Ayun Temple which has high rainfall. In addition to temperature and humidity factors, the type and material of the building greatly affect thermal comfort. Based on the analysis of building conditions, the results of the building condition index were obtained by 80%. The "baong capung" structure system with overlapping roofs is the main key in the process of air circulation throughout the building. The existence of this building shows that

the concept of green architecture has been applied by the ancestors of the Balinese people since the Royal era, more than fifty years. The basic principles and concepts of this structural system are a just cultural heritage of green architecture that should be preserved by the younger generation of today's successors.

#### Keywords: Green Architecture, Wantilan, Traditional Balinese Architecture



# The Importance of Forest Sago Conservation for Food Security and Addressing Climate Change

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n important impact of climate change is the disruption of the agricultural sector, which is a threat to the food supply for the world's population which will continue to increase in the future. Therefore, food security in every country is important and needs to be prioritized in agricultural development. This research aims to provide an understanding of sago forest conservation to deal with climate change through measuring the biomass content and C-Stock of Sago forests. The methodology used is determining the characteristics of the Sago forest habitat (determining the type and hydraulic conductivity of the soil) and assessing biomass and C-Stock through cutting Sago trees at various growth stages, weighing the wet weight and dry weight of each fraction, calculating the Top Root Ratio, and determining starch yield. The results of research in the field showed four types of soil: Fluvic Gleisol, District, Hydric and Oxic Cambisole. C-Stock is 26.99 tonnes per hectare with a Top-Root Ratio of 636%, which means above ground biomass (AGB) is six times more than below ground biomass (BGB). The dry Sago flour produced ranges from 490.3-571.8 kg per tree and the potential is relatively varied. This is due to differences in forest structure and composition, as well as habitat and environment. Sago tree felling is still occurring on a very small scale but initial signs of disturbance have emerged in hydrological conditions and fluctuations in water levels or puddles of water in the soil profile. Thus, considering the vital role of Sago forests in dealing with climate change, conservation efforts need to be increased. This needs to be done, among other things, by minimizing the occurrence of conversion of Sago forests to other uses, especially for the expansion of grain crops on a large scale. If the Sago forest is converted into rice fields, there will be disruption to the Sago forest ecosystem and will result in drought in the area.

Keywords: Sago Forest, Climate Change, Biomass, Food Security, Conservation

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# Evaluating the Efficacy of Mulching Materials on Weed Suppression and Growth Enhancement of Pechay (*Brassica rapa pekinensis*)

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he study was conducted to determine the most effective mulching material for weed suppression and enhancing the growth and yield of pechay (Brassica rappa pekinensis). This research was carried out at Iloilo State College of Fisheries-Dingle Campus, Dingle, Iloilo, in Iloilo Province, utilizing a total area of 20 square meters organized in a Randomized Complete Block Design (RCBD). The experiment included four treatments: Treatment A (Control), Treatment B (Rice Straw), Treatment C (Sawdust), and Treatment D (Plastic Mulch), each replicated four times. The results demonstrated that Treatment B, employing rice straw as the mulching material, was significantly superior to the other treatments across all evaluated parameters. Specifically, it produced the highest pechay yield, averaging 0.80 kgs, compared to Treatment C (Sawdust) at 0.69 kgs, Treatment A (Control) at 0.68 kgs, and Treatment D (Plastic Mulch) at 0.65 kgs. Additionally, Treatment B significantly enhanced growth metrics, including average plant height and leaf count, measured at ten (10), twenty (20), and thirty (30) days post-transplant, consistently outperforming the other treatments. Furthermore, rice straw mulch was also effective in weed suppression, showing significantly lower weed presence than Treatments A, C, and D at all assessment intervals. In conclusion, the findings affirm that rice straw mulch not only significantly improves the yield of pechay but also enhances growth parameters and effectively suppresses weeds compared to other mulching materials. The study recommends further exploration of organic mulching options, particularly during dry planting seasons, and advocates for applying organic mulch only after crops have become fully established to maximize benefits.

Keywords: Mulching, Weed Suppression, Growth Enhancement, Pechay, Brassica Rapa Pekinensis



### Arctic Alienation: An Abandoned Admonition

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rctic is a unique habitat covering a vast area of 16 million sq. km. is going to have its first ice free day by 2027, thereby converting the white wonderland into a Blue briny. A 12% decadal reduction of sea ice is an unprecedented event which scientists claim to be inevitable. Climatologists reveal that over 90% of the old ice is melted and what we have today is new ice, which is 5 years old or more, which makes melting more expeditious. Winter and spring blocking events, heat waves in the Arctic, increased hydrocarbon emissions are at fault. Due to the sensitive topography of the region and escalation by the 'Albedo Effect', the region is melting 4 times faster than the global average. Despite the shocking statistics, Arctic falls short to get the global spotlight and universal anthropogenic attention. One of the reasons responsible is the region's remote location. Other is Arctic-ambition on the part of countries. An ice-free arctic would mean new routes for travel, cutting time and money for ships by up to 75%, connecting East Asia and Europe, extraction of rare earth metals, oil and natural gas resources, thereby facilitating more commercial exploitation. Yet another factor is that an immediate effect would be felt by the indigenous communities and they do not have adequate representation at the international platforms, even after being home to about 4 million people across 8 Arctic countries. The conflict-ridden era has turbo-charged militarisation in the region and hampered progress on Arctic emergency. This study analyses the reasons of Arctic-Alienation and the necessity of integrating this essential vista into the mainstream, considering the same as a global ecological crisis and taking collective actions, if not, the world will witness the demise of this frigid pole.

Keywords: Arctic, Alienation, Ice, Anthropogenic, International

ISBN: 978-93-92106-65-1



## Green Innovation: Paving the Way for Sustainable Development

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G reen innovation has become a crucial driver in the transition toward sustainable development in today's rapidly evolving world. As environmental concerns continue to rise, businesses, governments, and researchers are seeking novel solutions to address pressing ecological challenges while promoting economic growth. This paper explores the concept of green innovation, its importance, and the role it plays in mitigating climate change, reducing resource consumption, and fostering the development of eco-friendly technologies. Green innovation is not just about creating environmentally friendly products; it encompasses a holistic approach that integrates environmental consciousness into all aspects of innovation, including process improvements, business models, and consumer engagement.

Through a comprehensive review of existing literature and case studies, the paper highlights key drivers of green innovation, such as governmental policies, consumer demand for sustainable products, and advances in green technologies. It also identifies barriers that hinder the widespread adoption of green innovations, including high initial costs, lack of regulatory frameworks, and insufficient research and development. Moreover, the paper delves into the economic, social, and environmental benefits of green innovation, demonstrating its potential to create new markets, improve quality of life, and reduce environmental degradation.

The study further examines the role of industries such as renewable energy, sustainable agriculture, and green manufacturing in advancing green innovation. These sectors are at the forefront of integrating sustainable practices into their operations, thereby leading the way for future innovations. Lastly, the paper emphasizes the importance of collaboration between stakeholders, including governments, businesses, and research institutions, to foster an ecosystem conducive to the growth of green innovations.

In conclusion, green innovation is indispensable for achieving long-term sustainability goals. It not only offers solutions to environmental challenges but also drives economic growth through the creation of new technologies, business models, and markets. Policymakers, entrepreneurs, and researchers must prioritize green innovation to ensure a sustainable future for generations to come.

Keywords: Green Innovation, Sustainable Development, Eco-Friendly Technologies, Environmental Challenges, Renewable Energy, Sustainable Agriculture, Business Models, Climate Change



### Green Dreams, Hard Realities: The Hidden Struggles of Maintaining Green Office Buildings

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**urpose:** The shift towards sustainability has driven a growing number of Green Office Buildings (GOBs). GOBs have been a trend in minimising environmental footprint, maximising energy efficiency, and reducing operation costs. Yet, realities in maintaining these buildings rarely live up to expectations. While there is a large amount of interest in design and construction, there is a surprising dearth of studies on operation and maintenance (0&M) aspects, in Malaysia in particular. Facility managers face various technical, financial, and operation-related barriers preventing achievement of sustainability objectives, questioning GOBs' long-term sustainability. This study aims to identify underappreciated GOB maintenance challenges, examining differences between desired sustainability objectives and actual performances. The outcomes will provide valuable insights for policymakers, real estate developers, and facilities managers in managing green buildings in a more sustainable direction in the long term.

