

ICONEET 2024

INTERNATIONAL CONFERENCE ON GREEN ENVIRONMENTAL ENGINEERING AND TECHNOLOGY

"SHAPING SUSTAINABLE FUTURE: EXPLORING STRATEGIES
FOR GREEN TECHNOLOGY"

28-31 AUGUST 2024
ASTON DENPASAR HOTEL & CONVENTION, BALI, INDONESIA

6TH
INTERNATIONAL
CONFERENCE ON
GREEN
ENVIRONMENTAL
ENGINEERING AND
TECHNOLOGY



PROGRAMME AND ABSTRACT BOOK

Organized By



In Collaboration With



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This year, IConGEET 2024 will be held at the **Aston Denpasar Hotel & Convention, Bali, Indonesia**—a breathtaking island renowned as one of the most popular tourist destinations in the region.

Under the theme **"Shaping Sustainable Future: Exploring Strategies for Green Technology"** we are excited to welcome cutting-edge research that addresses pressing scientific needs and fosters the integration of knowledge among academicians, researchers, industries, corporate organizations, and interest groups. Our goal is to advance various environmental-related fundamentals and applications toward achieving a green and sustainable environment.

This year's conference is in collaboration with **INNOPA and Indonesia Inventors Day 2024**. This prestigious event will take place in the Grand Ballroom of the **ASTON Hotel & Convention Centre, Denpasar, Bali, Indonesia, from 28-31 August 2024**. Join us to explore innovative ideas, network with leading experts, and contribute to shaping a sustainable future.

FOREWORD BY THE COE HEAD

Bismillahirrahmanirrahim
Assalamualaikum Warahmatullahi Wabarakatuh

It is my great pleasure to welcome you to the 6th International Conference on Green Environmental Engineering and Technology (IConGEET) 2024. This prestigious event, organized by Sustainable Environment Research Group (SERG), a sub-research group under Centre of Excellence Geopolymer & Green Technology (CEGeoGTech), Universiti Malaysia Perlis and co-organised by National Institute for Research and Development in Environmental Protection (INCDPM) Bucharest, Romania, brings together technologists, researchers, and professionals from academia, industry, and public sectors across the globe.



IConGEET 2024 serves as a dynamic platform for sharing the latest innovations, research findings, and practical solutions in the fields of environmental-related fundamentals and applications toward achieving a green and sustainable environment. Our aim is to address the pressing challenges of sustainable development by fostering collaboration, learning, and knowledge transfer. The conference will feature keynote speeches, technical presentations, and numerous opportunities for networking, all designed to inspire and drive progress.

As we gather here today, I encourage you to focus on the valuable exchange of knowledge and the forging of strong collaborations that will benefit our institutions, universities, nations, and the global community at large. Let us make the most of this opportunity to advance our collective goals.

I would like to extend my heartfelt congratulations to the organizing committee and everyone who has contributed to making this conference a reality. To our international participants, I wish you a memorable and enriching stay in Bali, Indonesia.

Assoc. Prof. Jr. Dr. Shayfull Zamree Bin Abd. Rahim

COE Head

Centre of Excellence for Geopolymer and Green Technology (CEGeoGTech)

FOREWORD BY THE CHAIRMAN OF IConGEET 2024

Ladies and Gentlemen, esteemed guests, and distinguished participants,

A very warm welcome to each and every one of you to the 6th International Conference on Green Environmental Engineering and Technology (IConGEET2024). We are honored to have you all here with us in the beautiful island of Bali, Indonesia.

First and foremost, I would like to extend my heartfelt gratitude to all of you for attending this conference. Your presence here today reflects your commitment to advancing green environmental engineering and technology, and we are truly grateful for your participation.



IConGEET is an annual event organized by the Sustainable Environment Research Group (SERG), a sub-research group under the Centre of Excellence Geopolymer & Green Technology (CEGeoGTech) at Universiti Malaysia Perlis. This conference is co-organized by our esteemed partners, the National Institute for Research and Development in Environmental Protection (INCDPM) Bucharest, Romania. Over the years, IConGEET has successfully brought together researchers, practitioners, engineers, and students from across the globe, creating a platform for networking, knowledge integration, and the exchange of innovative ideas among participants.

This year, we are proud to announce that we have received more than 70 papers from various countries around the world, including Romania, Russia, Uzbekistan, Indonesia, Iraq, Nigeria, and Malaysia. The diversity of contributions underscores the global significance of our theme for this year's conference: "Shaping Sustainable Future: Exploring Strategies for Green Technologies." This theme not only highlights the importance of green technologies in shaping a sustainable future but also encourages us to explore innovative strategies that can drive positive change for our planet.

I would also like to take this opportunity to express my deepest appreciation to the conference secretariat and committee members. Your dedication and hard work have been instrumental in making this event a reality, and we cannot thank you enough for your unwavering support.

As we embark on these two days of insightful discussions and fruitful exchanges, I hope that all of you will find this conference enriching and inspiring. Bali, with its unique blend of culture and natural beauty, offers a perfect setting for us to engage in meaningful dialogue and foster collaborations that will drive the future of green technologies.

Finally, I hope that you will enjoy your stay here in Bali and take the time to explore all that this magnificent island has to offer.

Once again, thank you for being here, and I wish you all a successful and memorable conference.

Thank you.

Assoc. Prof. Ts. Dr. Norazian Mohamed Noor.
IConGEET2024

6TH
INTERNATIONAL
CONFERENCE ON GREEN
ENVIRONMENTAL ENGINEERING
AND TECHNOLOGY

29-30
AUGUST
2024

Opening Ceremony

29 August 2024 (Thursday)

8.30 am – 1130 am

Agung Hall, Aston Denpasar Hotel & Convention, Bali, Indonesia

Emcee: Ir Dr. Nur Anira Asyikin Hashim

TIME	
0830	Arrival of guest and registration
0850	Welcoming Speech by Manager of Center of Excellence Geopolymer and Green Technology (CEGeoGTech)
0900	Keynote Speaker 1: Dr. Alexander Egorov Sirius University of Science and Technology, RUSSIA. <u>Title: Environmental pollutants and metabolic diseases</u>
0920	Keynote 2: Assoc. Prof. Dr. Acep Purqon Institute of Technology Bandung (ITB), INDONESIA <u>Title: Sustainable Hybrid Renewable Energy for Remote Area in Indonesia</u>
0940	Keynote Speaker 3: Associate Prof. Dr. Mohd Remy Rozainy Mohd Arif Zainol Universiti Sains Malaysia (USM), MALAYSIA <u>Title: Pioneering Sustainable Drainage System: USM Engineering Campus, Nibong Tebal, Penang</u>
1000	Video Presentation
1005	Invited Speaker 1: Dr. Deák Gyorgy & Dr. Monica Matei (INCDPM, Romania) <u>Title: Applying The EU Green Taxonomy Principles in Order To Preserve Biodiversity, In Particular Wild Sturgeon Populations</u>
1020	Invited Speaker 2: Assoc. Prof. Dr Noor Hana Hanif Abu Bakar (Universiti Sains Malaysia) <u>Title: Designing Nanocomposites of Natural Polymer and Metal Organic Frameworks for Enhanced Removal of Organic Contaminants at Neutral pH</u>
1035	Invited Speaker 3: Assoc. Prof. Ts Dr Anurita Selvarajoo (University of Nottingham Malaysia) <u>Title: Turning Palm Oil Waste into Green Building Materials: A Sustainable Solution for Reducing Cement's Carbon Footprint</u>
1050	Invited Speaker 4: Ts Dr. Razi Ahmad (Universiti Malaysia Perlis) <u>Title: Co-gasification of Pretreated Palm Waste and Low Rank Coal</u>
1110	Token of appreciation and photograph session
1115	Coffee break

Parallel Schedule

ICONGEET

INTERNATIONAL CONFERENCE ON GREEN ENVIRONMENTAL ENGINEERING AND TECHNOLOGY

Session 1: Environmental Management and Protection

29 August 2024 (Thursday)

11.30 am – 1.30 pm

Agung Hall, Aston Denpasar Hotel & Convention, Bali, Indonesia

Chair Session: Associate Prof. Ts Dr. Irmis Azura Zakarya

TIME	
11.30 am	1. Associate Prof. Dr. Nadzifah Bt Yaakub (Unisza, Malaysia) <u>Title:</u> Bioaccumulation of Heavy Metals on Freshwater Fish at Taman Rimba Ilmu Tanah Bris (Tribe) Unisza
11.45 am	2. Dr. Madalina Boboc (INCDPM, Romania) <u>Title:</u> Scientific Approach to Iron Gates System By-Pass Solutions to Address the Discontinuity of Historical Migration Routes of Danube Anadromous Sturgeons
12.00 pm	3. Dr. Alfita Puspa Handayani (ITB, Indonesia) <u>Title:</u> Cultural Heritage and Environmental Challenges: A Complex Conservation Processes Of Batik, Ground Water And Subsidence In Pekalongan
12.15 pm	4. Dr. Wardati Hashim (UiTM, Malaysia) <u>Title:</u> Physical and Rheological Properties of Coconut Waste Modified Bitumen
12.30 pm	5. Dr. Elena Holban (INCDPM, Romania) <u>Title:</u> Mitigation Measures for the Impact of Hydrotechnical Works in Răstolița River, Romania on Hucho hucho Species
12.45 pm	6. Ms. Hayana Dullah (MAHSA University Malaysia) <u>Title:</u> Assessment of Greenhouse Gas Emissions and Water Quality in Relation To Tourism and Human Activities At Kenyir Lake, Terengganu
1.00 pm	7. Mrs. Georgeta Tudor (INCDPM, Romania) <u>Title:</u> Developing a Water Discharge Echohydrograph Conditioned by Specific Ichthyofauna Habitat Conservation
1.15 pm	8. Assoc. Prof. Ir Dr. Dewika (Sunway University, Malaysia) <u>Title:</u> Identification and Mitigation of Deposited Indoor Air Microplastics in an Office Environment In Kuala Lumpur
1.30 pm	Lunch Break

Parallel Schedule

ICONGEET

INTERNATIONAL CONFERENCE ON GREEN ENVIRONMENTAL ENGINEERING AND TECHNOLOGY

Session 2: Green Technology

29 August 2024 (Thursday)

2.15 pm – 3.45 pm

Agung Hall, Aston Denpasar Hotel & Convention, Bali, Indonesia

Chair Session: Associate Prof. Dr. Zarina Yahya

TIME	
2.15 pm	1. Associate Prof. Dr. Deprizon Syamsunur (UCSI, Malaysia) <u>Title:</u> Investigating the Strength Characteristics of Reinforced Concrete Grouted Sleeve Connections in Seismic Zones
2.30 pm	2. Mr. Muhammad Hafidz Syahputra (Gadjah Mada University, Indonesia) <u>Title:</u> Performance Analysis of Mobile Vertical Burner Machine Using Various Types of Biomass Pellets
2.45 pm	3. Dr. Mimi Diana binti Ghazali (UiTM, Malaysia) <u>Title:</u> Petrophysical Relationship Between Soil Moisture Content and Dielectric Permittivity for Wastewater Landfill Contaminated in Cherang Hangus Soil Using GPR
3.00 pm	4. Mr. Lusman Sulaiman (Public Works Polytechnic, Indonesia) <u>Title:</u> Compressive Strength of Corn Stalk Ash as Supplementary Cementitious Material in Mortar
3.15 pm	5. Ms. Wan Amin Wan Yahaya (UMP SA, Malaysia) <u>Title:</u> Biopolymer-Based Active Packaging: A Study on Physicochemical Properties and Antioxidant Effect of Semi-Refined Carrageenan-Reinforced Cellulose Nanofibers Infused with Eugenol
3.30 pm	6. Ms. Jalina Kassim (UiTM, Malaysia) <u>Title:</u> Sustainable Fertilized Soil From Alum Sludge By Takakura Composting
3.45 pm	End of Day 1

Parallel Schedule

ICONGEET

INTERNATIONAL CONFERENCE ON GREEN ENVIRONMENTAL ENGINEERING AND TECHNOLOGY

Session 3: Global Warming & Climate Change

29 August 2024 (Thursday)

2.15 pm – 3.30 pm

Abang Room, Aston Denpasar Hotel & Convention, Bali, Indonesia

Chair Session: Ts Dr. Norlia Mohamad Ibrahim

TIME	
2.15 pm	1. Mr. Heri Andreas (ITB, Indonesia) <u>Title:</u> Time Series of Coastal Inundation in Jakarta: Key to Understand Climate Change Effect and the Adaptation Act
2.30 pm	2. Dr. Azianabiha A Halip Khalid (UiTM, Malaysia) <u>Title:</u> Environmental Noise Mapping : GIS-Based Study of Urban Industrial Zones and Traffic Areas
2.45 pm	3. Ms. Sagung Putri Chandra Astiti (Udayana University, Indonesia) <u>Title:</u> Analysis of Vegetation and Land Cover Using the Soil Adjusted Vegetation Index (SAVI) Method
3.00 pm	4. Mr. Makbul Hajad (Universitas Gadjah Mada, Indonesia) <u>Title:</u> The Development of Traceability Technology in The Fisheries Industry Supply Chain: A Systematic Literature Review
3.15 pm	End of Day I



Online Parallel Schedule

Friday 30th August 2024 (MYT 09:00 – 12:30)