**Design/Methodology/Approach:** This research adopts a qualitative approach, using semi-structured interviews with nine facility managers that are directly responsible for the operation and maintenance (O&M) of Green Office Buildings (GOBs). Utilising the purposive sampling method, participants were chosen based on at least three years of experience and a variety of ownership structures, such as government-owned buildings, REIT-managed properties, and corporate-owned offices. Interviews were carried out from April to June 2024 in Kuala Lumpur, Selangor, Putrajaya, Cyberjaya, and the Klang Valley, where certified GOBs are more concentrated. Data were systematically interpreted using a thematic analysis approach, supported by Nvivo software, to provide a rich description of the main operational challenges identified by facility managers for maintaining GOBs.

**Findings:** The study examines the challenges in operating and maintaining Green Office Buildings (GOBs) as apparently there are not many research looking into the hurdle in operation and maintenance stage of GOBs, especially in Malaysia context.

Since the establishement of the local green building certification, the first born, GBI, in year 2009, and subsequently with GreenRE in year 2013, and MyCREST in year 2015. It has stir the application of green certification and boost the number of green office buildings in the countries. Through interviews with 9 facility managers and personnel who has experiences in managing GOBs, it provided a rich inside to verify the issues that identify via literature review. Some of the common challenges included energy

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consumption can be far exceeded the anticipated energy consumption during design stage. This is mainly contributed by the tropical climate and climate change factors. In addition, financial issue appears to be common issue, as the investment to the sustainable element (i.e. equipment, material, system) can be costly. Furthermore, to safeguard the stakeholders interest appear to be another common issue. Building owner prioritise return of investment, tenants and occupant proritise personal comfort and etc. This research also discover some new challenges and issues, such as the rising cost of green certification renewal due to engagement of consultant and renewal fee, limited focus on water conservation despite clean water source is getting scarce as compare to early days, low occupancy rate causing deterioration which can impact the long term sustainability of GOBs.

The study examines the challenges of maintaining Green Office Buildings (GOBs), where sustainability goals often prove difficult to achieve in daily operations. In Malaysia's tropical climate, high cooling demands frequently result in greater energy consumption than projected, complicating efforts to enhance efficiency. While Building Management Systems (BMS) and IoT technologies are intended to optimise energy use, their effectiveness is often hindered by the need for specialised expertise and ongoing maintenance. In addition, financial constraints further challenge sustainability efforts. Higher maintenance costs than conventional buildings discourage long-term investment. Furthermore, diverging priorities among owners, tenants, and facility managers create additional complexities. The study also identifies the rising cost of green certification renewal, limited focus on water conservation, energy inefficiencies from low occupancy rates, and a shortage of skilled maintenance personnel, all of which impact the long-term viability of GOBs.

The shift towards sustainability has driven a growing number of Green Office Buildings (GOBs), promising energy efficiency, environmental responsibility, and long-term cost savings. However, beneath the vision of sustainability lies a complex reality—one where maintaining these buildings is far more challenging than anticipated. Despite their innovative designs and advanced technologies, GOBs often fail to perform as expected, raising concerns about their long-term viability and operational effectiveness. While much attention has been given to green building design and construction, the realities of operating and maintaining these structures remain underexplored, particularly in Malaysia. This study uncovers the hidden struggles faced by facility managers in sustaining GOBs, revealing how the gap between expectations and actual performance threatens the very sustainability these buildings were designed to achieve.

Through an extensive literature review and qualitative interviews with facility managers, this research highlights the often-overlooked realities of GOB maintenance. The findings indicate that energy performance rarely aligns with initial projections, with cooling demands in Malaysia's tropical climate and climate change, inefficient energy management, and unforeseen operational constraints undermining sustainability targets. The technological promise of green building systems, such as Building Management Systems (BMS) and Internet of Things (IoT) devices, often falls short due to maintenance complexities, compatibility issues, and a shortage of skilled professionals.

Beyond technical limitations, financial constraints emerge as a major roadblock, with high maintenance costs, limited financial incentives, and slow returns on investment discouraging organisations from prioritising green building upkeep. The study also exposes stakeholder conflicts, where investors focus on financial returns, tenants prioritise comfort, and facility managers struggle to bridge these diverging interests while ensuring compliance with sustainability standards. Occupants' limited awareness of green building operations further contributes to inefficiencies, as resources (i.e. water/energy) saving systems are frequently misused or overlooked.

However, the challenges extend beyond what is typically acknowledged. This study brings to light emerging issues such as the high costs and operational burdens of renewing green certifications, which





have led many buildings to abandon their sustainability commitments. Water efficiency measures, while essential, often receive less emphasis than energy-saving initiatives, despite growing concerns over water conservation. Meanwhile, low occupancy rates in commercial office spaces create new inefficiencies, as energy-intensive systems struggle to adapt to fluctuating usage patterns. Additionally, the shortage of skilled personnel and the inconsistent maintenance of complex green systems further compromise long-term performance, adding another layer of difficulty to GOB sustainability.

Despite these hidden struggles, there is a path forward. This study underscores the urgent need for stronger policies, improved financial support mechanisms, specialised training for facility managers, and greater stakeholder collaboration to ensure that green buildings fulfil their sustainability promises. Without addressing these operational challenges, the vision of green office buildings may remain an ideal rather than a reality.

By uncovering the hard truths behind green building maintenance, this research provides fresh insights into the practical realities of sustaining GOBs. It offers actionable recommendations to bridge the gap between green dreams and the realities of everyday operations, ensuring that sustainability is not just a goal at the design stage but an ongoing commitment throughout a building's lifecycle.

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# A Systematic Review of Factors Influencing Student Productivity in Higher Education

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igher education is a critical context in the development of human educative and productive capabilities and in determining the social and economic profile of societies. Despite the growing trend of higher education around the world, the student productivity remains a concern and has not been enhanced as expected. In this review paper, the paper has reviewed more than 50 recent studies that particularly focused on factor such as academic, individual and environmental to student productivity in higher education. The reviewed literature strongly emphasized that there are significant association between factor such as academic, individual and environmental to student productivity in higher education. Amid to the literature, it can recommend that universities should cultivate a favourable organizational culture that prioritizes academic principles and encouraging leadership, implement adaptable and dynamic learning approaches that integrate technology and collaborative tasks, and reinforce academic support services by providing individualized tutoring and counselling. moreover, it is also essential to establish educational settings that are favourable to learning, equipped with contemporary amenities, and to actively encourage a well-rounded campus experience, covering the areas of academic, individual and environmental. The review paper contributed to extension of state-of-art literature knowledge on the subject area, identifying existing research gaps thus promote improved efforts and strategies in the education sector to increase graduation rates, employment opportunities hence increasing the prospects of positive future employment status among graduates.



### Exploring the Impact of Narrative Techniques on Audience Satisfaction in Contemporary Chinese Commercial Films in the New Period of China

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oday, audience satisfaction is a major factor in a film's success in China's New Period commercial films. Using the narrative technique of storytelling methods is the cornerstone of making any film. However, there is insufficient academic evidence indicating the pros and cons of adopting narrative techniques in Chinese commercial film production and the effect of this adoption on audience satisfaction. The objective of this study is to investigate the influence of narrative techniques on audience satisfaction in commercial films from the New Period of China. The aim of the research is to investigation attempts to comprehend the mediating influence of perceived technique utility on the overall satisfaction of the films and the responses of the audience. The ground theoretical framework will adopt the Metaverse SPICE Model (MSM) and Technology Acceptance Model (TAM) to construct the conceptual framework and corresponding hypotheses in this study. This study employed quantitative research methodologies. The data were analyzed using descriptive analysis, reliability test, confirmatory factor analysis, and multi-linear regression test. The findings reveal that seamlessness, presence, and interoperability of narrative techniques significantly enhance audience satisfaction, particularly when perceived as useful. Therefore, Perceived techniques' usefulness acts as a mediating factor. However, excessive concurrence of techniques can negatively impact satisfaction by overwhelming the audience. The theoretical significance of the study accentuates the knowledge add-up in the corresponding sector of film industry of thinking audience satisfaction in the relationship with narrative technique usage.