Session 1: Environmental Management and Protection
(Chair Person: Mrs. Nurul Aida Mohd Mohtar)

Link: <https://meet.google.com/ivr-naws-shc>

No.	Paper ID	Time (MYT)	Title	Corresponding Author	Affiliation
1	IConGEET2024: 053-038	9:00	Effects of Coal Desulfurization on Ultimate, Proximate, and Functional Group Transformations	Mrs. Syarifah Nursyimi Azlina Syed Ismail	Universiti Teknologi Mara, Malaysia
2	IConGEET2024: 040-025	9:20	Assessing The Efficacy Of Magnesium Hydroxide And Aluminium Hydroxide In Enhancing Flame Retardancy Of Natural Fiber	Tengku Nuraiti Tengku Izhar	University Malaysia Perlis, Malaysia
3	IConGEET2024: 067-096	9:40	Malayan Tapir Roadkill: Assessment Towards Road User And Mitigation Strategies	Assoc. Prof. Dr. Norhafezah Kasmuri	Universiti Teknologi MARA, Malaysia
4	IConGEET2024: 067-075	10:00	The Potential of Algae-Based Nutrient Removal in Wastewater Treatment		
5	IConGEET2024: 073-061	10:20	Fracture behaviour of Sn-58Bi alloy reinforced by activated bamboo charcoal	Dr. Karen Mee Chu Wong	Universiti Tunku Abdul Rahman (UTAR), Malaysia
6	IConGEET2024: 092-095	10:40	Virtual Experiential Model and Digital Preservation Path of Traditional Wooden Carvings in Huizhou Traditional Dwellings	Mr. Weiyl Zhang	Universiti Sains Malaysia, Malaysia
7	IConGEET2024: 036-064	11:00	Analyzing the Traditional Rural Cultural Heritage of Lingnan Region in China as the Foundation for Protection and Development	Mr. Zhou JiaSheng	Universiti Sains Malaysia, Malaysia
8	IConGEET2024: 015-008	11:20	Ecological transition potential of tourists in mountainous Adjara	Prof. Dr. George Abuselidze	Batumi Shota Rustaveli State University, Georgia.
9	IConGEET2024: 087-084	11:40	Comparative Study Between Chloroquine Sulphate And Cooper Sulphate In Aquaculture At Low Dosages	Mr. Abdulhusein Jawdhari	National Institute for Research and Development in Environmental Protection, Bucharest, Romania
10	IConGEET2024: 080-067	12:00	The Impact of Anthropogenic Activities on Sturgeon Populations and The Role of Genetic Research	Ms Raluca Prangate	National Institute for Research and Development in Environmental Protection, Bucharest, Romania

Online Parallel Schedule

Friday 30th August 2024 (MYT 09:00 – 11:40)

Session 2: Global Warming & Climate Change
(Chair Person: Assoc. Prof. Dr. Sara Yasina Yusuf)

Link: <https://meet.google.com/gsa-tzbj-kie>

No.	Paper ID	Time (MYT)	Title	Corresponding Author	Affiliation
1	IConGEET2024: 074-063	9:00	The Accuracy Verification of Recent Global Geopotential Model based on GNSS/Levelling Data on Ground Control Points in Johor	Ms. Nornajihah Mohammad Yazid	Universiti Tun Hussein Onn, Malaysia
2	IConGEET2024: 083-073	9:20	Seasonal Water Level Variations and Predictive Modeling in Kampung Parit Hylam, Johor	Dr. Sabariah Musa	Universiti Tun Hussein Onn, Malaysia
3	IConGEET2024: 062-047	9:40	POFA-PET Concrete as an Ionizing Radiation Shielding - Preliminary Review	Mrs. Siti Amira Othman	Universiti Tun Hussein Onn, Malaysia
4	IConGEET2024: 042-028	10:00	The Effect of Planting Deadlines on the Thickness of the Rice Seedling	Mr. Xasanjon Askarov	Urgench State University, Uzbekistan
5	IConGEET2024: 064-051	10:20	Developing Mathematical Models to Study Changes in Groundwater Levels and Salt Concentration	Assoc. Prof. Dr. Sherzod Daliev	Kattakurgan branch of Samarkand State University, Uzbekistan
6	IConGEET2024: 085-079	10:40	Dynamics and drivers of carbon dioxide emissions in two types of wetland soils	Mrs. Natalia Enache	National Institute for Research and Development in Environmental Protection, Bucharest, Romania
7	IConGEET2024: 085-080	11:00	Experiments on Soil Microcosms for the Assessment of Greenhouse Gases Fluxes from Different Land Uses in Laboratory Conditions		
8	IConGEET2024: 088-089	11:20	Heavy Metal Contamination and Ecological Risk Assessment in Soils in the Area of the Temporary Municipal Solid Waste Landfills in the City of Botosani, Romania	Mr Ghita Gina	National Institute for Research and Development in Environmental Protection, Bucharest, Romania

Online Parallel Schedule

Friday 30th August 2024 (MYT 09:00 – 11:20)

Session 3: Sustainable Energy and Energy Management
(Chair Person: Dr. Nur Liza Rahim)

Link: <https://meet.google.com/vjw-mjou-jwi>

No.	Paper ID	Time (MYT)	Title	Corresponding Author	Affiliation
1	IConGEET2024: 041-054	9:00	Assessing Sustainability Impacts and Paradoxes of Large-Scale Solar Farms in Energy Infrastructure Project	Mr. Keddy Ambau	Universiti Teknologi MARA (UiTM), Malaysia
2	IConGEET2024: 070-056	9:20	Optimizing green synthesis of copper nanoparticles using ananas comosus leaf extract: unveiling optimum parameters for enhanced production	Ms. Nur Diyana Zulpahmi	Universiti Teknologi MARA (UiTM), Malaysia
3	IConGEET2024: 052-036	9:40	Contribution of Natural Lighting in Workspaces to Visual Comfort Improving User Productivity	Ms. Ingrid Vicaningrum	Gadjah Mada University, Indonesia
4	IConGEET2024: 054-062	10:00	Synergistic Effect Between Empty Fruit Bunch and HDPE on Product Yield and Functional Group Content in Bio-fuels Produced from Coliquefaction Process Under Supercritical Methanol Condition	Ms. Asnida Yanti Ani	Universiti Teknologi MARA (UiTM), Malaysia
5	IConGEET2024: 007-058	10:20	Design Analysis of Sustainable Composite Slab using Profiled Steel Sheeting: A Case Study based on BS 5950-4: 1994 and EN 1994-1-1: 2004	Faisal Dr. Amsyar Bin Redzuan	Kattakurgan branch of Samarkand State University, Uzbekistan
6	IConGEET2024: 096-100	10:40	Modeling of Shell and Various Tube Shapes with Annular Fins for Thermal Solar Energy Storage System	Assoc. Prof. Dr. Kadhim Hussein Suffer Suffer	Al-Nahrain University, Iraq
7	IConGEET2024: 082-072	11:00	Development of An Innovative Hydrogen Production Solution for Use in The Field of Environmental Protection	Mr. Teodor Diaconu	National Institute for Research and Development in Environmental Protection, Bucharest, Romania

Online Parallel Schedule

Friday 30th August 2024 (MYT 14:30 – 17:30)

Session 4: Environmental Management and Protection
(Chair Person: Assoc. Prof. Dr. Tengku Nuraiti Tengku Izhar)

Link: <https://meet.google.com/sqa-vfxo-hbq>

No.	Paper ID	Time (MYT)	Title	Corresponding Author	Affiliation
1	IConGEET2024: 090-091	14:30	Assessing the Level of Implementation of Cost Reduction Techniques on Educational Building Projects in Public Tertiary Institutions in Southwestern Nigeria	Gbemisola Akinola	Covenant University, Nigeria
2	IConGEET2024: 086-082	14:50	The assessment of the lower Danube sediment regime and morphology in order to further identify important habitats for critically endangered ichthyofauna	Maria Carachiciu	National Institute for Research and Development in Environmental Protection, Bucharest, Romania
3	IConGEET2024: 086-083	15:10	Impact of Polyvinyl Chloride (PVC) Powder Ingestion on Growth Rate and Length of Oreochromis Niloticus - A Preliminary Study	Ms Isabela SADÎCA	National Institute for Research and Development in Environmental Protection, Bucharest, Romania
4	IConGEET2024: 097-099	15:50	The sustainability strategy of a metallurgical company in the context of digitalization	Dr. Elizaveta Gromova	Russian Presidential Academy of National Economy and Public Administration, Saint-Petersburg, Russia
5	IConGEET2024: 086-092	16:10	Artificial Intelligence Prediction Tool for Hydrogen Production From Renewable Energy Aimed At Reducing The Impact on The Environment	Teodor Diaconu	National Institute for Research and Development in Environmental Protection, Bucharest, Romania
6	IConGEET2024: 081-071	16:30	The Influence of Hydroxyapatite/Zinc Oxide Composite Synthesis Method on Its Sorbent and Photodegradability Characteristics	Cristina Dumitrescu	National Institute for Research and Development in Environmental Protection, Bucharest, Romania
7	IConGEET2024: 081-074	16:50	Assessing the Photocatalytic Activity Of ZnO/HA Composites	Florina-Diana GHEORGHE	National Institute for Research and Development in Environmental Protection, Bucharest, Romania
8	IConGEET2024: 089-090	17:10	Ecological impact of invasive fish species on species and ichthyocenotic associations in freshwater aquatic ecosystems of Romania	Mr. Lucian-Dorin Hanganu	National Institute for Research and Development in Environmental Protection, Bucharest, Romania
9	IConGEET2024: 102-102	17:30	Advances in Beehive Monitoring Systems: Low-Cost Integrating Sensor Technology for Improved Apiculture Management	Dr. Zsolt Bodor	Research and Development Institute for Wildlife and Mountain Resources, Romania

Online Parallel Schedule

Friday 30th August 2024 (MYT 14:30 – 16:10)

Session 5: Water and Wastewater

(Chair Person: Assoc. Prof. Ts Dr. Sam Sung Ting)

Link: <https://meet.google.com/uue-trew-mwu>

No.	Paper ID	Time (MYT)	Title	Corresponding Author	Affiliation
1	IConGEET2024: 091-093	14:30	Influence of Temperatures of Biochar Derived from Agro-waste onto Polyester Composite for improving the Water Effluent Discharge	Dr. Siti Samahani Suradi	Universiti Tun Hussein Onn Malaysia, Malaysia
2	IConGEET2024: 081-069	14:50	Removal of oil from wastewater: An overview of the polymeric photocatalytic membranes	Dr. Ioana Chiulan	National Institute for Research and Development in Environmental Protection, Bucharest, Romania
3	IConGEET2024: 009-004	15:10	Adsorption of Metaldehyde by Oil Palm Kernel Biochar and Rice Husk Biochar: A Comparative Study	Ms. Nur Salsabila Kamarudin	Universiti Malaysia Perlis, Malaysia
4	IConGEET2024: 081-070	15:50	Assessing the Transboundary Water Pollution Possibly Produced By An Armed Conflict	Alexandra Harabagiu	National Institute for Research and Development in Environmental Protection, Bucharest, Romania

Environmental Management and Protection

No.	Title
1	Bioaccumulation of Heavy Metals on Freshwater Fish at Taman Rimba Ilmu Tanah Bris (Tribe) Unisza
2	Ecological Transition Potential of Tourists in Mountainous Adjara
3	Physical and Rheological Properties of Coconut Waste Modified Bitumen
4	Assessing the Efficacy of Magnesium Hydroxide and Aluminium Hydroxide in Enhancing Flame Retardancy of Natural Fiber
5	Effects of Coal Desulfurization on Ultimate, Proximate, and Functional Group Transformations
6	The Development of Food Waste Management in Universiti Malaysia Perlis
7	Comparison of Optimized Production of Palm Oil Waste Biochar with Response Surface Methodology for Cement Replacement Application
8	Identification and Mitigation of Deposited Indoor Air Microplastics in an Office Environment in Kuala Lumpur
9	Malayan Tapir Roadkill: Assessment Towards Road User and Mitigation Strategies
10	Cultural Heritage and Environmental Challenges: A Complex Conservation Processes of Batik, Ground Water and Subsidence in Pekalongan
11	Environmental Impact Assessment of Tourism Activities in Kenyir Lake: A Life Cycle Approach
12	Fracture Behaviour of Sn-58Bi Alloy Reinforced by Activated Bamboo Charcoal
13	The Impact of Anthropogenic Activities on Sturgeon Populations and the Role of Genetic Research
14	Applying the EU Green Taxonomy Principles in Order to Preserve Biodiversity, in Particular Wild Sturgeon Populations
15	The Assessment of the Lower Danube Sediment Regime and Morphology in Order to Further Identify Important Habitats for Critically Endangered Ichthyofauna
16	Impact of Polyvinyl Chloride (PVC) Powder Ingestion on Growth Rate And Length of Oreochromis Niloticus - A Preliminary Study