#### Keywords: Narrative Technique, Commercial Movie, Audience Satisfaction



## Seasonal Analysis of Marine Debris Hotspots in the Bali Strait, Bali, Indonesia

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n recent years, the Bali Strait has been threatened by marine debris contamination that pollutes both coastal areas and the seabed, potentially endangering coastal and underwater ecosystems. Although numerous studies have been conducted on marine debris, research on marine debris hotspots in the Bali Strait remains limited. This study aims to analyze marine debris hotspots in the Bali Strait during the west and east monsoon seasons. The method used includes the Finite Volume Community Ocean Model (FVCOM) integrated with the Lagrangian Particle Tracking module to model the movement of debris particles. Simulations were conducted using an Unstructural Triangular Grid with a resolution of 200 m - 5000 m to calculate the number of particles per unit area (km<sup>2</sup>). The results show that during the west monsoon, marine debris hotspots were distributed over an area of 4784 km<sup>2</sup> with a maximum density of 6137 particles/km<sup>2</sup>, mainly concentrated along the coast of Badung Regency near Kuta Beach. In the near-bottom waters, particles were distributed over 484 km² with a maximum density of 882 particles/km². In contrast, during the east monsoon, marine debris hotspots expanded to 5265 km<sup>2</sup> with a maximum density of 6188 particles/km<sup>2</sup>, primarily along the coast of Banyuwangi Regency. Near-bottom particles were observed across an area of 897 km<sup>2</sup> with a maximum density of 1362 particles/km<sup>2</sup>, indicating that stronger currents during this season facilitated wider dispersion. The seasonal differences in marine debris hotspots emphasize the significant role of ocean currents in influencing the spatial patterns of debris accumulation in the Bali Strait. These findings provide essential baseline data for local authorities to develop more effective marine debris management strategies, emphasizing the need for season-specific interventions. Furthermore, this study highlights the importance of integrating oceanographic data into debris monitoring programs to enhance the accuracy of marine litter management policies.

#### Keywords: Marine Debris Hotspots, Bali Strait, FVCOM, Lagrangian Particle Tracking, Seasonal Distribution



## Thermal Comfort in Malaysian Secondary Schools: Evaluating Classroom Conditions During Heat Waves

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lobal warming continues to drive extreme temperature variations and unpredictable precipitation patterns, with El Nino serving as a prolonged cycle of this phenomenon. In Malaysia, over 250 schools were forced to close due to extreme heat waves associated with El Nino, raising concerns about the thermal comfort of classrooms. This study monitored the indoor environmental conditions of classrooms at National High School Bukit Jalil and National High School Taman Yarl in Kuala Lumpur, selected based on their typical design, orientation, and floor levels. The study aimed to evaluate classroom thermal conditions based on ASHRAE Standard 55 and ISO EN 7730, assess students' thermal comfort perceptions, and identify key influencing factors. Objective assessments were conducted over six days in March 2016, from 7:30 AM to 1:30 PM, during lesson hours. Thermal comfort variables were recorded using an HD32.2 Delta Ohm Data Logger to develop the Predicted Mean Vote (PMV) model and calculate the Predicted Percentage Dissatisfied (PPD) value. The analysis revealed that none of the classrooms met ASHRAE Standard 55 comfort conditions, with all classified as warm to hot on the 7-point ASHRAE scale. A questionnaire survey assessing students' perceptions indicated that 80% to 100% were dissatisfied with the classroom thermal environment. Key factors influencing thermal discomfort included seating positions, clothing insulation, classroom floor levels, and orientation. Although this study was conducted in 2016, its findings remain highly relevant, as extreme heat events continue to pose challenges to indoor learning environments in Malaysia. The results provide a valuable benchmark for assessing the long-term impact of climate change on classroom thermal comfort and highlight the urgent need for sustainable climate adaptation strategies in educational institutions.

Keywords: Thermal Comfort, Heat Wave Impact, El Nino, Classroom Environment, Climate Change Adaptation, Secondary Schools



## Mitigation Strategies of Fly Ash in Concrete Production for High Performance Airport Runways

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ly ash, an industrial waste generated from burning coal in power plants, threat to green environment because of its potential to pollute ecosystem. Recycling and repurposing fly ash in various industries can significantly reduce its environmental impact while maximizing its benefits. In cement and concrete production, its pozzolanic properties enhance strength and durability while also decreasing the carbon footprint of conventional Portland cement. Safe disposal methods, including controlled landfilling and ash ponds with modern containment systems, along with technological advancements in fly ash generation and management, are examined as additional mitigation strategies. To mitigate the environmental impact of fly ash, emphasizing sustainable practices, innovation, and responsible management to minimize risks while maximizing it's potential in the construction sector Using fly ash in concrete improves workability, minimizes heat production, enhances resistance to chemical attacks, and offers an eco-friendly solution to strengthen and extend the lifespan of airport runways, making it suitable for diverse construction projects. This study examines various strategies to reduce the environmental impact of fly ash while optimizing its role in high-performance concrete applications. The results indicate that incorporating an optimal amount of fly ash can increase compressive strength by 30%, attributed to improvements in workability, and cohesiveness in the fresh PC mixture. Additionally, the study found that replacing sand with fly ash led to a 15% increase in flexural strength. These findings highlight the potential of fly ash to enhance the mechanical performance and durability of PC systems, making them valuable for various structural applications.

#### Keywords: Fly Ash, Industrial Waste, Concrete, Environmental Impact, Sustainable



## Studies on Synthesis of Starch-Based Bioplastics for Sustainable Packaging Applications

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illions of tons of plastic waste are generated worldwide every year, severely impacting landfills, The overuse of plastics and their non-biodegradability have become serious environmental issues. oceans, and wildlife. These plastics take a long time to degrade, and their disposal poses a major challenge. Additionally, plastic pollution affects human health, as microplastics enter the food chain. Therefore, there is a pressing need for an eco-friendly, biodegradable, and easily disposable alternative. Bioplastics present a potential solution, as they are derived from renewable sources and can serve as a sustainable alternative to conventional plastics. The primary objective of this research is to synthesize and characterize starch-based bioplastics for packaging applications. Starch is an abundantly available and biodegradable polymer. However, starchbased bioplastics have certain limitations, such as brittleness, water sensitivity, and poor mechanical properties, which hinder their direct replacement of conventional plastics. To address these challenges, this study incorporates plasticizers to enhance flexibility and durability. Additionally, cross-linking agents are introduced to strengthen the bonding between starch molecules, thereby improving the tensile strength of the bioplastics. Previous studies indicate that optimizing the formulation of starch-based bioplastics can significantly improve their properties. However, challenges such as water absorption, mechanical strength, and thermal stability still need to be addressed. This research aims to overcome these limitations and develop a bioplastic that is both effective for packaging applications and a sustainable alternative to petroleum-based plastics. Beyond biodegradability, starch-based bioplastics offer cost-effective and environmentally friendly benefits, as starch is a low-cost and widely available raw material. If efficiently manufactured on an industrial scale, these bioplastics could significantly contribute to reducing plastic pollution. Moreover, their faster decomposition process helps minimize plastic accumulation in landfills, promoting a circular economy. By developing an optimized formulation of starch-based bioplastics, this research supports green technology and the circular economy, paving the way for long-term sustainability in the packaging industry.

Keywords: Bioplastic, Renewable Sources, Biodegradable, Sustainable Growth, Circular Economy



## Fly Ash Derived Magnetic Nanocomposites for Sustainable Microwave Absorption

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o ensure a safe, healthy and radiation-free environment, researchers have been exploring different types of microwave (MW) absorbents. Recently, there has been great progress in the production of diverse types of ferrite absorbers. This could help protect people and their devices from unhealthy levels of radiation. Microwave absorbing nanomaterials (MANs) are an effective way to reduce or eliminate electromagnetic reflections on large objects relevant to high frequency electronics, biomedical devices, aerospace and defence. MANs made devices are fabricated into sheets, coatings and sponges for desired applications. Explorations are on the way towards development of novel MANs that can effectively absorb MW with improved reflection loss and wide absorption bandwidth. Present research shall reveal advancements in fly ash (FA) derived nanomagnetic materials applicable as MW absorbers. Research shall demonstrate the status of FA as potential industrial waste and its application in development of ferrite based MANs. For the purposes of the current research, NHs have been fabricated, characterized and examined for electrical conductivity ( $\sigma$ DC) in a wide range of physical conditions. Development and stability of nanohybrids (NHs) has been confirmed by UV spectroscopy. Surface morphology of NHs has been ascertained through scanning electron microscopy. The effect of temperature on σDC of NHs has been evaluated from the range of 25°C to 115 (±2°C). I-V characteristics of all the specimens were recorded in the voltage range of 5 to 45 V at RT.