Environmental Management and Protection	
No.	Title
17	Artificial Intelligence Prediction Tool for Hydrogen Production from Renewable Energy Aimed at Reducing the Impact on the Environment
18	Comparative Study Between Chloroquine Sulphate and Cop-per sulfate in Aquaculture at Low Dosages
19	Scientific Approach to Iron Gates System By-Pass Solutions to Address the Discontinuity of Historical Migration Routes of Danube Anadromous Sturgeons
20	Mitigation Measures for the Impact of Hydrotechnical Works in Răstolița River, Romania on Hucho hucho Species
21	Ecological impact of invasive fish species on species and ich-thycenotic associations in freshwater aquatic ecosystems of Romania
22	Assessing the Level of Implementation of Cost Reduction Techniques on Educational Building Projects in Public Tertiary Institutions in Southwestern Nigeria
23	Virtual Experiential Model and Digital Preservation Path of Traditional Wooden Carvings in Huizhou Traditional Dwellings
24	The Sustainability Strategy of a Metallurgical Company in the Context of Digitalization
25	Advances in Beehive Monitoring Systems: Low-Cost Integrating Sensor Technology for Improved Apiculture Management
26	Developing a Water Discharge Echohydrograph Conditioned by Specific Ichthyofauna Habitat Conservation
27	Analyzing the Traditional Rural Cultural Heritage of Lingnan Region in China as the Foundation for Protection and Development
28	The Effect of Planting Deadlines on the Thickness of the Rice Seedling

Green Technologies	
No.	Title
1	Co-Gasification of Torrefied Palm Kernel Shell and Low-Density Polyethylene for Hydrogen Production
2	Performance Analysis of Mobile Vertical Burner Machine Using Various Types of Biomass Pellets
3	Assessing Sustainability Impacts And Paradoxes Of Large-Scale Solar Farms In Energy Infrastructure Project
4	Optimizing Green Synthesis of Copper Nanoparticles Using Ananas comosus Leaf Extract: Unveiling Optimum Parameters for Enhanced Production
5	Synergistic Effect Between Empty Fruit Bunch and HDPE on Product Yield and Functional Group Content in Bio-fuels Produced from Coliquefaction Process Under Supercritical Methanol Condition
6	Modeling of Shell and Various Tube Shapes with Annular Fins for Thermal Solar Energy Storage System
7	Compressive Strength of Corn Stalk Ash as Supplementary Cementitious Material in Mortar
8	Contribution of Natural Lighting in Workspaces to Visual Comfort Improving User Productivity
9	Design Analysis of Sustainable Composite Slab using Profiled Steel Sheetting: A Case Study based on BS 5950-4: 1994 and EN 1994-1-1: 2004
10	Development of an Innovative Hydrogen Production Solution For Use in the Field of Environmental Protection

Green Technologies

No.	Title
11	Investigating the Strength Characteristics of Reinforced Concrete Grouted Sleeve Connections in Seismic Zones
12	POFA-PET Concrete as an Ionizing Radiation Shielding- Preliminary Review

Water & Wastewater

No.	Title
1	Adsorption of Metaldehyde by Oil Palm Kernel Biochar and Rice Husk Biochar: A Comparative Study
2	Sustainable Fertilized Soil from Alum Sludge by Takakura Composting
3	The Development of Food Waste Management in Universiti Malaysia Perlis
4	Assessment of Greenhouse Gas Emissions and Water Quality in Relation to Tourism and Human Activities at Kenyir Lake, Terengganu
5	Removal of Oil From Wastewater: An Overview of the Polymeric Photocatalytic Membranes
6	Assessing the Transboundary Water Pollution Possibly Produced by an Armed Conflict
7	Influence of Temperatures of Biochar Derived from Agro-waste onto Polyester Composite for Improving the Water Effluent Discharge

Global Warming & Climate Change

No.	Title
1	Time Series of Coastal Inundation in Jakarta: Key to Understand Climate Change Effect and the Adaptation Act
2	The Development of Traceability Technology in the Fisheries Industry Supply Chain: A Systematic Literature Review
3	Seasonal Water Level Variations and Predictive Modeling in Kampung Parit Hylam, Johor
4	Dynamics and Drivers of Carbon Dioxide Emissions in Two Types of Wetland Soils
5	Experiments on Soil Microcosms for the Assessment of Greenhouse Gases Fluxes from Different Land Uses in Laboratory Conditions
6	Dynamics and Drivers of Carbon Dioxide Emissions in Two Types of Wetland Soils
7	Developing Mathematical Models to Study Changes in Groundwater Levels and Salt Concentration
8	Petrophysical Relationship Between Soil Moisture Content and Dielectric Permittivity for Wastewater Landfill Contaminated in Cherang Hangus Soil Using GPR

Environmental Remediation

No.	Title
1	The Influence of Hydroxyapatite/Zinc Oxide Composite Syn-thesis Method on its Sorbent and Photodegradability Characteristics
2	Assessing the Photocatalytic Activity of ZnO/HA Composites
3	The Potential of Algae-Based Nutrient Removal in Wastewater Treatment
4	Biopolymer-Based Active Packaging: A Study on Physicochemical Properties and Antioxidant Effect of Semi-Refined Carrageenan-Reinforced Cellulose Nanofibers Infused with Eugenol
5	Heavy Metal Contamination and Ecological Risk Assessment in Soils in the Area of the Temporary Municipal Solid Waste Landfills in the City of Botosani, Romania

GIS & Remote Sensing

No.	Title
1	Analysis of Vegetation and Land Cover Using the Soil Adjusted Vegetation Index (SAVI) Method
2	The Accuracy Verification of Recent Global Geopotential Model based on GNSS/Levelling Data on Ground Control Points in Johor
3	Environmental Noise Mapping : GIS-Based Study of Urban Industrial Zones and Traffic Areas

Keynote Speaker

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Dr. Alexander Egorov

Leading researcher,
Group leader, "Gene therapy" division,
Scientific Center for Translational Medicine

Lecturer/professor of "Molecular Medicine" Master's program

Alexander began his professional career at the Faculty of Medicine at Moscow State University as a laboratory assistant before advancing to a junior researcher role at the Medical Scientific and Educational Center at the same university.

He spent two years as a postdoctoral researcher at the Institute of Molecular Oncology (IFOM) in Milan, focusing on the structural and functional relationship of the acute myeloid leukemia suppressor, Prep1. Alexander then continued his research at the Center for Experimental Medicine (CeRMS) at the University of Turin.

Since March 2021, Alexander has been leading research in the field of gene therapy. He serves as the principal investigator and project head for the "Reprogramming of Adipose Tissue Cells Using Adeno-Associated Viral Vectors" project (<https://rscf.ru/project/22-14-20046/>), supported by the Russian Scientific Fund and the Kuban Scientific Fund. He has authored more than 20 peer-reviewed publications, co-authored one monograph, and holds six patents in the Russian Federation

White-to-Beige Adipose Reprogramming: Novel Approach

Obesity has become a pandemic, as currently more than half a billion people worldwide are obese. The etiology of obesity is multifactorial, and combines a contribution of hereditary and behavioral factors, such as nutritional inadequacy, along with the influences of environment and reduced physical activity. Two types of adipose tissue widely known are white and brown. While white adipose tissue functions predominantly as a key energy storage, brown adipose tissue has a greater mass of mitochondria and expresses the uncoupling protein 1 (UCP1) gene, which allows thermogenesis and rapid catabolism. Even though white and brown adipocytes are of different origin, activation of the brown adipocyte differentiation program in white adipose tissue cells forces them to transdifferentiate into "beige" adipocytes, characterized by thermogenesis and intensive lipolysis. Nowadays, researchers in the field of small molecule medicinal chemistry and gene therapy are making efforts to develop new drugs that effectively overcome insulin resistance and counteract obesity. Existing state-of-the-art gene therapy offers several opportunities to stimulate the conversion of WAT into beige adipose tissue based on secreted proteins, such as FGF21 or BMP7. We have developed novel anti-obesity gene therapy that enhances white-to-beige adipose transition through overexpression of single transcription factors.

The research was supported by Russian Science Foundation and Kuban Science Foundation (grant #22-14-20046)

Keynote Speaker

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Assoc. Prof. Dr. Acep PURQON

Physics of Earth and Complex Systems,
Institute of Technology Bandung (ITB), Indonesia
Senior Advisor and Senior Collaborative Professor,
Kanazawa University, Japan



Associate Professor Acep Purqon is researcher for 25 years in physics of earth and complex systems at Institute of Technology Bandung (ITB) Indonesia. He pursued doctoral degree in Computational Science at Kanazawa University, Japan in 2005-2008 and continued Postdoctoral position at Institute for Chemical Research at Kyoto University, Japan 2008-2010. His research focuses on Green Physics and Smart Complex Systems. He had a position as Chairman of Science TechnoPark (STP) roadmap ITB. He is also a member of SDGs expert ITB (Sustainable Development Goals) and also member at research centre of new and renewable Energy ITB.

He has interest in hybrid renewable energy such as a grant collaboration with bp Indonesia for constructing Solar Panel in remote area in entitle: "Development of Sustainable Hybrid Energy for Empowering the Arguni Island Community, West Papua". He also give a course entitled Precision farming in department of agricultural engineering ITB and project to agrivoltaics as solution in remote area. Hybrid renewable energy is challenging in Indonesia country with more than 17,000 islands mainly in remote area.

Sustainable Hybrid Renewable Energy for Remote Area in Indonesia

Hybrid renewable energy is challenging for remote areas in Indonesia particularly due to spreading more than 17,000 islands. One of the pilot project islands is Arguni Island, Fakfak, West Papua. The Arguni island has the potential to become a new economic growth point in West Papua, including for the tourism sector, however, currently it only has electricity for 12 hours at night, and it is used for all various educational and economical activities. The Academic-industry collaboration approach is taking a lead by bp Indonesia, the company really concern supporting renewable energy to community empowerment in this location and collaborating with Institute of Technology Bandung (ITB) to jointly develop an hybrid renewable energy program entitled "Development of Sustainable Hybrid Green Energy for the Empowerment of the Arguni Island Community, West Papua." It is also funded by Kedaireka grant from Ministry of Education , Indonesia. This pentahelix collaboration also involves the Fakfak regional government, Fakfak State Polytechnic and local communities regarding the biggest challenge being the sustainability aspect in the form of developing local human resources. It was constructed hybrid power plants using energy sources from solar power and wind power. Arguni Island may be a benchmark for Indonesia's future, in the future where electricity comes from clean energy in the form of renewable energy because of its potential in the form of sun, wind and wave power. It is also an engine for the new economic growth to implement a circular economy starting from energy, zero waste management, then from this waste management it generate products in the form of feeders in the form of feed for livestock and fertilizer for agriculture to support sustainability city by an integrated farming concept. Another pilot project is to develop land-based aquaculture in Lampung, Sumatra using hybrid renewable energy. It is also hoped that this hybrid renewable energy can bring together green energy and blue economy to generate a new economic growth.

Keynote Speaker

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Associate Prof. Dr Mohd Remy Rozainy Mohd Arif Zainol

Director, River Engineering and Urban Drainage Research Centre (REDAC)
Associate Prof. School of Civil Engineering, Universiti Sains Malaysia



Associate Prof. Dr Mohd Remy Rozainy Mohd Arif Zainol is a researcher for 21 years in the field of water resources engineering with specialization in hydraulic physical model and numerical simulation model. He is a lecturer at the School of Civil Engineering and holds the position of Director, River Engineering and Urban Drainage Research Centre (REDAC). His latest research focus is on the development of hydraulic physical models for Kenyir and Chenderoh Dams, to study the characteristics of flow that can generate vibration and will affect the structure integrity of the dams. He is also involved in the development of Flood Risk Assessment (FRA) and Flood Vulnerability Index (FVI) for Critical Infrastructure (CI) in Malaysia.

He has published more than 120 journal papers and in well reputable scientific journals in the field of water resources engineering. He had joined many innovation competitions since 2014 and won more than 80 awards. He is actively involved in consultancy jobs for more than 50 projects from various local and international companies. He is a former member of the Japan Society of Civil Engineers (JSCE), a graduate member of the Board of Engineers Malaysia (BEM) and committee member of Malaysia Research and Innovation Society (MyRIS). He was also a visiting professor in many universities and research center such as Kyoto University, Japan; Chang'an University, China; Universitas Muhammadiyah Yogyakarta, Indonesia; Physics of Earth and Complex System, Institut Teknologi Bandung (ITB), Indonesia and Center of Excellent Geopolymer and Green Technology (CEGeoTech), UniMAP.

Pioneering Sustainable Drainage System: USM Engineering Campus, Nibong Tebal, Penang

Constructed in 2001, the Bio-Ecological Drainage System (BIOECODS) is a national pilot project located at the Engineering Campus, Universiti Sains Malaysia (USM Engineering Campus), Penang. It represents a drainage system to restore natural environment while maintaining river flow and controlling ground subsidence through an innovative and sustainable method. The concept of the BIOECODS is based on Sustainable Urban Drainage System (SUDS) or Best Management Practices (BMPs), namely the "Control-at-Source" approach, integrated into urban planning and designed to achieve multiple objectives. By integrating green stormwater components (swales, dry ponds, wetlands, wet ponds) with the green area and landscape, the BIOECODS will also enhance the aspect of a "healthy campus". Through the construction of the BIOECODS in newly developed areas, several water-related conundrums including rapid flooding, river pollution, and scarcity of water during dry seasons which have afflicted Malaysia will likely be overcome. The BIOECODS in USM is a national pilot project and can be seen as a prototype for developing new urban areas. This project meets the Urban Stormwater Management Manual for Malaysia (MSMA) requirement, which was launched in 2000 by the DID to manage and control the quantitative and quality runoff of stormwater at its source. The implementation of the BIOECODS will also help maintain the downstream waterway, i.e., River Kerian, in a natural environment. The concept of quantity control in stormwater runoff applies engineering elements including infiltration, storage, and flow attenuation. The infiltration and storage component helps to attenuate the runoff flow and improve the runoff water quality through the treatment process. Removal of pollutants from the stormwater runoff can be achieved through applying best management practices from the source to the river. Treated runoff can also be stored and detained in the designed pond such as the wet pond and recreational pond for domestic use. The BIOECODS includes a series of components from upstream to downstream, namely grass swale, dry pond and ecological pond (wet pond, detention pond and recreational pond).

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Invited Speaker

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**Assoc. Prof. Dr Noor Hana
Hanif Abu Bakar**

School of Chemical Sciences, Universiti Sains Malaysia,
11800 USM, Penang, Malaysia.



Designing Nanocomposites of Natural Polymer and Metal Organic Frameworks for Enhanced Removal of Organic Contaminants at Neutral pH

A wide variety of organic contaminants with different properties exist in the environment. As such, numerous materials have been designed to adsorb or catalytically degrade the organic contaminants at specific conditions. Most materials are not capable of treating organic contaminants with different properties at a more neutral pH. Hence our research has focused on developing a material which can address this issue. This talk will cover on the modification of natural polymers with nanometals and metal organic frameworks to improve adsorption and degradation of various organic contaminants at a more neutral pH.

Invited Speaker



Assoc. Prof. Ts Dr Anurita Selvarajoo

Department of Civil Engineering,
Faculty of Science and Engineering,
University of Nottingham Malaysia

Turning Palm Oil Waste into Green Building Materials: A Sustainable Solution for Reducing Cement's Carbon Footprint

Cement production is a major contributor to carbon emissions, making it a critical issue in the fight against global warming and climate change. Reducing these emissions is essential for mitigating climate change, and researchers are exploring alternative materials to achieve this goal. One promising approach is using waste from the palm oil industry, such as palm kernel shells and empty fruit bunches, to create biochar, a type of green building material. In Malaysia, the palm oil industry generates a significant amount of waste. Converting this waste into biochar can produce a material with similar or even better properties than traditional cement. This not only helps in managing waste but also offers a more sustainable option for the construction industry, thereby reducing the overall carbon footprint. In a recent study, optimisation process was carried out to produce biochar from empty fruit bunches. Different temperatures, heating rates, and residence time were evaluated to find the best conditions. The optimal settings were 455 °C, a heating rate of 15°C per minute, and a residence time of 20 minutes. The resulting biochar had a high carbon content, which is desirable for use in construction as a green building material. The study also compared the biochar from empty fruit bunches to that made from palm kernel shells, demonstrating that the type of biomass used is important. These findings suggest that using biochar from palm oil waste as a cement replacement can significantly reduce carbon emissions associated with construction. This approach promotes effective waste management and supports sustainable construction practices, making a positive impact on climate change.

Invited Speaker

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Ts. Dr. Razi Ahmad

Faculty of Civil Engineering & Technology,
Universiti Malaysia Perlis, Malaysia



Co-gasification of Pretreated Palm Waste and Low Rank Coal

Malaysia has an abundance of biomass, such as palm waste, which has great potential as a renewable energy source. The use of low rank coal offers a promising opportunity to substitute high rank coal in gasification. However, due to inadequate qualities, individual gasification of biomass or low-rank coal is limited. To address these issues, samples should be pretreated prior to co-gasification. Thus, this presentation will discuss pretreatment options for biomass and low rank coal prior to co-gasification as a possible method for improving product distribution, specifically hydrogen production.

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ABSTRACT

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Environmental Management & Protection

Bioaccumulation of Heavy Metals on Freshwater Fish at Taman Rimba Ilmu Tanah Bris (Tribe) Unisza

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Abstract. Bioaccumulation is the process by which substances build up in the tissues of living organisms over time and occurs in the environment, whereby a chemical substance accumulates within the tissues of organisms at concentrations higher than that found in the surrounding environment. The objectives of this study are to determine the concentration of heavy metals in water and fish samples at Taman Rimba Ilmu Tanah BRIS (TRIBE) UnisZA. The samplings were carried out from November 2022 until January 2023. Both water and freshwater samples were collected manually. The samples were analysed using the acid digestion method (AOAC, 2016) and heavy metal analysis was determined by Inductively Coupled Plasma Optical Emission Spectrophotometer (ICP-OES). The heavy metals found in water samples were Cu (0.617 ppm)> Fe (0.165 ppm)> Mn (0.161 ppm)> Al (0.075 ppm) respectively. The level of Al, Cu, Fe, and Mn accumulated in water samples in all streams was still within permissible limits, according to DOE (2017). Meanwhile, the highest metal accumulation was found in *Osteochilus vittatus* in order of Fe (1.683 ppm)>Al (0.484 ppm)>Mn (0.287 ppm)> Cu (0.081 ppm). However, the heavy metals levels in all fish samples were below the permissible limit stated by MFA (1985) and FAO (1983). The statistical analysis ANOVA shows the p-value of Fe in fish samples is less than 0.05, proving significant differences in heavy metals in fish among streams. The water quality at station 1 is categorized as class II except for stations 2 and 3, which fall into class III. The class II water quality shows that recreational activities can be done at the study location, while Class III requires extensive treatment.

Environmental Management & Protection



Ecological Transition Potential of Tourists in Mountainous Adjara

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Abstract. One of the main directions for sustainable development of mountainous regions is rational application of touristic and recreational resources, especially in quite densely populated regions, and environment is known with low sustainability. The mentioned issue constitutes one of urgent topics of modern times and identification of issue and setting a reference in line with its settlement (on the example of particular region) will bear an applicable significance. Tourism is granted with priority in line with increase of social and economic level of mountainous Adjara, but there are number of problems in its development. The work evaluates the potential of touristic and recreational resources of mountainous Adjara, geographic originalities of tourism development and the role of tourism in increase of local population's living standards. There are established the territorial originalities of ecological transition potential of tourists and on the basis of existing resources, there are determined the development perspectives of some particular type of tourism.

Environmental Management & Protection

Physical and Rheological Properties of Coconut Waste Modified Bitumen

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Abstract. Numerous modifications have been made to bitumen to improve its durability and performance. This study aims to enhance bitumen by evaluating the physical and rheological properties of bitumen modified with coconut waste, a sustainable material. The study develops bitumen samples modified with varying lengths and fiber content of coconut waste. The samples were evaluated for rheological behavior using modern testing methods like the Dynamic Shear Rheometer (DSR) and Rolling Thin Film Oven (RTFO). Findings shows the penetration value decrease and the softening point increase with higher coconut waste content, suggesting the modified bitumen is more prone to deformation. The complex modulus G^* increase significantly to 3872Pa for the 1% coconut fiber modified bitumen and 9771Pa for 1% coconut powder modified bitumen as compared to the control sample (3431Pa), indicating prospective higher resistance to rutting. In conclusion, modified with coconut waste, bitumen exhibits enhanced flexibility and reduced susceptibility to temperature-related issues. Unlike conventional bitumen, which often suffers from rutting and thermal cracking, this modified version shows improved resistance against shear stresses at elevated temperatures and retains greater flexibility in colder conditions.

Environmental Management & Protection

Assessing the Efficacy of Magnesium Hydroxide and Aluminium Hydroxide in Enhancing Flame Retardancy of Natural Fiber

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Abstract. Natural fiber panels have gained attention as sustainable alternatives in various applications, including construction and interior design. Utilizing natural fibers provide effective sound absorption, helping to enhance acoustics in different indoor settings. Although these fibres are highly valued for their environmental sustainability and acoustic advantages, they are inherently flammable. These panels, when subjected to fire or high-temperature conditions, pose significant safety risks due to their flammability and potential for rapid combustion. This study evaluates the efficacy of various synthetic additives in enhancing the flame retardancy of natural fiber panels. The panels were made by mixing the natural fiber with polyester resin and additives. The experimental setup includes standard fire tests such as ASTM D635 Horizontal Burning and ASTM D3801 Vertical Burning Test. The results show that rice husk has the higher burning rate for both magnesium hydroxide and aluminium hydroxide. Coconut coir outperforms rice husk and sawdust for both magnesium hydroxide and aluminium hydroxide which are 655 s and 640 s respectively in terms of vertical burning. The study showed that magnesium hydroxide is a better flame retardant than aluminium hydroxide. This makes it a promising option for enhancing the fire resistance of natural fiber panels (PMMA).

Environmental Management & Protection

Effects of Coal Desulfurization on Ultimate, Proximate, and Functional Group Transformations

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Abstract. Coal desulfurization is essential for addressing environmental concerns related to air quality and their impact on human health and climate change. This study treated coal with potassium carbonate (PC) and ethylene glycol (EG) mixture at molar ratios 1:8 and 1:16, respectively, for 60 minutes at 30 °C. The highest removal of OS occurred at a molar ratio of 1:16, compared to treated coal at 1:8, with a removal percentage of 61.91% and 40.11%, respectively. The low-viscosity mixture was beneficial, as it was easier to handle and move around the coal than the higher viscosity, which had limited free volume to enter the coal structure. The treated coal at a molar ratio of 1:16 indicated the lowest volatile matter (VM) and ash (A) values, while the highest fixed carbon (FC) and fuel ratio. Furthermore, FTIR analysis indicated a shift in the peaks for thiophene and organic sulfates, demonstrating the effective removal of sulfur from coal by the PC:EG mixture. This study presents a promising approach toward achieving the safety and environmental objectives outlined in the 2030 Agenda for Sustainable Development.

Environmental Management & Protection

The Development of Food Waste Management in Universiti Malaysia Perlis

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Abstract. Due to changing lifestyles and population expansion, food waste is currently on the rise. A large amount of food waste can lead to a number of issues, including those that impact the environment and public health and are caused by ineffective food waste management. The objective of this study was to determine physical and chemical properties of manual composting and composting machine. Two methods for composting to manage the food waste produced such as manual composting bin and composting machine were conducted. Firstly, temperature results obtained for manual composting is 33°C. However, nitrogen results obtained for manual composting and composting machine are 1.4 % and 2.1 % while phosphorus result obtained for manual composting and composting machine are 4.5 mg/L and 4.23 mg/L. After that, for potassium results obtained for manual composting and composting machine are 3.02 mg/L and 2.2 mg/L. Lastly, the best method to manage food waste is manual composting based on data analysis, manual composting achieved the most optimal range for all parameters and making the best compost in this research compare to composting machine. Food waste generation rate for 8 cafeteria per week is 0.079 kg/capita/week and 28.96 kg/capita/year for a year.

Environmental Management & Protection

Comparison of Optimized Production of Palm Oil Waste Biochar with Response Surface Methodology for Cement Replacement Application

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Abstract. Carbon emissions associated with cement production has been recently highlighted as it has been one of the most widely utilised building materials, due to its strength, durability, and widespread availability. This led studies to investigate supplementary cementitious materials utilisation that has been increasing due to the promising resultant mechanical properties in mortar and concrete composites. Increase in palm oil industry in Malaysia has resulted with abundance of palm waste like palm kernel shell and empty fruit bunch that have been widely investigated as biochar. Advantages of using biochar as building material resulted in similar or improved mechanical properties compared to conventional mix. In this study, response surface methodology was used to optimize the production of empty fruit bunch biochar to be potentially used as a cement replacement. The pyrolysis parameters that are experimented with are temperature, heating rate and residence time. The responses are biochar yield, carbon, oxygen, potassium and silicon content. Analytical analysis conducted on the biochar are FESEM-EDX and TGA. The resultant optimised factors were at temperature of 455 °C, heating rate of 15°C/min and residence time of 20 min which responded 37 % biochar yield, 71.98 % carbon, 23.40 % oxygen, 0.61 % potassium and 3.68 % silicon content. These results have been compared to the palm kernel biochar produced with the same parameters and highlighting the importance of the parent biomass selection to be used as cement replacement. Ultimately, these findings have potential in promoting waste management for palm oil industry and sustainable practices for the construction industry.

Environmental Management & Protection



Identification and Mitigation of Deposited Indoor Air Microplastics in an Office Environment in Kuala Lumpur

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Abstract. Microplastics (MPs) in indoor air environments has gained research interest in the past decade owing to their potential impacts on human health and environmental sustainability. In fact, human population spend most of their time indoors which further increases exposure to MPs contamination by various mediums such as settled dust and air, drinking water and food. To this end, ventilation, air conditioning and filtration systems play an important role in improving indoor air quality. In the present study, authors assessed the performance of Air Purifier Unit (APU) in various indoor settings and their effectiveness in reducing microplastic concentrations in an office environments in a university located in Malaysia. This is because efficiency of APU is highly dependent on several factors such as type of purifier, filtration method, airflow rate and room size. Experimental findings were validated by statistical analysis to determine significance; Shapiro-Wilk test was used to examine normality of microplastic count, while Kruskal-Wallis test was employed to assess differences in these counts. Wilcoxon Signed-Rank Test and KruskalWallis test was used as non-parametric approach to compare the medians of dependent an independent groups while post-hoc Dunn's test was applied to discern specific group discrepancies following significant findings from Kruskal-Wallis test.