Keywords: FA, DC Conductivity, Nhs, Nano-Ferrite, Microwave Absorbing Material, Reflection Loss



## Pulse Production Dynamics Under Selected Integrated Pest Management in the Semi-Arid Areas of Muranga County, Kenya

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frican indigenous pulses such as beans Phaseolus vulgaris, cowpeas Vigna unguiculata, lentils Lens culinaris subsp. culinaris, chickpeas Cicer arietinum, pigeon peas Cajanus cajan, and green grams Vigna radiata play a crucial role in combating malnutrition, food insecurity, and improving soil health by fixing nitrogen. These pulses are important food crops grown primarily for consumption by smallholder farmers in the semi-arid areas of Ithanga, located in the south of Murang'a County, Kenya. However, erratic weather conditions and the surge in the abundance and diversity of pests due to climate change are major constraints to agricultural production. Pests continue to threaten the production of these pulses, leading to significant yield losses and contributing to food insecurity. The use of Integrated Pest Management (IPM) strategies for controlling these pests is limited in certain agricultural areas. This study, conducted in Ithanga from July 2024 to February 2025, investigated local and indigenous knowledge on pulse production and pest control. The level of pest damage, pest and natural enemy diversity, and crop yield under selected IPM packages in beans (Phaseolus vulgaris, Nyota variety) and cowpeas (Vigna unguiculata, K80 variety) were assessed. The treatments included several IPM packages, such as biopesticide, blue and yellow traps, seaweed, organic botanical pesticide ("Apichi"), and conventional pest control methods as control treatments. The study followed a randomized complete block design with three replicates. Data on the diversity of pests, damage levels, and yields from each plot were collected from two weeks after germination to harvest. The data were analyzed using the R statistics package for mean separation, followed by post hoc analysis using LSD where significant differences existed. Farmers' awareness and use of IPM technologies were monitored using structured questionnaires and analyzed using Statistical Package for the Social Science (SPSS.) Results indicated that IPM packages were more efficient in controlling and managing pests, such as aphids, whiteflies, and thrips, and in improving the yields of pulses. This research contributes to the understanding of the current state of IPM strategies and recommends the use of sustainable pest management practices for improved yields and income among smallholder



farmers. By combining indigenous knowledge with scientific methods, this study helps bridge the knowledge gap and optimize pulse production in the region

Keywords: Climate-smart Agriculture, Indigenous knowledge, pulses, Integrated Pest management, Natural enemies, Apichi



# Online Electrochemical Monitoring of the Release of Antibacterial Nanoparticles from Biopolymer Derived Food Packaging

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A series of biopolymer derived food packaging has been fabricated through *insitu* dispersion of various proportions of antibacterial organophilic montmorillonite (Ommt, ≤ 1 wt %) into corn starch cross-linked with polyvinyl alcohol. The fabricated food packaging was characterized through various spectral, microscopic electrical and electrochemical methods. The dispersion of Ommt and their integration into biopolymer matrix has been investigated through scanning electron microscopy in coherence with online square wave Voltametry (SWV). The effect of composition on humidity (RH 40%) of food packaging has been investigated. The electro-analytical studies reveal food packaging fabricated at different Ommt proportions demonstrates their release in variable time fashion up to 3h. The food packaging demonstrates well electrical insulation up to 10V and sustainability in humid environment over 1hr. The study delivers a simple one pot method of fabrication of food packaging with sustained antibacterial action, resistance in electrostatic and humid environment.

#### Keywords: Food Packaging, Electroanalysis Electrical Insulation, Effect of Humidity



## Mechanical and Thermal Properties of PMMA Reinforced Wood Plastic Composites

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where the inception of human civilizations. To enhance the performance of furniture and building components for application under humid environments, wood has been subjected to modification through reinforcing the polymeric fillers over the decades. The present investigation deals with modification in mechanical and thermal properties of pine wood (PW). Modification of the properties of WPC over untreated wood was evaluated in terms of FTIR and simultaneous differential thermogravimetry-thermogravimetric-differential thermal analysis (DTG-TG-DTA) in air. The study concludes that incorporating nanomaterials into pine wood significantly enhances its mechanical strength and thermal stability, making it more durable and suitable for demanding environments. FTIR analysis confirms adequate bonding between nanomaterials and wood, while TGA results demonstrate improved resistance to thermal degradation, with slower decomposition and reduced mass loss at high temperatures. Additionally, AIBN nanofluid enables complete thermal degradation, leaving minimal residue and making the modified wood suitable for applications requiring full combustion or breakdown. These findings highlight the potential of nanomaterial-treated wood as a high-performance material for construction and other applications in humid or thermally intense environments.

#### Keywords: FTIR, TGA, Pinewood, AIBN (Azobisisobutyronitrile). Thermal Stability



### Green Skills 2030: An Industry Perspective on Bridging the Gap Between Education and Sustainable Employment

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s the global economy increasingly prioritizes sustainability, the demand for green skills has also become a key area of interest for employers wanting to see through the process of transitioning towards a greener future. "Green Skills 2030: An Industry Perspectives on Bridging the Gap between Education and Sustainable Employment" is a presentation that addresses the serious disconnect between the skills being offered by educational institutions and the skills needed in the constantly changing green employment market. A recent report by Bridgespan- a non-profit organization, noted that there could be as many as 30 million sustainability-linked jobs in Southeast Asia by 2030, with the region's green economy projected to provide up to US\$1 trillion in annual economic opportunities. Despite the high growth projections, the majority of educational programmes are not yet well-equipped to deliver the necessary talent.

The findings and insights in this presentation are derived from over 20 years of professional experience as a global corporate "Transformer" consultant, to governments and large companies globally and they provide a realistic perspective of the most important skills required in contemporary industry. Research indicates that while the demand for green roles is escalating, only a fraction of educational offerings effectively equip students with relevant competencies. It is such a misfit that poses a big challenge to job seekers as well as firms seeking to achieve sustainability goals.

In addressing this gap, the presentation emphasizes the importance of fostering a robust industryacademia linkage. It also urges institutions of education to transform curricula to correspond more closely to the realities of the labour marketplace and the specialized skills in most demand by employers. Industry-academia linkage is also indispensable, as training experience is at the heart of developing training systems that prepare learners for near-future contribution within green sectors.

Additionally, this presentation also looks at the broader implications of such a skills gap for the sustainability agenda, arguing that without an adequately prepared workforce, the lofty aspirations of nations and sectors can remain unfulfilled. Industry-aligned education is essential to the end that the future professionals possess skills necessary to stimulate innovation and achieve sustainable practice across industries.

As we count down to 2030, the presenter calls for a collaborative effort by educational institutions, business leaders, and policymakers to close the gap between education and green employment. The findings outlined are intended to spur earnest conversation and drive practical change that will boost workforce preparedness in meeting the demands of an increasingly green economy. Through investing in the cultivation of practical skills aligned with the needs of the industry, we can build a generation capable of leading us towards a sustainable future.

#### Keywords: Green Skills, Sustainable Employment, Practical Skills, Skills Gap

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## Impact of CuO Nanoparticles on Green Leafy Vegetable Crop System

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The increasing use of nanoparticles, particularly copper oxide (CuO), in various industrial applications has led to concerns regarding their impact on agricultural systems. However, recent studies suggest that CuO nanoparticles, when applied in controlled concentrations, may offer potential benefits for plant growth and agricultural sustainability. This research investigates the positive effects of CuO nanoparticles on green leafy vegetables irrigated with wastewater containing these particles. CuO nanoparticles, at low concentrations, have been shown to enhance plant growth by stimulating antioxidant activity, improving nutrient uptake, and boosting resistance to environmental stresses such as drought and disease. Additionally, CuO nanoparticles may promote root development and improve the overall health of plants by acting as a growth stimulant. The study examines the mechanisms through which CuO nanoparticles (34nm) positively influence plant physiology, including their role in enhancing photosynthetic efficiency and nutrient absorption. By evaluating their effects on crop productivity, this research highlights the potential for using CuO nanoparticles as a tool for improving agricultural sustainability, particularly in regions with limited access to chemical fertilizers. The findings emphasize the importance of optimizing nanoparticle concentrations to achieve beneficial outcomes while minimizing any potential risks to the environment and human health.

#### Keywords: Copper Oxide, Nanoparticles, Agricultural Sustainability, Crop Health



### Assessment of Indoor Air Quality in Low-Income Urban Compact Households in Sri Lanka- A Case Study from Western Province of Sri Lanka

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ndoor air quality (IAQ) is a significant environmental and public health concern, particularly in densely populated urban settings characterized by compact housing. In Colombo, Sri Lanka's largest metropolitan area, many low-income households utilize various cooking fuels and ventilation practices that considerably impact IAQ. This study examined IAQ in 65 systematically sampled households from two low-income compact housing schemes, Sayurupura and Sinhapura, in the Western Province of Sri Lanka. Data collection was done using TROTEC PC 200 particle counter. Statistical analyses, including regression and One-Way ANOVA, were performed using Microsoft Excel to identify trends in PM2.5 and PM10 levels during cooking hours. The results indicated that 54% of households primarily used liquefied petroleum gas (LPG) for cooking, while 10% utilized both LPG and wood, and 29% relied on a combination of LPG and electricity. The PM2.5 count in Sayurupura ranged between 62 and 680, with an average of 152, and 21% of households exhibited levels exceeding this average. PM10 count in Sayurupura ranged between 120 and 1905, with an average of 850, and 56% of households recorded values above this threshold. In outdoor fresh air, the PM2.5 and PM10 counts were recorded as100 and 156, respectively. Similarly, in Sinhapura, 14% of households had PM2.5 levels above the average, with count ranging from 27 to 789. The average PM10 count in Sinhapura was 973, with 42% of households surpassing this value, while outdoor fresh air exhibited PM2.5 and PM10 count of 110 and 155, respectively. These findings indicate that a considerable proportion of households experience elevated levels of particulate matter, highlighting the need for improved ventilation strategies and cleaner cooking fuel alternatives to mitigate IAQ-related health risks in low-income urban housing environments.

Keywords: IAQ, PM 2.5, PM10, Cooking fuel, LPG

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# Knowledge and Attitudes Towards Recycled Fashion, As Well As Constraints and Expectations towards the Recycled Fashion Industry in Indonesia

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#### **Qualitative Analysis**

From the open-ended answers, some key findings include:

- Reasons for interest or disinterest in recycled fashion:
  - » Many are interested because they want to protect the environment and reduce the negative impact of textiles.
  - » Some are not interested due to a lack of sewing skills or the notion that recycled fashion is less attractive.
- Obstacles in using recycled fashion:
  - » Limited product availability.
  - » Lack of information about recycled fashion.
  - » The price is considered too expensive.
  - » Hygiene and product quality factors.
- Suggestions for reducing textile waste:
  - » Work with communities for recycling.
  - » Using textile waste as a creative fashion material.
  - » Educate the public about the importance of waste management.
- Expectations for the recycling fashion industry in Indonesia:
  - » It is hoped that this industry will develop as part of the creative economy.
  - » Parallel to other existing fashion lines.
  - » More innovative to attract more consumers.

#### Analysis in the Perspective of Sociology of Communication

From a communication and sociology perspective:

- Awareness of recycled fashion is already high (100% of respondents are aware of this concept).
- The lack of effective information about product quality, price, and accessibility is a major obstacle.
- Social perceptions are still mixed—many are interested but some are still hesitant due to price and quality factors.
- Strategic communication is needed, whether through social media, community campaigns, or educational promotions, to increase the acceptance of recycled fashion in the community.



### Local Government Communication Strategy in Public Policy Implementation

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ocal governments have an important role in organizing effective governance, including in the implementation of public policies. The success of these policies is highly dependent on the ability of local governments to convey information clearly and effectively to the community. Research Objectives 1. Analyze the communication strategies implemented by local governments in implementing public policies, 2. Identify the challenges and obstacles faced by local governments in conveying policies to the community, 3. Explore government communication strategies in public participation in public policies, 4. Provide recommendations for local governments on how to optimize communication strategies to increase the effectiveness of public policies. This study uses qualitative methods, which focus more on an in-depth understanding of the phenomenon of local government communication in implementing public policies. that effective communication strategies play an important role in the success of public policy implementation at the local government level. Multi-channel approaches, community involvement, and information transparency are key elements. Challenges such as low community literacy and limited infrastructure can be overcome by integrating digital technology and increasing human resource capacity. By implementing the recommendations given, local governments can increase the effectiveness of policy communication and strengthen community participation.

#### Keywords: Communication Strategy, Local Government, Implementation, Public Policy



## Traditional Utilization of Plants for Malaria Prevention and Treatment by the Sumba Tribe, East Nusa Tenggara

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alaria is a tropical disease that remains a major public health problem in Indonesia. The eastern region of Indonesia, including Sumba Island, is recorded as an area with a high prevalence of endemic malaria cases. This study aims to identify plant species used for the prevention and treatment of malaria, determine the plant parts most commonly utilized, and analyze the Use Index Value (UVi), Fidelity Level (FL), and Relative Frequency of Citation (RFC) of each plant species used. This study employed structured interview techniques using the snowball sampling and purposive sampling methods on 25 informants, consisting of 76% males and 26% females. Field observations were conducted to identify plant species, and documentation was carried out. Plant species were identified using the Flora of Malesiana book, while species verification was conducted using the *Plants of the World Online (POWO)* website. The data were analyzed quantitatively. This study identified 43 plant species from 30 families used for malaria treatment on Sumba Island. The families with the highest number of species were *Fabaceae* and *Meliaceae*. Most of the plants used were trees (51%), with the most common processing method being decoction (53%). The most frequently utilized plant part for therapeutic preparation was the leaves (49%). The plant most commonly used for malaria treatment, based on the highest UVi value (0.64) and the highest RFC value (0.56), was papaya (*Carica* papaya L). Additionally, 24 plant species with an FL of 100% were recommended as potential materials for malaria prevention and treatment. Medicinal plants should be preserved due to their ecological value, such as maintaining soil fertility, acting as natural pest control, balancing water cycles, producing oxygen, and providing habitats. This study demonstrates that ethnomedicine practices play a crucial role in people's lives. The medicinal plants used have the potential to be further developed as natural alternative treatments. Therefore, efforts should be made for conservation and further research on their effectiveness and safety. The contribution of this study lies in the preservation of biodiversity and the improvement of public health, particularly on Sumba Island.

## Keywords: Medicinal Plants, Ethnobotany, Ethnomedicine, Antimalarial, Tropical Diseases, Conservation



## Ethnobotany and Sustainable Use of Medicinal Plants in Toraja: Phytochemistry, Pharmacology, and Conservation

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he Toraja people have long utilized various species of medicinal plants as part of their local wisdom for maintaining health, with this knowledge being passed down through generations. The effectiveness of these plants in treating various diseases is believed to be linked to their pharmacological potential, supported by bioactive compounds. This study aims to identify the phytochemical contents of medicinal plant species used by the Toraja people, explore the relationship between active compounds and their therapeutic properties in traditional medicine, and discuss the importance of conservation and sustainable practices in the use of these plants. Data were collected through semi-structured interviews with informants selected using Snowball and Purposive Sampling methods. Field exploration documented plant species based on these interviews, and samples were collected for identification and herbarium specimen preparation. Phytochemical data were obtained through a literature review of research databases such as Science Direct, Scopus, PubMed, and Google Scholar, focusing on the phytochemical components of species identified in previous ethnobotanical studies. The study identified 94 medicinal plant species from 46 families, which contain phytochemical compounds supporting their traditional therapeutic uses. Phytochemical analysis revealed dominant compounds such as flavonoids (e.g., quercetin, kaempferol, myricetin, luteolin, rutin, catechin, apigenin, vitexin, isovitexin) and terpenoids (e.g., phytol, squalene, limonoids, β-carotene, carvacrol, momordicin, xanthorrhizol), known for their pharmacological activities, including wound healing, antibacterial, anti-inflammatory, antioxidant, immunomodulatory, antidiabetic, anti-ulcer, antihypertensive, antihyperlipidemic, antimalarial, and anticancer effects. Among these species, 28 species (30%) are wild plants, and 66 species (70%) are cultivated. The majority of species have a status of Least Concern (LC), while some are more threatened, including Santalum album (VU) and Swietenia macrophylla (EN). This study emphasizes the importance of sustainable harvesting and conservation efforts to protect valuable medicinal plant resources for future generations. Conservation strategies can be implemented through various approaches, including in-situ and ex-situ conservation, sustainable harvesting, customary protection, and cultivation practices following Good Agricultural Practices (GAP). The research provides scientific insights into the pharmacological basis of traditional medicinal plant use, highlights their potential for modern drug development, and underscores the urgent need for integrated conservation strategies to ensure their long-term availability.