Environmental Management & Protection

Malayan Tapir Roadkill: Assessment Towards Road User and Mitigation Strategies

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Abstract. Biodiversity conservation has become one of the key components in the Sustainable Development Goals (SDGs) agenda. In line with Goal 11 towards sustainable cities and communities and Goal 15 for life on land, the conflict between animals and humans must be reduced. Prolonging the development of infrastructure and urbanization, animals, particularly the Malayan Tapir, have been in the brink of extinction as their numbers have been depleted due to the roadkill. These animals need to migrate in search of food and shelter. However, the deforestation and conversion of land into highways and buildings make it challenging for them to survive. This study investigated the road user awareness and perception of Malayan tapir roadkill and strategies for mitigation among villagers in Felda Bersia, Perak, and aims to address the problem among road users. Moreover, deforestation and illegal logging are the leading causes of roadkill, and road user attitudes and awareness are the most significant factors. The research also evaluated the effectiveness of the management approaches in reducing roadkill, focusing on road users' viewpoints and preferences. Mitigation options included identifying roadkill hotspots and maintaining more fences. These findings will aid in guiding the conservation efforts and upgrading the development of targeted strategies to protect the Malayan tapir population. Moreover, by engaging with local communities and incorporating road user perspectives, this outcome would later promote a collaborative approach to safeguarding this endangered species from becoming extinct.

Environmental Management & Protection

Cultural Heritage and Environmental Challenges: A Complex Conservation Processes of Batik, Ground Water and Subsidence in Pekalongan

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Abstract. Batik, a traditional Indonesian textile art, significantly contributes to local employment and national exports. However, its production processes, which involve intensive water use and dyeing techniques, have raised environmental concerns. This study investigates the environmental impacts of batik production in Pekalongan City, focusing on its role in surface water pollution, groundwater exploitation, and land subsidence. It aims to propose sustainable solutions that balance the preservation of cultural heritage with environmental protection. Utilizing a multi-faceted approach, this research includes mapping batik production sites and examining data on groundwater extraction and land subsidence. Key findings reveal that batik production significantly contributes to severe surface water pollution through the discharge of untreated wastewater. This pollution exacerbates groundwater reliance, leading to substantial land subsidence. Over 80% of the water used in batik production is sourced from groundwater wells, with extraction rates causing 1-2 cm subsidence per year. This subsidence increases vulnerability to flooding and coastal inundation, adversely affecting infrastructure and local communities. The study underscores the need for sustainable water management practices, improved regulatory frameworks to mitigate environmental damage, and stakeholder engagement to promote sustainable practices in Pekalongan. Collaborative and innovative solutions are crucial for achieving a sustainable and resilient future for the city.

Environmental Management & Protection

Environmental Impact Assessment of Tourism Activities in Kenyir Lake: A Life Cycle Approach

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Abstract. This study evaluates the environmental impacts of tourism activities at Kenyir Lake, focusing on houseboat and resort operations using a Life Cycle Assessment (LCA) approach. The research aims to identify key contributors to environmental degradation by systematically analyzing the inputs and outputs associated with these activities. Data was meticulously collected from primary sources, supported by secondary literature, and analyzed using SimaPro 9.1.1.1 software following the CML-IA method, which evaluates ten impact categories. The findings highlight that operations, especially energy consumption and waste management, are significant contributors to environmental impacts, with substantial effects on global warming, ozone layer depletion, and various forms of ecotoxicity. The study emphasizes the need for sustainable practices in tourism operations, particularly in reducing energy use and improving waste management. The results provide critical insights into the sustainability and efficiency of tourism infrastructure at Kenyir Lake, offering valuable recommendations for mitigating adverse environmental impacts and promoting sustainable tourism practices in the region.

Environmental Management & Protection

Fracture Behaviour of Sn-58Bi Alloy Reinforced by Activated Bamboo Charcoal

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Abstract. Sn-Bi solders are considered by PV manufacturers as acceptable Pb-free alternative due to its low operating temperature and cost, despite being prone to brittleness caused by coarse Bi phases. Bamboo charcoal (BC) is a sustainable and environment-friendly resource with high surface area and its addition to Sn-Bi solder meets the requirement of a green solder, in line with environmental regulations. Sn-58Bi solder paste was reinforced with 0.25, 0.50, 0.75 and 1.00 wt.% of activated BC, respectively and reflowed to create a single lap shear joint. Aging response was determined through accelerated aging at 120 °C for 7 days and 14 days. Shear strength of the joints increased as the activated BC content increased in the as-reflowed condition and there was lower degradation in shear strength for heat-aging specimens compared to pure Sn-Bi solder. No failures occurred via Mode 3 when the as-reflowed samples contained 0.50 wt.% or more of activated BC, and the 7- and 14-day heat-aged samples were free from Mode3 failures when the activated BC composition was at 0.75 wt.% and above. Fracture surfaces showed transitions from flat and smooth surface to elongated-dimple structures even with just 0.25 wt.% of activated BC addition. While prolonged heat-aging increased cleavage presence, increasing amounts of activated BC reduced facet numbers and dimple sizes, indicating successful suppression of Bi phase segregation.

Environmental Management & Protection

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The Impact of Anthropogenic Activities on Sturgeon Populations and the Role of Genetic Research

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Abstract. Sturgeons are an important group of fish, being one of the earlier extant vertebrates. As most of these species are endangered, vulnerable, or extinct, efforts to understand their genetic diversity are crucial to preserve their existence. Genetic studies such as microsatellite and mitochondrial DNA genotyping have proved to be essential in better understanding the overall genetic status of sturgeons as well as in developing effective management plans regarding aquaculture and conservation. Moreover, analyzing their genetic diversity gives insights into their phylogeny and interspecies relations.

Environmental Management & Protection



Applying the EU Green Taxonomy Principles in Order to Preserve Biodiversity, in Particular Wild Sturgeon Populations

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Abstract. The three wild anadromous sturgeon species currently present in the Black Sea and Lower Danube are in a critically endangered state. Their population has been consistently declining due to a combination of various factors, both caused by human activity and natural phenomena. These factors include unsustainable exploitation and poaching, hydro-technical projects aimed at improving navigation, water management, and energy production, pollution of essential habitats, and climate change. The EU Green Taxonomy is an essential framework that facilitates collaboration between researchers, communities, and the government to protect natural ecosystems and conserve biodiversity while promoting a sustainable and balanced socioeconomic environment. INCDPM Bucharest has developed a research agenda for environmental protection and biodiversity conservation based on the six main principles of the Green Taxonomy. This agenda focuses on 7 core themes that address the highest priorities in these areas and provide future scientific directions to achieve these goals.

Environmental Management & Protection



The Assessment of the Lower Danube Sediment Regime and Morphology in Order to Further Identify Important Habitats for Critically Endangered Ichthyofauna

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Abstract. The investigation of sediment morphology and sediment regime is crucial for the initial stages of hydromorphodynamic modeling of the Lower Danube basin. This helps in identifying significant habitats and potential obstacles that may disrupt the migration patterns of anadromous sturgeon species in the lower Danube. This investigation involved the analysis of 10 samples, which were collected in equal quantities from specific places where hydrotechnical activities have been conducted, specifically the Bala and Caleia branches. The sediment samples were analyzed to determine their morphological and structural characteristics through granulometric assessments. Additionally, three significant parameters, namely the standard deviation, symmetry index (skewness index), and flattening index (kurtosis index), were used for further characterization.

Environmental Management & Protection

Impact of Polyvinyl Chloride (PVC) Powder Ingestion on Growth Rate And Length of *Oreochromis Niloticus* - A Preliminary Study

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Abstract. Aquatic ecosystems face increasing contamination from plastic pollutants, with Polyvinyl Chloride (PVC) being one of the most prevalent. This study investigates the impact of ingested PVC powder particles on the body weight and length of *O. niloticus* (Nile tilapia), a commercially important fish species and a common inhabitant of freshwater systems worldwide. Groups of Nile tilapia specimens were subjected to different amounts of PVC powder particles, specifically 500 ppm and 1000 ppm. Specimens and water parameters were meticulously observed for 40 days. The control groups were provided with a diet that did not contain any PVC. After exposure, body weight and length were measured every two weeks and compared between the experimental and control groups. Preliminary results suggest a significant correlation between PVC ingestion and alterations in the growth parameters of Nile tilapia. Fish exposed to higher concentrations of PVC exhibited reduced body weight and length compared to the control groups. These findings indicate a potential negative impact of PVC pollution on the growth and development of aquatic organisms, highlighting the urgent need for effective strategies to mitigate plastic pollution in freshwater ecosystems.

Environmental Management & Protection

Artificial Intelligence Prediction Tool for Hydrogen Production from Renewable Energy Aimed at Reducing the Impact on the Environment

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Abstract. Hydrogen production from renewable energy sources is a sustainable idea both in the field of energy storage and for environmental protection. Still, the fluctuations of production levels can become an impediment and may attract risks or additional production costs. In order to predict hydrogen production from such sources, an Artificial Intelligence prediction tool was implemented as a measure of control for future forecasts and evolutions.

Environmental Management & Protection



Comparative Study Between Chloroquine Sulphate and Cop-per sulfate in Aquaculture at Low Dosages

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Abstract. Aquaculture water was exposed to very low dosages of copper sulfate and chloroquine sulphate in order to observe purgative effects at minimal concentrations. where both substances are commonly employed for their antimicrobial and antiparasitic properties in fish farming It was observed that the well-known treatment with cooper sulphate is effective at even low dosage, while the proposed novel purpose of chloroquine was not. The present study highlights the need to effective treatment while avoiding to compromise medicine missusage which greatly leads to host resistance.

Environmental Management & Protection

Scientific Approach to Iron Gates System By-Pass Solutions to Address the Discontinuity of Historical Migration Routes of Danube Anadromous Sturgeons

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Abstract. Historical migration routes for anadromous sturgeons in the Danube River have been interrupted by transversal structures for hydropower use, from which the Iron Gates hydropower system represents the first significant barrier upstream Danube from the Black Sea. For the implementation of DALIA project, funded by Horizon Europe, the National Institute for Research and Development in Environmental Protection Bucharest (INCDPM) carries out research and innovation activities that aim to provide a sustainable solution for ultrasonic tagged sturgeons to by-pass upstream and downstream the hydropower dams.

Environmental Management & Protection

Mitigation Measures for the Impact of Hydrotechnical Works in Răstolița River, Romania on Hucho hucho Species

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Abstract. Hucho hucho habitats in the Răstolița River, Romania are under the pressure of anthropic activities, the most significant impact coming from hydrotechnical works implemented in the river started in the '80s. In the context of further development of the hydropower system, mitigation measures must be taken in order to ensure the conservation of ichthyofauna habitats, especially for Hucho hucho, a critically endangered species in Romania. Based on available data regarding the fish specimens' presence and specific local hydromorphological and hydrodynamic conditions, a scientific-based tailored impact mitigation measures set for the conservation of Hucho hucho habitats is proposed for the Răstolița dam downstream area.

Environmental Management & Protection

Ecological impact of invasive fish species on species and ichthyocenotic associations in freshwater aquatic ecosystems of Romania

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Abstract. The authors provide a list of the alien fish species that have entered the Romanian ichthyofauna fauna and specify the year, place of signaling and the ecological impact of the respective species. Further on, the authors describe some behavioural aspects of the following species: *Lepomis gibbosus* (pumpkin seed sunfish), *Carassius auratus gibelio* (silver crucian carp) and *Pseudorasbora parva* (topmouth gudgeon)

Environmental Management & Protection

Assessing the Level of Implementation of Cost Reduction Techniques on Educational Building Projects in Public Tertiary Institutions in Southwestern Nigeria

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Abstract. In the face of limited financial resources, public tertiary institutions are pressured to optimize expenditure on educational building projects. Effective cost reduction techniques can help bridge the gap between limited budgets and the need for quality infrastructure. This research investigates cost reduction techniques implemented on educational building projects in public tertiary institutions in southwestern Nigeria and its relationship with the type of tertiary institution. A quantitative research method was employed in the study using a questionnaire survey. The building projects considered were those completed between the years 2012- 2022. One hundred and thirty-three projects from 15 public tertiary institutions in southwestern Nigeria were surveyed using purposive sampling techniques. The mean item score and the Kruskal-Wallis test were employed for data analysis. The findings showed that amongst the 16 various cost reduction techniques investigated, value analysis/engineering, supply chain management, target value design, and budget control were top-ranked and used on many elements of the projects. At the same time, automation and circular economy were the least ranked cost reduction techniques used. The study further showed significant differences in implementing 7 of the techniques in the various tertiary institutions. It is concluded that integrating cost reduction techniques into existing policies and guidelines will facilitate the development of a standardized framework for their implementation across public tertiary institutions, promoting broad adoption and ensuring consistency in their application.