#### Keywords: Bioactive compounds, Ethnobotany, Medicinal plants, Phytochemistry, Conservation



## Advancing to a Circular Plastic Economy: A Systematic Review of Policy Instruments

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The transition towards a Circular Economy (CE) in plastic waste management is essential for achieving sustainability. Policy instruments are critical in facilitating this transition, yet their effectiveness varies significantly across regions due to contextual differences in governance, infrastructure, and economic incentives. This study conducts a systematic literature review to examine the global landscape of policy instruments for CE implementation in plastic waste management, with a particular focus on Malaysia. Using the PRISMA methodology, this study analyzes academic literature and policy documents to categorize instruments into five types: regulatory, economic, informational-based, collaborative, and investment instruments. Findings reveal significant gaps and inconsistencies in Malaysia's CE policy framework. Drawing from international best practices, this study proposes an integrated policy framework to enhance Malaysia's transition towards a circular plastic economy. The insights contribute to policy discussions by offering strategic recommendations for enhancing the implementation of CE in plastic waste management.

## Keywords: Circular Economy, Policy Instruments, Plastic Waste Management, Systematic Review, Malaysia, Sustainability



### Utilizing Geothermal Energy for a Heated Swimming Pool System in the Mataloko Geothermal Plant Area

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G eothermal energy offers a clean, sustainable heat source for swimming pools, replacing conventional fossil-fueled heating. This study presents the design of a geothermal heated swimming pool system in the Mataloko Geothermal Plant area (Flores, Indonesia). The goal is to utilize available geothermal heat to maintain a 30°C pool for recreation and therapy, thereby providing community benefits and improving public perception of geothermal projects. We detail the system components, heat transfer calculations, and design specifications needed to meet the pool's thermal demands. Calculations show that a geothermal fluid supply of similar order to previous designs (e.g. ~12.7 L/s at 110°C) can sustain pool temperatures of 26–30°C. Heat loss analysis indicates evaporation is the dominant thermal loss, comprising roughly 50–70% of total heat loss. A heat exchanger-based design is proposed to transfer geothermal heat to the pool water while keeping systems separate for safety. The results demonstrate the technical feasibility of the Mataloko geothermal pool projects (e.g. net positive value and ~17% internal rate of return over 10 years). This direct-use application exemplifies how geothermal resources can be harnessed beyond power generation, offering both recreational value and educational showcase of renewable energy in the community.

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## Species Diversity and Community Structure of Riparian Forest in Mau-it-Tipuluan River, Antique, Philippines: Implications for Reforestation and Disaster Risk Reduction

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his study examines the structural characteristics and species composition of the riparian forest along the Maui-it-Tipuluan River, Sibalom, Antique, 2024, as inputs for reforestation and disaster risk reduction strategies. Conducted across three sampling stations-Igpanolong, Salvacion, and Iglanot-the research assessed species diversity and community structure of the riparian forest using standardized methods. It was found that the forest hosts 65 species across 23 families, with Euphorbiaceae, Leguminosae, and Moraceae being the most represented. Key species such as Mahogany Swietenia macrophyla, Bangkal Nauclea orientalis, and Rain Tree/Acacia Samanea samman showed high importance values, indicating their dominant ecological roles. Despite very low diversity indices (H') across all stations–Igpanolong at 1.09, Salvacion at 0.94, and Iglanot at 0.79–high seedling densities suggest strong regenerative potential. Species evenness (J') varied, with Igpanolong at 0.75, Salvacion at 0.70, and Iglanot at 0.82, indicating varying levels of distribution balance among species. The findings emphasize the importance of planting native species like Anagas Semecarpus cuneiformis, Malapaho Mangifera altissima, Salong Canarium aspeirum, Talisay Terminalia catappa, and Narra Pterocarpus indicus to enhance biodiversity and establish natural flood buffers. Prioritizing these species in reforestation efforts will ensure the long-term sustainability and resilience of the riparian forest ecosystem, thereby reducing flood risks and protecting local communities.

## Keywords: Riparian Forest, Species Diversity, Community Structure, Reforestation, Disaster Risk Reduction, Mau-it-Tipuluan River



### Enhanced Vegetative Growth, Quality and Yield of Guava CV L-49 Under the Influence of Macro and Micronutrients Under Tarai Conditions of Uttarakhand, India

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uava (Psidium guajava L.) is an important subtropical fruit crop that possesses both medicinal and nutritional values. Balanced fertilization seems to be an important factor governing the productivity of guava trees. Nutrients both macro and micro can be made available to the plant by the basal as well as by the foliar application. This method is highly helpful for the correction of element deficiencies as well as to restore disrupted nutrient supply, overcome stress factors limiting their availability and it plays important role in improving vegetative growth and quality of guava fruit. The high nutritional value of guavas is much appreciated and valued by the consumers. Thus keeping in view importance of macro and micronutrients in guava plant a research was conducted to study the influence of macro and micronutrients treatment on vegetative growth, quality and yield of guava cv. L-49. However, the nutrient levels were 100, 75, 50 and 25% Recommended Dose of Fertilizers (RDF) under Tarai condition of Uttarakhand during the year 2023. The recommended dose of fertilizer for guava under the present investigation was 450 g N, 400 g P<sub>2</sub>0<sub>5</sub> and 300 g K<sub>2</sub>0 per plant per year and the micronutrient application of Zn<sub>2</sub>SO<sub>4</sub> (1%), CaCl<sub>2</sub> (0.5%), FeSO<sub>4</sub> (0.5%) and H<sub>3</sub>BO<sub>4</sub> (0.2%). Application of both macro and micronutrients in different concentrations in ten treatments influenced the vegetative growth, quality and yield of guava fruit. Some of these parameters include tree growth, flowering, fruit set, physical and biochemical parameters of fruits such fruit length, fruit width, TSS, acidity, ascorbic acid, fruit weight, reducing sugar, shelf life etc. But the best treatment in terms of enhancing the growth, quality and yield of fruit was T5 (75% RDF + Two foliar sprays (1% Zn<sub>2</sub>SO<sub>4</sub> + 0.5% CaCl<sub>2</sub> + 0.5% FeSO<sub>4</sub> + 0.2% H<sub>3</sub>BO<sub>4</sub>).

#### Keywords: Macronutrients, Micronutrients, Guava, Vegetative Growth, Quality, Yield



## Empowering Mindful Consumption for a Greener Future: Strategic Marketing Pathways to Pro-Social and Pro-Ecological Behavior

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The escalating climate emergency and prevailing patterns of unsustainable consumption necessitate a fundamental shift toward mindful consumption-defined by ethical awareness, deliberate decision-making, and sustained commitment to ecological and social well-being. This conceptual study explores how marketing can evolve from a traditional persuasive function into a strategic tool for fostering pro-social and pro-ecological behavior. By integrating insights from sustainability marketing, consumer behavior research, and behavioral science, the study proposes a structured framework for guiding mindful consumption through targeted marketing interventions.

The proposed model identifies key marketing levers—such as eco-conscious branding, values-based consumer education, behaviorally informed digital engagement, and strategic messaging—designed to influence psychological mediators, including environmental awareness, perceived behavioral control, and the alignment of consumer identity with sustainability values. These mediators are theorized to lead to tangible behavioral outcomes, such as reduced waste, increased adoption of sustainable products, and long-term shifts in consumption patterns aligned with responsible lifestyle choices.

This framework is aligned with the objectives of the United Nations Sustainable Development Goals (SDGs), particularly SDG 12 (Responsible Consumption and Production), and contributes to the ongoing discourse on sustainability-driven marketing practices. It underscores the role of marketers in designing systems and campaigns that not only shape consumer preferences but also strengthen intrinsic motivation toward sustainable behavior. Furthermore, it accounts for the influence of digital platforms in reinforcing social norms, enabling peer-based validation, and promoting consistent, value-driven actions.

This study offers actionable guidance for marketing practitioners and policymakers seeking to support consumer transitions toward sustainability. By positioning marketing as a strategic tool for ethical influence and societal value creation, this work highlights its transformative potential in reshaping consumption patterns to align with long-term environmental and social goals.