Environmental Management & Protection

Virtual Experiential Model and Digital Preservation Path of Traditional Wooden Carvings in Huizhou Traditional Dwellings

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Abstract. In recent years, the conservation of intangible cultural heritage (ICH) has garnered widespread attention, emerging as a novel approach to cultural inheritance. Digitalization and virtual technologies have become the primary modes of ICH preservation and development. This paper argues that the integration of Huizhou's traditional wooden architecture and Digital Twins (DT) exemplifies the continuous evolution of ICH conservation principles and cognition. However, conventional digital preservation methods tend to emphasize technological or informational aspects, resulting in low public engagement and subpar experiential outcomes during the conservation process. Based on the fusion of Huizhou's traditional wooden architecture and digital twins, this paper extensively analyzes the digital preservation roadmap under the DT model, encompassing digital reconstruction, geometric structures, sensor data, photography and imaging techniques, as well as immersive experiences. Furthermore, it is demonstrated that within the three-dimensional space of digital twins, Huizhou's traditional wooden architecture can be authentically represented, allowing for a virtual experience that brings the public in close contact with intangible cultural heritage. This virtual mode of experience enables the "activation" and transmission of wooden carving art. The conservation and inheritance of Huizhou's traditional wooden architecture find rejuvenation within the virtual experience and digital realm.

Environmental Management & Protection

The Sustainability Strategy of a Metallurgical Company in the Context of Digitalization

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Abstract. Digitalization has spread its influence to all aspects of life. It is already difficult to imagine that there are non-digitized processes. In response to the challenges of digitalization, industrial enterprises are increasingly focusing their activities on the implementation of the principles of sustainable development, which provides them with certain competitive advantages. Metallurgy is traditionally considered a conservative industry, but it is one of the most promising industries in terms of digital development. Thus, the goal of the study is to analyze the sustainability strategy of a metallurgical company in the conditions of digitalization. Severstal is one of the most efficient mining and metallurgical companies in the world, creating new products and integrated solutions from steel together with customers and partners. At the beginning of 2023, it published a Strategy for Sustainable Development until 2030 under the general motto "Together towards a sustainable metallurgy of the future". Severstal has achieved some success in key economic indicators in the field of sustainable development, which confirms the thesis about the prospects for the development of the domestic sector of the economy, in particular, the metallurgical industry.

Environmental Management & Protection

Advances in Beehive Monitoring Systems: Low-Cost Integrating Sensor Technology for Improved Apiculture Management

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Abstract. The integration of monitoring systems in beekeeping has significant implications for the health and sustainability of honeybee colonies. These advanced systems, which include sensors for temperature, humidity, hive weight, and sound analysis, allow for real-time tracking of hive conditions, enabling beekeepers to respond promptly to potential threats such as disease, pests, or environmental stressors. Research shows that such technology can lead to improved colony management, reducing the incidence of colony collapse disorder (CCD) by facilitating early intervention. Additionally, continuous data collection helps in identifying patterns and anomalies in hive behavior, contributing to a better understanding of bee biology and environmental interactions. However, the effectiveness of these systems depends on the accuracy of the data collected and the beekeeper's ability to interpret and act upon this information. Moreover, while monitoring systems have the potential to enhance colony health, there are concerns about the cost, accessibility, and the need for technical expertise, which could limit widespread adoption among small-scale beekeepers. Overall, the use of monitoring systems in beehives represents a promising tool for enhancing bee colony health, though its success will rely on overcoming the challenges of implementation and ensuring that beekeepers can utilize the data effectively to support their colonies.

Environmental Management & Protection

Developing a Water Discharge Echohydrograph Conditioned by Specific Ichthyofauna Habitat Conservation

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Abstract. Deriving from the concept of ecological flow that applies to aquatic ecosystems as a whole, the specific local conditions required by ichthyofauna were considered in the development of a new discharge echohydrograph - QDFLT for Răstolița River, Romania. Hydrological statistics was used on a 30 years (1986-2015) dataset of daily averaged discharge values in order to determine and plot the corresponding hydrographs, the discharge ensurance/exceedance curve and the frequency curve. Using the ecological flow values determined according to the national legislation, there were applied considerations of climate change impact on the hydrodynamic conditions of the river and taxonomy principles in order to determine the specific minimal discharge values required for a major ichthyofauna element represented by Hucho hucho, a critically endangered species that is present in Răstolița River.

Environmental Management & Protection

Analyzing the Traditional Rural Cultural Heritage of Lingnan Region in China as the Foundation for Protection and Development

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Abstract. This research analyzes the conservation and development of traditional rural cultural heritage in the Lingnan region of China, using Bagua Village in Zhaoqing City as a case study. Tasks for the protection of Bagua Village include investigation of cultural heritage resources, assessment of values, identification of protection measures, policy support and community participation. The study found that the restoration of ancient buildings faces the challenges of missing materials, lack of technicians and inadequate management. The conclusion proposes conservation measures for Bagua Village, such as finding substitutes for ancient building materials. In addition, it is recommended that the government develop conservation policies, establish teams, and promote cooperation between businesses and villages for long-term sustainable development.

Environmental Management & Protection

The Effect of Planting Deadlines on the Thickness of the Rice Seedling

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Abstract. In this article, a scientific study was carried out on the seedling thickness of the shawl. Experiments were carried out in the conditions of two regions, and elements were studied that ensure the seedling thickness of the shawl in different climates. The dependence of the size of the seeds of the shoot of the plant at the beginning of the generative period in the middle of the shoot phase will be equal to the number of spikes on the mature shoot. High water temperatures and a lack of nitrogen lead to small rosettes and a decrease in the number of grains. The intensity of clumping is considered a varietal sign. But it depends on the irrigation regime, nitrogen nutrition, the amount of oxygen on the soil surface, air temperature, water temperature, Bush thickness. Under production conditions, the yield coefficient corresponds to an average of 1.8-2.2 single plants. The budding phase begins with the formation of additional stems in plants. The formation of a clump joint in a single plant was controlled by lowering the water level during the clumping period, providing light to reach the clump joint of the plant.

Green Technologies



Co-Gasification of Torrefied Palm Kernel Shell and Low-Density Polyethylene for Hydrogen Production

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Abstract. In this study, co-gasification of torrefied Palm Kernel Shell (TPKS) and Low-density Polyethylene (LDPE) was carried out in a fixed bed reactor with steam as co-gasification agent. Prior co-gasification, PKS was subjected to undergo torrefaction as pre-treatment process at temperature of 250 oC with 40 minutes reaction. The individual and co-gasification were carried out at 850oC with PKS blending ratio of 75% and reaction time at 60 min. The effect of torrefaction was investigated by using elemental analyzer, thermogravimetric analysis, and x-ray fluorescent. The UnPKS shows the lowest carbon content (33.82%) than TPKS (36.90%). The calorific value of PKS also improved after torrefaction. The product yield in term of char, tar and gas and hydrogen composition of individual and co- gasification were compared. Based on the findings, TPKS:LDPE has higher gas yield and lower tar yield compared than UnPKS:LDPE. These results revealed that the pre-treatment of PKS which produce high concentration of AAEM in the TPKS can act as an internal catalyst during gasification. Meanwhile, H₂ composition of co-gasification were higher than individual gasification for each reaction time due to the present of LDPE. However, TPKS:LDPE contains higher H₂ composition for each reaction time compared with UnPKS:LDPE. The high production of H₂ is in accordance with the high quantity of carbon content in TPKS. Therefore, torrefaction as pre-treatment help to improve the quantity of hydrogen meanwhile, co-gasification of TPKS:LDPE produce the highest gas yield and higher hydrogen composition than individual gasification.

Green Technologies



Performance Analysis of Mobile Vertical Burner Machine Using Various Types of Biomass Pellets

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Abstract. The high availability of biomass waste in the agricultural sector as an energy source promises sustainable energy for drying agriculture product. The low efficiency of air heating of biomass burners due to their separate design from the heat exchanger. This study aims to analyze the effect of various types of biomass pellets on the performance of a mobile vertical burner according to the air heating system efficiency and carbon emission production. This experiment used biomass waste from tea plantations as raw material for the pellets. There are three variations of biomass pellets used in this study: black pellet (A), mixed pellet (B), and white pellet (C). An analysis for the efficiency of the air heating system is conducted at six different heating process levels. The analysis showed that the mobile vertical burner machine can provide up to 1,028 CFM with a temperature of 89,9°C. The highest air heating efficiency is achieved using black pellet (80,6%), followed by mixed pellet (75,2%), and white pellet (71,4%). Carbon monoxide gas emission production from this machine ranges from 33,6-114,8 ppm. These results indicate that black pellets have the potential to improve air heating efficiency with low gas emission production.

Green Technologies



Assessing Sustainability Impacts And Paradoxes Of Large-Scale Solar Farms In Energy Infrastructure Project

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Abstract. This study aims to determine the sustainability impact of large-scale solar PV farms and to recommend strategies for their sustainable development. Using a comprehensive assessment framework, we analyzed environmental, economic, and social dimensions through a combination of life cycle assessment (LCA), cost-benefit analysis, and respondent interviews. Our findings reveal that while solar farms significantly reduce greenhouse gas emissions and dependence on fossil fuels, they also pose challenges such as land use conflicts, ecological disruption, and social equity issues. Specifically, the displacement of agricultural land and impacts on local biodiversity emerged as critical concerns. Additionally, although solar farms create jobs and reduce energy costs, these benefits are sometimes offset by high initial investment costs and long-term maintenance. The study underscores the importance of integrated planning and policy-making to address these challenges and enhance the sustainability of solar energy projects. These insights contribute to the broader discourse on balancing renewable energy development with sustainable land and community management practices.

Green Technologies



Optimizing Green Synthesis of Copper Nanoparticles Using Ananas comosus Leaf Extract: Unveiling Optimum Parameters for Enhanced Production

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Abstract. The vast volume of agricultural waste of Ananas comosus leaf leads to environmental damage. However, this waste is currently being recycled for the creation of environmentally friendly metallic nanoparticles. Ananas comosus leaf extract is regarded as a cost-effective and efficient option for serving as reducing, capping, and stabilizing agents in copper nanoparticle manufacturing. This study addresses the utilization of Ananas comosus leaf extract coupled with copper sulfate as a precursor salt, leading to the increased generation of CuNPs using optimal green synthesis processes. The data suggest that the absorption spectra in the UV-visible band exhibit a peak at 280 nm. FTIR research indicated the existence of bioactive chemicals in the Ananas comosus leaf extract that allow the reduction of Cu²⁺ ions to CuNPs. The FESEM examination indicated that the CuNPs had a FCC crystal structure with an average particle size of 70.4 nm. Further analysis using HRTEM demonstrated that the interior structure of CuNPs has a particle size ranging from 20 to 25 nm. The SAED patterns corresponded with the structural properties of the produced nanoparticles, as revealed by XRD analysis, which found peaks at the (111), (200), and (220) lattice planes. The phytochemical components of the extract were effectively applied in the green synthesis of CuNPs, boosting production efficiency.

Green Technologies



Synergistic Effect Between Empty Fruit Bunch and HDPE on Product Yield and Functional Group Content in Bio-fuels Produced from Coliquefaction Process Under Supercritical Methanol Condition

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Abstract. Co-processing biomass and plastic waste is a viable option to solve the problems of high oxygenated compounds and low yields with high viscosity in oil from individual processing of biomass and plastic, respectively. Synergism between this combination reported to be able to produce higher products yield with enhanced quality. In this study, the synergistic effect (SE) of co-liquefying EFB and high-density polyethylene (HDPE) in sc-MeOH was investigated using a high-pressure, hightemperature batch-wise reactor system at 260 °C for 30 minutes and at various EFB-HDPE ratios to determine the best ratio for bio-fuel yield and its functional group content. It was found that 25% EFB:75% HDPE (wt/wt%) provides the most significant SE for bio-fuel yield and the most considerable reduction in solid residue formation under the studied conditions. The presence of hydroxyl groups from EFB and aliphatic hydrocarbons from HDPE, along with new carbonyl compounds, further highlights the SE resulting from the combined processing of these materials. The findings suggest that optimizing the ratio of biomass to plastic waste in co-liquefaction can significantly enhance the efficiency and yield of biofuels while minimizing waste, providing a promising approach for sustainable energy production and waste management.

Modeling of Shell and Various Tube Shapes with Annular Fins for Thermal Solar Energy Storage System

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Abstract. With increasing global interest in transitioning from old, expensive fossil fuels to clean energies, particularly solar energy, which is abundant in most regions of the world, the challenge arises of storing solar energy generated during the day for reuse at night. Therefore, many researchers have focused their efforts on developing and enhancing thermal storage systems for solar thermal energy. Phase change materials are considered the most suitable and least expensive when used in thermal solar energy storage systems, especially in shell-and-tube heat exchangers. In this study, the issue of latent heat storage in a shell heat exchanger was addressed using different tube shapes (tube, nozzle, and reducer), surrounded by annular fins. The main objective was to simulate the solidification process for the proposed models, which represent the state during which thermal energy is released into the phase change material during the night and stored during the day. The models were designed using SolidWorks software. CFD technology, employing finite volume and enthalpy methods, was utilized with ANSYS-Fluent 19 software for numerical simulations. The results obtained from the CFD predictions indicated that the variation in liquid fraction among the proposed models was minimal. The tube model exhibited a lower average liquid fraction than other models, suggesting faster solidification of paraffin compared to the others. In the upper part of the reducer model, where there is less paraffin, the temperature of the paraffin is close to the wall surface temperature, similar to the nozzle model. The reduction in solidification time achieved by the tube model was 25.7% compared to the nozzle model, while the reducer model delayed solidification time by approximately 16.3% compared to the tube model. Designing the heat exchanger with a tube is more suitable for the solidification process, whereas the nozzle is preferred for the melting process. There was a satisfactory agreement between numerical and published experimental findings.

Green Technologies



Compressive Strength of Corn Stalk Ash as Supplementary Cementitious Material in Mortar

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Abstract. The study utilized corn stalk ash (CSA) as a partially cementitious material in producing cement mortar. Moreover, this study aims to understand the compressive strength of CSA mortar samples and their characteristics, such as absorption and their correlation. The method was used by conducting compressive machines in the laboratory to all specimen control and partial replacement of CSA to Portland Composite Cement (PCC) at different portions of 5%, 10%, and 15% or named M0 (control), M5, M10, and M15. Then, the average compressive strength and weight change were measured. Before that, we measured cement and fine aggregate (sand) properties. In addition, the water to binder (w/b) was 0.45 based on the standard reference in producing an ordinary mix mortar. The results show that the maximum increase in compressive strength was achieved with a 10 percent portion of CSA without incrementing the heating process (for a 2-hour heat oven).

Green Technologies



Contribution of Natural Lighting in Workspaces to Visual Comfort Improving User Productivity

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Abstract. Visual comfort is an essential aspect of workspace interior design, especially architecture studios where creativity and productivity can affect the health and well-being of users. Poor visual conditions can lead to eyestrain, headaches, and decreased work productivity. This study the factors that affect visual comfort in architecture studio workspaces against user perceptions. This research method uses SketchUp simulation experiments, VR (Virtual Reality), and questionnaires to determine the user's response to visual comfort in the architecture studio workspace. The variables used in this evaluation look at the amount of light entering, window openings (WWR), wall materials and colors, perceptions of visual comfort, and work productivity. The results showed that natural lighting plays an important role in creating visual comfort, with the right lighting intensity, so that it has a positive impact on user health. In addition, the use of bright wall colors such as white and orange tends to make a positive contribution to the user's visual environment which can directly improve work performance and productivity. This study proves that workspace design with the right lighting and color selection can have a positive visual impact on users with sustainable lighting distribution techniques and methods.

Green Technologies



Design Analysis of Sustainable Composite Slab using Profiled Steel Sheeting: A Case Study based on BS 5950-4: 1994 and EN 1994-1-1: 2004

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Abstract. Composite slabs, combining the structural benefits of steel and concrete, are an integral part of modern construction due to their high load-bearing capabilities and efficiency. Steel sheeting provides tensile reinforcement, while the concrete offers compressive strength, contributing to the sustainability and durability of the flooring systems. Recent projects in Malaysia, such as the construction of high-rise Merdeka 118 and PNB Mall have demonstrated the effectiveness of composite slabs in achieving efficient, robust, and environmentally friendly structures. This study basically involves in examining and reassessing the composition of floor slabs using profiled steel from NS BlueScope Lysaght. Technically, this study has amended a manual excel spreadsheet to reassess the design and in-depth analysis of the composite concrete slab using a case study from PNB Mall projects. Through the checking and re-evaluation process, several comments and critical discussions have been made, categorized into two subjects: (a) discussions on the formwork/construction stage analysis, and (b) evaluations on the composite (slab) stage analysis. In conclusion, the MegaFloor modelling software is capable of designing and analyzing composite floor slabs when comparing it to the amended excel spreadsheet calculations. The manual design calculations adhere to BS 5950 Part 4, as well as EN 1994-1-1:2004.

Green Technologies



Development of an Innovative Hydrogen Production Solution For Use in the Field of Environmental Protection

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Abstract. The European Union has marked out various targets to achieve climate neutrality by 2050, one of which includes reducing CO₂ emissions and the impact of climate change, through a transition to green energy and to contribute to the EU targets on production of an annual hydrogen capacity of 1 million tons by 2025 and 10 million tons by 2030. In this context, the study analyses the removal of water quality restrictions used for the electrolyser supply facilitating the placement of a hydrogen installation near any source of water. Simultaneous, to maintain hydrogen production efficiency yield renewable energy sources will be used. The suggested technology offers a decarbonized solution in the naval sector from protected wetlands regions and of the natural gas utilized in the domestic and industrial sectors. Additionally, its potential to be repeatable, resilient and sustainable makes the developed innovative hydrogen production solution eco-friendly.

Green Technologies



Investigating the Strength Characteristics of Reinforced Concrete Grouted Sleeve Connections in Seismic Zones

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Abstract. Four precast columns with vertical grouted splice anchor connection are simulated using the pseudo-static method while the cast-in-situ columns are the control group to assess the performance of the precast concrete members having steel sleeve connections. The result showed that the cracking modes of the precast columns and the cast-in-place columns are identical, however, these variations come into play when considering the pattern distribution of fractures. The in-sit columns are usually base cracked horizontally and much higher diagonally descending fractures at their sleeves while prefabricated columns experience higher sleeves horizontally cracked followed by descending diagonally high at their bases. Also, additional cracks progress into this beam within a high range of 300 mm that appear on the underside of the beam. The hysteresis curves for prefabricated columns are generally stably shaped, signaling the fact that such structures are prone to dissipate or absorb energy. In addition, the rate at which the stiffness of the prevailed prefabricated specimens reduces is low compared to the rate at which the stiffness of the wet-cast specimens reduces. A base mold of columns with a minimum displacement angle of $1/104$ of $1/104$ $1/54$ is used and it is an appropriate displacement ratio for the design of large earthquakes. At the very end this given paper recommends the best way to do the construction of the Earthquake Framework applying precast concrete constituents with the grouted secured joingroups.

Green Technologies



POFA-PET Concrete as an Ionizing Radiation Shielding- Preliminary Review

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Abstract. This paper discusses a prior project's investigation based on the review and properties. These are based on prior research on the physical characteristics of POFA-PET-incorporated concrete mixers for shielding gamma rays.

Water & Wastewater



Adsorption of Metaldehyde by Oil Palm Kernel Biochar and Rice Husk Biochar: A Comparative Study

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Abstract. Metaldehyde is a toxic molluscicide that has the potential to contaminate water supplies and damage aquatic life. Existing water treatment methods are ineffective at removing it from water bodies. In this study, oil palm kernel biochar and rice husk biochar were utilized to assess metaldehyde adsorption. Using a batch adsorption approach, the physicochemical parameters of biochar and their metaldehyde adsorption capacities were investigated. The results indicated that the metaldehyde adsorption capacities of both varieties of biochar are significant. Considering the initial concentration of metaldehyde, contact time, and adsorbent dosages, oil palm kernel biochar demonstrated a higher metaldehyde adsorption capacity than rice husk biochar. The study examined metaldehyde's effects on OPKB and RHB using Langmuir and Freundlich isotherms. Both models provided a good fit, with the Freundlich model slightly better fitting. The study also used pseudo-first and second order kinetic models, revealing that the adsorption process follows pseudo-second-order kinetics for both biochars. This information can aid in developing efficient and successful metaldehyde removal technologies from contaminated water sources. This study showed that oil palm biochar has the potential to be an effective adsorbent for removing metaldehyde from contaminated water.

Water & Wastewater



Sustainable Fertilized Soil from Alum Sludge by Takakura Composting

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Abstract. The management of sludge produced by water treatment plants has become a significant environmental issue. Improper handling of this sludge can lead to various environmental problems. Effective sludge management is crucial to mitigate or eliminate negative impacts on land, air, soil, and water quality. This study aimed to evaluate the performance of Takakura composting methods (TCM) using sludge from a water treatment plant in Jenderam Hilir, Sepang. Four different TCM were prepared with varying ratios of vegetable waste, sludge, and seed compost. The composts were allowed to stabilize for up to four weeks, and the final product was analyzed to assess the level of decomposition and quality of the final compost. The physical analysis revealed a maximum temperature of 46°C. After four weeks of composting, the nutrient content analysis showed that available phosphorus ranged from 23.71 mg/kg to 33.75 mg/kg, potassium from 0.36 meq/100g soil to 0.53 meq/100g soil, and total nitrogen from 0.21% to 0.45%. The study concludes that the compost developed is appropriate for use in farming. Notably, Compost B, consisting of a 0.4:0.1:0.5 ratio of vegetable waste, sludge, and seed compost respectively (measured in grams), yielded the best results.

Water & Wastewater



The Development of Food Waste Management in Universiti Malaysia Perlis

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Abstract. Due to changing lifestyles and population expansion, food waste is currently on the rise. A large amount of food waste can lead to a number of issues, including those that impact the environment and public health and are caused by ineffective food waste management. The objective of this study was to determine physical and chemical properties of manual composting and composting machine. Two methods for composting to manage the food waste produced such as manual composting bin and composting machine were conducted. Firstly, temperature results obtained for manual composting is 33°C. However, nitrogen results obtained for manual composting and composting machine are 1.4 % and 2.1 % while phosphorus result obtained for manual composting and composting machine are 4.5 mg/L and 4.23 mg/L. After that, for potassium results obtained for manual composting and composting machine are 3.02 mg/L and 2.2 mg/L. Lastly, the best method to manage food waste is manual composting based on data analysis, manual composting achieved the most optimal range for all parameters and making the best compost in this research compare to composting machine. Food waste generation rate for 8 cafeteria per week is 0.079 kg/capita/week and 28.96 kg/capita/year for a year.

Water & Wastewater



Assessment of Greenhouse Gas Emissions and Water Quality in Relation to Tourism and Human Activities at Kenyir Lake, Terengganu

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Abstract. This study assesses the impact of tourism and human activities on greenhouse gas (GHG) emissions and water quality at Kenyir Lake, Terengganu. Kenyir Lake, a tourist destination in Malaysia, faces environmental challenges due to increased anthropogenic activities. The research quantifies GHG emissions from various sources such as forest land management, land conversion to flooded areas, aquaculture, domestic wastewater, and solid waste disposal using IPCC guidelines. The total GHG emissions from these activities amounted to 151,527 tCO₂-eq/year, highlighting the substantial contribution of tourism and human activities to climate change. Water quality was evaluated through the analysis of parameters including Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Suspended Solids (TSS), ammonia nitrogen (NH₃-N), total phosphorus (TP), and total nitrogen (TN). Samples were collected from resorts, houseboats, aquaculture farms, and parks during wet and dry seasons. The findings indicate that houseboat areas significantly contribute to high levels of BOD (up to 8.73 mg/l), COD (up to 69.23 mg/l), TSS (up to 303.39 mg/l), and NH₃-N (up to 2.64 mg/l), with seasonal variations reflecting the influence of runoff and water volume on pollutant concentrations. These results underscore the need for effective pollution control and sustainable tourism practices to preserve Kenyir Lake's ecological balance and reduce its GHG footprint.

Water & Wastewater



Removal of Oil From Wastewater: An Overview of the Polymeric Photocatalytic Membranes

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Abstract. The oily wastewater represents one of the major threats to environment nowadays and requires innovative water treatment technology. This review provides an overview of polymeric photocatalytic membranes used for oily wastewater treatment, with key focus on the pollution sources and the membrane materials. Moreover, the advantage of coupling the photocatalysts technology into the membrane fabrication for oil removal is explored. This work evaluates the removal performance and anti-fouling properties in oily wastewater treatment of the most recent developed polymeric photocatalytic membranes.

Water & Wastewater



Assessing the Transboundary Water Pollution Possibly Produced by an Armed Conflict

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Abstract. The impact of armed conflicts can be direct, highlighted by population displacement and casualties, infrastructure destruction, together with social and economic hiatus, but also indirect determined by the movement of air, water and soil pollutants across regional and national borders. There are numerous possible contamination sources of the water bodies and aquatic ecosystems that may appear during armed conflicts, including projectile composition, use of chemical weapons, discharge of untreated wastewater due to damage to sewage lines or wastewater treatment plants, unregulated waste management (improper disposal of industrial, hospital and municipal waste), oil spills, and deliberate poisoning of water resources. Thus, a comprehensive study from a multidisciplinary perspective of the armed conflicts is a sine qua non condition. In accordance, in order to properly assess the effects of pollution in the study area (Black Sea and coastal area) and to establish further strategies that can hinder the impact, water samples from various points of interest were analysed to determine the water quality of the aquatic ecosystem and to possibly identify contaminants in the analysed water bodies.

Water & Wastewater



Influence of Temperatures of Biochar Derived from Agro-waste onto Polyester Composite for Improving the Water Effluent Discharge

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Abstract. The biochar-based rice straw (RS) is the agro-waste from rice production which is one of the significant contributors to pollution. This study focused on the alteration of RS biochar on polyester/polyvinylidene fluoride (RS-g-polyester) composites to improve the quality of water final effluent from industrial-based palm oil mills. Alteration of RS biochar-g-polyester composites was investigated at various RS calcination temperatures ranging from 300-900°C. The RS biochar-g-polyester composites were prepared using a dip-coating technique and characterized via spectroscopy (FTIR-ATR), Scanning Electron Microscopy (SEM-EDS), and tensile strength. Meanwhile, the performance of biochar RS-g-polyester composites was evaluated based on the pH, turbidity, and color removal of water effluent discharge. It was found that the biochar RS-g-polyester samples displayed different patterns in intensities and morphologies at different temperatures affecting the filtration of water effluent. Good interfacial compatibility of RS-g-polyester composite is also evidently seen via morphologies and mechanical properties. With consistent pH of waste effluent (8.83-8.89), the filtrate effluent discharge exhibits a significant reduction in color removal, 35% (~1150 ADMI), and turbidity, ~85% (0.9 8NTU) compared to initial water effluent discharge (~1800 ADMI). An increase in temperature has significantly improved the quality of water, thus it has potential use in the filtration of water treatment.