Keywords: Mindful Consumption, Sustainable Marketing, Pro-Social and Pro-Ecological Behavior, SDG 12 (Responsible Consumption and Production), Digital Engagement for Sustainability



# Neuroprotective Effects of Erigeron Annuus Extract in Models of Alzheimer's and Parkinson's Diseases

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Progressive neuronal loss and cognitive or motor impairment are hallmarks of neurodegenerative disorders, including Parkinson's Disease (PD) and Alzheimer's Disease (AD). Existing therapies are ineffective and do not stop the progression of the disease. Plant-based treatments have garnered attention recently because of their neuroprotective and antioxidant qualities. A promising candidate for neuroprotection is *Erigeron annuus*, a medicinal herb with anti-inflammatory and free radical-scavenging properties. The effects of *Erigeron annuus* extract on *in-vitro*, *in-Silico* and *in-vivo* models of AD and PD are examined in this work. In in-vitro analysis, we have performed various parameters like Phytochemical Screening, Quantitative Estimation of Phyto-Constituents, and Anti-Oxidant Activity. In the phytochemical screening, we found various secondary metabolites like phenols and flavonoids. In the quantitative estimation, the total flavonoid and phenolic content was found to be 0.04mg quercetin equivalent/50g of extract, 0.2 mg GAE/ 50g of extract. Radical scavenging activity (RSA) was performed using the DPPH Assay, and the RSA was found to be 96%. In-silico molecular docking analysis reveals that kaempferol and quercetin exhibited good binding affinity towards MAO-B. Adenosine receptor  $A_2A$ , AChE Receptors, and Tau Protein. These findings highlight that *Erigeron annuus* can be a potential therapeutic agent for neurodegenerative diseases. The further in vivo evaluation will be performed later.

#### Keywords: Neurodegenerative, Cytoprotective, Quercetin, Hydroalcoholic Extract, Antioxidant



## Nanotech and Its Environmental Footprint

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To keep up with the growing population, there is an ever-increasing demand for consumables resulting in further depletion of energy and materials. This, in turn, has direct consequences on the environment such as generation of solid wastes, increased vehicular and industrial pollution, and contamination of groundwater and surface water. Pollutants such as hydrocarbons, gases and heavy metals when in excessive amounts are detrimental. Additionally, the constructive utilization of nanotechnology within industrial design, environmentally sustainable product innovation, and bioremediation processes permits effective application of nanostructures that could transform the ineffective technologies into an efficient technology. Capable of enhancing catalysis and undergoing diverse molecular reactions, nanoscale catalysts can be used for water and air purification. These increasing societies may be potential stimuli for finding ways to eliminate risks resulting from the nanotechnology life-cycle. Many facets like the threat of perpetual air over-suspension, slow-degradation accumulation, and easy absorption raise concerns for safety. This damage can occur via noble directly affecting the various limbs within the body. This investigation is conducted across the scope of air pollution mitigation, space nanoremediation, phase materials, waste materials, portable water nanomaterials, and other nanoscale emissions.

#### Keywords: Nanotechnology, Environment, Waste Management, Air Pollution



# Targeting Kertainocyte Trafficing in Psoriasis: An *In-Silico* and Molecular Docking Study

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**Background:** Recent studies have established a connection between psoriasis and disturbances in the skin's microbiome, the immune system, and the trafficking of keratinocytes (KCs). It has been observed that an altered microbiome activates the skin's immune system, leading to the hyperproliferation of KCs. These KCs then produce extracellular vesicles that contain mRNA, which are transported to other cells. This process stimulates the production of interleukin 17 (IL-17) and the interleukin 25 and IL-17-receptor complex (IL-25-17-RB) through the JAK/STAT signaling pathway. Ultimately, this cascade of events results in hyperproliferation, scaling, and inflammation, which contribute to psoriasis-like conditions.

**Methodology:** Docking studies were conducted using Discovery Studio and PyRx, which simulate the molecular interactions between ligands and proteins. The protein with PDB ID: 5HI4 (Interleukin-17RA inactive) and the complex 7UMK (IL-25-17-RB) were utilized for these docking studies. Two ligands, Butein and Formononetin, were tested for their binding affinity in comparison to Tofacitinib.

**Results and Discussion:** The binding of Butein and Formononetin with both IL-17 RA (an inactive form of IL-17 receptor) and IL-25-17 RB (an active form of IL-17 and IL-25) proves the antagonist activity of these. Also, their binding energy and interactions were found to the superior to the standard Tofacitinib. However, they act as a co-crystal ligand for the IL-17 RA but not for the IL-25-17 RB.

**Conclusion and Future Directions:** The studies found that Butein and Formononetin were either similar to or superior to Tofacitinib. Furthermore, in vivo studies are necessary to confirm the efficacy of butein and formononetin in promoting epidermal regeneration and maintaining skin homeostasis after psoriasis treatment, compared to tofacitinib. The *in vivo* studies through ELISA and histopathology are required to conclude which ligand acts more efficiently in the skin regeneration and maintenance of skin homeostasis, besides reduction in the psoriatic symptoms (PASI scale score).

## Keywords: Molecular Docking Studies, Psoriasis, Immune System, Interleukin, Binding affinity, keratinocyte trafficking


# Phytochemical Insights from *Geranium Wallichianum* for Formulation Development

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Geranium wallichianum, a Himalayan medicinal plant, is traditionally known for its therapeutic benefits. In the present study, an ethyl acetate extract of G. wallichianum was prepared and analyzed using Liquid Chromatography-Mass Spectrometry (LC-MS) to explore its phytochemical constituents. The LC-MS profiling revealed the presence of several bioactive compounds, notably flavonoids such as kaempferol and quercetin, which are well-known for their antioxidant, anti-inflammatory, and hepatoprotective properties. The major problem associated with kaempferol and quercetin are their poor solubility in water and low bioavailability. To overcome these challenges various approaches have been investigated. One approach is the use of nanoparticles while other includes liposomal and phytosomal encapsulation for improving bioavailability. To enhance water solubility cyclodextrin inclusion complexes, hydrotropy and co- solvent system can also be used. Moreover, some transdermal delivery systems provide continuous release and avoids first-pass metabolism. These approaches have led to the development of various dosage forms such as tablets and capsules, topical creams and gels and inhalable and injectable nanoparticle formulations. These advancements markedly enhance the therapeutic potential of kaempferol and quercetin in modern pharmaceutical formulations. Further research into new delivery systems will maximize efficacy, enhance patient compliance and support the integration of these flavonoids as practical therapeutic agents. This study emphasizes the phytochemical richness of Geranium wallichianum and proposes its application in modern drug development.

#### Keywords: LC-MS, Nanoparticle, Cyclodextrin, Bioavailability



## LC-MS Phytochemical Profiling and Investigation of Antioxidant Activity of Ethyl Acetate Extract of Leaves of *Allium Stracheyi* (Baker)

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**Aim and Objectives:** Allium stracheyi commonly known as pharan is one of the most popular and important ethnobotinical traditional plant belong to genus Allium. The aim of present study is to investigate the phytochemical screening of ethyl acetate extract of leaves of Allium stracheyi Baker and to evaluate their chemical compositions and antioxidant activity.

**Method:** The successive extraction of *Allium stracheyi* Baker leaf was carried out by using a petroleum ether for defatting followed by ethyl acetate by soxhlation apparatus. The concentrated extract was subjected to qualitative screening test for presences of phytochemicals and their chemical compositions were determined by Liquid Chromatography-Mass Spectrometry (LCMS). Antioxidant activity was measured by DPPH method.

**Result:** The phytochemical screening showed that ethyl acetate leaf extract of *Allium stracheyi* Baker contains flavonoids, alkaloids, phytosterols, tannins, saponins, glycosides etc. The ethyl acetate extract exhibit antioxidant activity with maximum inhibition of 97.8% at 10µg/ml concentration; (IC50- 1.49). This result was supported by LC-MS analysis which showed the presence of apegenin, athrolide B, dolabriferol, dioscin, cynolide A, sesquicannabigerol, xeniolactone A, capsiconiate, eriocasin B, carnoic acid, porrigenic acid, (â<sup>^</sup>)-andrographolide, resolvin E1, tectorigenin , which are mainly responsible for their antioxidant property.

**Conclusion:** On the basis of findings it can be concluded that present phytochemicals possess significant antioxidant potential and are important source of natural antioxidants and can be effectively used in treating oxidative stress disorders. Moreover, additional phytochemical study are strongly suggested to isolate and purify the major active phytocompounds..

#### Keywords: Allium stracheyi, Phytochemicals, DPPH, LC- MS

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# Exploring the Anticonvulsant Potential of *Cissampelos Pareira*: A Green Step towards Safer Therapeutics

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**Aim:** To evaluate the anticonvulsant activity of *Cissampelos pareira* using the Maximal Electroshock Seizure (MES) model and explore its potential mechanism through behavioral and biochemical assessments.

**Background:** As the world embraces the "Go Green" initiative, the medicinal value of plants is gaining renewed interest-not only for environmental sustainability but also as safer alternatives to synthetic drugs. *Cissampelos pareira*, a traditionally used herb, holds potential in neurological disorders with fewer side effects.

**Methodology:** Wistar rats were divided into five groups: control, standard (phenytoin), and treatment groups receiving *Cissampelos pareira* extract at 100, 200, and 400 mg/kg. The MES model was used to induce seizures. Seizure phases—flexion, extension, clonus, stupor, and recovery time-were recorded. Post-seizure brain tissue was analyzed for Superoxide Dismutase (SOD), Glutathione (GSH), Lipid Peroxidation (LPO), Calcium, and Sodium concentrations.

**Results:** The 400 mg/kg dose significantly reduced the hind limb extension phase by 68%, clonus by 55%, stupor by 50%, and decreased flexion by 42%. Recovery time improved, decreasing from 312 seconds in control to 147 seconds. Biochemical analysis revealed a 45% increase in SOD, 38% rise in GSH, and a 41% decrease in LPO levels compared to control, indicating enhanced antioxidant defence. Additionally, calcium and sodium levels decreased by 36% and 28%, respectively, indicating a reduction in neuronal excitability.

**Proposed Mechanism**: The plant's anticonvulsant effect due to GABAergic modulation and calcium channel inhibition, supported by the presence of bioactive alkaloids such as berberine and tetrandrine.

**Conclusion:** *Cissampelos pareira* shows promising anticonvulsant potential with antioxidant benefits, supporting the integration of herbal therapies into sustainable, green healthcare approaches.

#### Keywords: *Cissampelos pareira*, Anticonvulsant, MES model, Herbal medicine, Oxidative stress, Go Green



### Phytochemical Profiling and Antioxidant Activity of Ethanolic Leaf Extract of *Smilax aspera* L.

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**Objective:** The study aimed to assess the phytochemical composition, total phenolic and flavonoid content, and antioxidant activity of the ethanolic extract of Smilax aspera leaves.

**Materials and Methods:** Leaves of Smilax aspera were extracted using ethanol. The extract underwent preliminary phytochemical screening to identify secondary metabolites. Total phenolic content was measured using the Folin–Ciocalteu method, while flavonoid content was determined via the aluminum chloride colorimetric assay. Antioxidant activity was analyzed through the DPPH (2,2-diphenyl-1-picrylhydrazyl) radical scavenging method.

**Results:** The qualitative analysis indicated the presence of flavonoids, phenolic acids, steroids, and saponins. Quantitatively, the extract showed a phenolic content of 0.47 mg gallic acid equivalent (GAE)/g and a flavonoid content of 0.38 mg quercetin equivalent (QE)/g. The DPPH assay revealed dose-dependent antioxidant activity, with an  $IC_{50}$  value of 1.62 µg/mL, comparable to that of ascorbic acid, indicating a high capacity for neutralizing free radicals.

**Conclusion:** The ethanolic leaf extract of Smilax aspera demonstrates the presence of several bioactive compounds and exhibits strong antioxidant properties. These results support the potential of this plant as a natural source of therapeutic agents and warrant further pharmacological investigation.

#### Keywords: Smilax aspera, Ethanolic Extract, Phytochemicals, Antioxidant Activity, DPPH Assay



# Traditional Medicinal Plant Research: Exploring the Pharmacological Benefits of *Smilax aspera* in Traditional Medicine

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**Objective:** This study investigates how traditional knowledge and modern pharmacology can be combined in medicinal plant research, with a specific focus on the plant *Smilax aspera*.

**Material & Method:** Preliminary phytochemical screening, total phenolic, total flavonoid content of leaves extract of the *Smilax aspera* is done. Extract of the Smilax aspera plant was prepared by using ethanol and screened for the presence of secondary metabolites. While total phenolic and total flavonoid content was evaluated by folin-Ciocalteu reagent and aluminum chloride spectrophotometric methods. The chemical compositions were determined by using Liquid Chromatography-Mass Spectrometry (LCMS).

**Results:** Qualitative analysis of the extract i.e. preliminary screening was conducted revealed the presence of secondary metabolites such as flavonoids, phenolic acids, steroids, saponin and quantitative analysis such as total flavonoid, and total phenolic contents was calculated and found to be 0.47 mg GAE/g and 0.38 mg QE/g respectively. By conducting LC-MS analysis the presence of luteolin, quercetin, kaempferol, isorhamnetin, Phyto sphingosine, hedychium B, agallochaol K, sarcophytonolide C, reinocarnoside B, cyathin A3, is revealed which are mainly responsible for their antioxidant properties.

**Conclusion:** Quantitative analysis confirmed significant levels of total phenolic and flavonoid content and LC-MS analysis also confirmed the presence of antioxidant compounds, indicating the plant's potential as a source of bioactive compounds for hepatoprotective activity and to reduce oxidative stress. For further, isolation of the compounds can be done.

#### Keywords: Smilax aspera, LC-MS, Hepatoprotective Activity



### A Qualitative Research on Influencing Factors of Art Exam Tutors' Teacher Identity Formation in an Exam-oriented Education Context

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In the context of exam-oriented education, the identity construction of art teachers is a complex but underexplored field. The continuous emphasis on standardized assessments often relegates the holistic nature of arts education to a secondary position. However, previous research has significantly overlooked the Chinese art exam, and the teachers involved in its preparation. This qualitative study aims to identify the factors influencing the professional identity development of art exam tutors. Conducted in two private art exam training institutions in Shandong Province, China, the study collected data through two rounds of semi-structured interviews with six teacher participants. The findings reveal that the identity construction of art exam tutors is shaped by a complex interplay of personal, institutional, and societal factors. On a personal level, early educational experiences, passion and commitment to the arts, professional skills, and personal values play a critical role. Institutional factors include supportive work environments and interactions with students, while societal factors encompass standardized testing, policy reforms, cultural identity, and social evaluations. This study contributes to a deeper understanding of the professional development of art teachers and the broader issues involved in arts education under an exam-driven system. It should be noted that the study's findings are limited by the small sample size, cultural and geographical specificity, and the absence of long-term participant observation.

Keywords: Teacher Identity, Art Exam Tutor, The Art College Entrance Examination

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### Introducing Colors to the Visually Impaired Children for Creating Employment Opportunities

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Colors play a very important role in influencing various choices in our lives. The introduction of colors to the visually impaired children and their applications to various art forms is a challenge due to their lack of sight. This concept has been relatively unexplored in conventional art forms and is important as it can be a primary source of earning for the visually impaired children. The objective of this study was to introduce colors to visually impaired children with an aim to create employment opportunities for them through visual art. In this study, the visually impaired children were introduced to the concept of colors using daily objects and by using fragrant colors of Ranggandha. These children were first taught basic vocational skills in addition to simple but necessary skills such as color coordination of dresses, grooming themselves, and building their confidence. It was observed that the children did not dwell on their physical disabilities. Rather, they were quick to learn and grasp new concepts. Vocational education was more beneficial to them rather than traditional schooling. Their initial lack of confidence stemmed from requiring to rely on others to make simple decisions for them. This gradually changed when they started to learn how to get ready and take care of themselves independently. They were then taught various forms of visual art such as abstract, nature, butterfly, and portrait paintings, and other artforms such as origami. It was observed that some children were more skilled at a particular aspect than the others. For instance, visually challenged children were more skilled at origami artwork as compared to sighted children. They were further exposed to the real world through training sessions and exhibitions. As these activities were interactive in nature, the children learnt to convey and communicate their requirements. They learnt to showcase their skills and creative sides. This further bolstered their confidence in themselves. Their earnings through exhibitions and gifting portraits enabled a basic source of income for them. Being financially independent enhances the personality of a person, and that is what happened with the children, too. While training the children, an interactive approach was the best. They gradually got comfortable working in groups and learnt to coordinate with each other. Social and nation-related activities such as flag making, railway station cleaning campaigns helped them gain attention of a wider audience and showcase their love for their motherland. To the best of our knowledge, this is the first study that has attempted to provide unique colors that can be recognized by blind children. Several attempts to introduce these colors to the blind children have been successful. The children wholeheartedly used the colors and created masterpieces that have been the center of attraction in several exhibitions, conservation centers, government offices, and personal collections.

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# About Singapore Environment Council (SEC)

### Singapore Environment Council

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Singapore Green Labelling Scheme (SGLS)



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#### Our Mission

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- » Recognising Excellence: Acknowledging outstanding environmental achievements by individuals and organisations through awards and certifications.

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