Global Warming & Climate change

Time Series of Coastal Inundation in Jakarta: Key to Understand Climate Change Effect and the Adaptation Act

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Abstract. The impact of coastal inundation or tidal flooding due to the influence of land subsidence and sea level rise as well as probability as the effect of Climate Change on the coast in Jakarta has been categorized as a disaster. Losses economically have reached tens of trillions of rupiah and even hundreds of trillions if we consider the costs of mitigation and adaptation. Due to the fact of the disaster, coastal disaster deep understanding and risk management for tidal floods, land subsidence, sea level rise as well as climate change effect is mandatory, where one of the stages is to conduct a time series monitoring and analysis of tidal floods that occurred on the coast of Jakarta. This time series can be used as an input parameter for effective mitigation, key to understand Climate Change effect and adaptation measures and can even be used as a parameter for evaluating the implementation of mitigation and adaptation itself. Hypothetically, if the time series shows that there has been an expansion of flooding, then mitigation and adaptation efforts still need to be addressed as well as Climate Change effect are maybe more effecting. Meanwhile, if from the time series we can see a reduction in the tidal flood area, then this info can be an indicator of successful mitigation and adaptation including the adaptation from the climate change. Result of investigation in Jakarta shows decreasing number of places suffered coastal inundation through times.

Global Warming & Climate change

The Development of Traceability Technology in the Fisheries Industry Supply Chain: A Systematic Literature Review

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Abstract. Traceability has become an essential component of the fisheries supply chain. It ensures food safety, verifies product legitimacy, and addresses customer concerns about product origin and authenticity. In fisheries traceability refers to the ability to track the source and movement of fishery products throughout the supply chain. The purpose of this study is to find out how the development of traceability in the fisheries supply chain today. This study uses documents in the form of scientific articles obtained from 3 reference sources namely Scopus, PubMed and Web of Science. The total articles obtained were 2655 which were then screened from the title, abstract to the suitability of the documents obtained with the objectives of this study which resulted in 40 selected articles. The traceability system in the fisheries supply chain has been very developed and also uses the latest technology to guarantee the seafood obtained by consumers, but there are still many obstacles such as dishonest fisheries industry players that make the system not run well.

Global Warming & Climate change

Seasonal Water Level Variations and Predictive Modeling in Kampung Parit Hylam, Johor

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Abstract. This study aimed to assess the seasonal water level variations and their impact in Kampung Parit Hylam, located on the West Coast of Johor. The study focused on the distinct influences of the Southwest Monsoon (April-September) dry season and the Northeast Monsoon (October-March) wet season. By collecting and analyzing historical tidal records, weather data, and earth-level measurements, the study quantified and elucidated the variations in water levels across different seasons. Utilizing Minitab software, the project predicts short-term (3,6 and 9 months) water level changes based on historical trends and future climatic scenarios. The winter multiplicative method model was selected with MAPE 6 % for low tides and 0 % for high tides forecasting because of its excellent accuracy, and capability to capture seasonal patterns. For the next March 2024, June 2024, and September 2024, actual low tide levels were 0.60 m, 0.00 m, and 0.60 m, respectively, while forecasted levels were at 0.67 m, 0.68 m, and 0.54 with a 95 % PI of 0.60 m to 0.80 m, matching the actual values. Similarly, actual high tide levels were 2.60 m, 2.30 m, and 2.60 m, respectively, with forecasted levels at 2.67 m, 2.72 m, and 2.68 m with 95 % PI of 2.60 m to 2.70 m, covering both actual and forecasted values. These levels are significantly below the minimum bund height of 4 m, indicating effective protection. Additionally, the effectiveness of existing bunds as protective constructions was evaluated to understand their role in mitigating water level rise and structural vulnerability. The findings aimed to provide accurate forecasts of water level changes, support effective water resource management, and offer recommendations for enhancing bund design and maintenance. This comprehensive analysis was intended to aid local authorities and the community in planning and preparing for the impacts of seasonal water level fluctuations.

Global Warming & Climate change

Dynamics and Drivers of Carbon Dioxide Emissions in Two Types of Wetland Soils

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Abstract. Wetlands sequester substantial carbon due to their unique biogeochemical soil properties, yet they can emit significant carbon dioxide (CO₂), especially in the context of climate change. This study examined the complexity of CO₂ emissions from two distinct soil types in a natural wetland area formed along the Dambovita River. The results revealed distinct emission patterns influenced by various physical parameters, including temperature and precipitation during a seven-day period, as well as moisture regimes. The carbon sequestration capacity of flooded soils has been proven by sudden changes in the moisture regime, when emissions decreased under continuous water supersaturation. Extrapolation of CO₂ emissions highlighted the importance of accounting for environmental uncertainties, with corrected monthly means providing a more accurate representation of emissions by including day/night variations. Regression models predicting future CO₂ emissions based on meteorological and physical parameters showed that multiple predictor models explained more variance in CO₂ emissions. The investigation of these interactions improves predictions of CO₂ fluxes from wetlands and their impacts on climate change, contributing with a higher level of confidence to the GHG emissions inventory.

Global Warming & Climate change

Experiments on Soil Microcosms for the Assessment of Greenhouse Gases Fluxes from Different Land Uses in Laboratory Conditions

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Abstract. The importance of greenhouse gas (GHG) fluxes in ecosystem-atmosphere exchanges has grown due to climate change impacts. Achieving climate neutrality by 2050 requires emission reduction and removals, with land use contributing the most. Despite the advance of techniques to quantify GHG dynamics and their involved parameters, it is still uncertain how GHG fluxes respond to changes in each involved parameter, especially for in-situ conditions. Soil moisture and temperature are important parameters in relation to GHG fluxes, with a high degree of natural variation and influence from climate change. With the aim to establish the sensitivity of GHG fluxes for different soil types to natural and anthropogenic variations of parameters, experiments can be conducted in laboratory conditions with efficient resource allocation. Soils were sampled from parcels of long term in-situ monitored lands and large pots were prepared to create microcosms for tests in laboratory conditions. The results of GHG flux monitoring (CO₂) are presented in relation to soil moisture as a result of precipitation simulations by water applications on selected microcosms (from agricultural crops and abandoned land). The laboratory results are also compared with field measurements from the same parcels, realised in a period with similar precipitation quantities and temperatures. The presented results constitute the starting point for the laboratory tests on soils, verified by field data, with the aim of establishing the most suitable intervals of parameters for performant land use and carbon removal.

Global Warming & Climate change

Dynamics and Drivers of Carbon Dioxide Emissions in Two Types of Wetland Soils

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Abstract. Wetlands sequester substantial carbon due to their unique biogeochemical soil properties, yet they can emit significant carbon dioxide (CO₂), especially in the context of climate change. This study examined the complexity of CO₂ emissions from two distinct soil types in a natural wetland area formed along the Dambovita River. The results revealed distinct emission patterns influenced by various physical parameters, including temperature and precipitation during a seven-day period, as well as moisture regimes. The carbon sequestration capacity of flooded soils has been proven by sudden changes in the moisture regime, when emissions decreased under continuous water supersaturation. Extrapolation of CO₂ emissions highlighted the importance of accounting for environmental uncertainties, with corrected monthly means providing a more accurate representation of emissions by including day/night variations. Regression models predicting future CO₂ emissions based on meteorological and physical parameters showed that multiple predictor models explained more variance in CO₂ emissions. The investigation of these interactions improves predictions of CO₂ fluxes from wetlands and their impacts on climate change, contributing with a higher level of confidence to the GHG emissions inventory.

Global Warming & Climate change

Developing Mathematical Models to Study Changes in Groundwater Levels and Salt Concentration

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Abstract. One of the most important things to do is research how groundwater levels and salt concentrations fluctuate while freshwater reserves are being monitored. Thus, groundwater fluxes and salt migration were taken into consideration when examining the relationship between variations in groundwater levels and mineralization processes in this study. A more accurate mathematical model that captures the essential characteristics of the object was created in order to conduct a thorough investigation of the process of variations in salt and water levels. Nonlinear differential equations were used to represent this issue in order to monitor the geofiltration and geomigration processes using mathematical and numerical modeling and to create suggestions and recommendations. Unlike previous studies, such important parameters as soil density, active porosity, and third-order boundary conditions Open were taken into account. It is impossible to solve the problem analytically since it is represented by nonlinear differential equations with free variables. In order to solve these issues, an effective numerical technique was presented along with a completely stable implicit scheme with high-accuracy approximation, finite difference approach, and forward and backward sweep methods.

Global Warming & Climate change

Petrophysical Relationship Between Soil Moisture Content and Dielectric Permittivity for Wastewater Landfill Contaminated in Cherang Hangus Soil Using GPR

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Abstract. This study focuses on the dielectric permittivity of Cherang Hangus soil, a laterite type known for its water retention and landfill liner applications. By leveraging GPR data alongside empirical models, researchers aim to understand how moisture content influences dielectric permittivity, which is critical for managing wastewater migration in various soil types. The methodology involves simulating landfill conditions using a concrete tank filled with Cherang Hangus soil and solid waste, allowing for detailed monitoring of moisture and GPR scans. The study employs various regression models to predict dielectric permittivity based on moisture content, including linear, logarithmic, and polynomial approaches. Results indicate that more complex models, particularly the third-order polynomial, provide better accuracy in capturing the relationship between moisture content and dielectric permittivity, as evidenced by high R^2 0.9883 for 3rd order regression model for Cherang Hangus. The findings underscore the significance of soil composition in predicting dielectric permittivity, highlighting that the high gravel content in Cherang Hangus soil affects moisture retention and, consequently, the accuracy of empirical models.

Environmental Remediation



The Influence of Hydroxyapatite/Zinc Oxide Composite Synthesis Method on its Sorbent and Photodegradability Characteristics

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Abstract. The ZnO-hydroxyapatite nanocomposite was prepared by attrition in a planetary mill from hydroxyapatite (HA) and ZnO nanopowders. Their photocatalytic activity was assessed for the degradation of methyl orange (MO) under stirring and UV irradiations, and by measuring the spectroscopically UV-VIS absorbance of the solution, in order to determine the remanent dye concentration. The samples CZH3 (75% ZnO) and CZH4 (25% ZnO) highlighted the best MO retention from aqueous solution by adsorption and photodegradation effects. The nanocomposites showed a potential photocatalyst activity for wastewater treatment due to its high absorbance, photodegradation which facilitates the retention of both organic and heavy metal pollutants.

Environmental Remediation



Assessing the Photocatalytic Activity of ZnO/HA Composites

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Abstract. Wastewater treatment is crucial for the removal of pollutants and microorganisms from wastewater generated by human activities, but the traditional approach of treating contaminated water presents several drawbacks. A continuously developing solution is the use of materials with photocatalytic properties involving an advanced oxidation process (AOP) due to its efficiency in degrading pollutants without generating harmful byproducts. The development of these metal oxide nanoparticles in an economical, sustainable, and ecologically benign manner is the main challenge facing the entire planet. As a result, hydroxyapatite and zinc oxide were combined in different ratios to create composites that can be activated under solar radiation (UV). The photodegradation test findings indicated that this composite might be used in advanced oxidation procedures to break down organic contaminants in wastewater.

Environmental Remediation



The Potential of Algae-Based Nutrient Removal in Wastewater Treatment

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Abstract. Surface water quality has deteriorated in recent years due to the emerging pollutants from urbanization. In line with Sustainable Development Goals (SDG), adequate treatment is crucial to enhance the effluent discharges to the water bodies. Therefore, the potential of microalgae as phytoremediation, especially *Chlorella vulgaris*, in revolutionizing municipal wastewater treatment can be a substitute for the conventional method. Thus, this study aims to determine the percentage of pollutants in wastewater removed via microalgae. Effluent samples were taken from the wastewater treatment plant of Universiti Teknologi Mara, Dengkil, Selangor. The experiment was conducted in an aerated batch reactor with LED light to boost the algal growth. Microplastic has been inserted in the batch culture of microalgae to estimate the biodegradation process further. This research is a step towards a better understanding of the environmental and operational factors that can maximize the formation of algal biofilms and enhance the effectiveness of wastewater treatment. It also underscores the need for further research to optimize the concentrations and combinations of these additives for more efficient wastewater treatment.

Environmental Remediation



Biopolymer-Based Active Packaging: A Study on Physicochemical Properties and Antioxidant Effect of Semi-Refined Carrageenan-Reinforced Cellulose Nanofibers Infused with Eugenol

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Abstract. This work investigates the physicochemical and antioxidant effects of bio-based polymer films based on semi-refined carrageenan (SRC) plasticized with glycerol and enriched with eugenol to prevent lipid degradation in meat patties. Active films were formulated using 2% w/w semi-refined carrageenan (SRC), 0.9% v/v plasticized with glycerol, 10% v/v of cellulose nanofiber (CNF) as reinforcing agent and incorporated with 0.1 to 0.4% v/v of Eugenol (Eu). The wettability of the films were analyzed by using contact angle analysis and the weight loss were analysed by soil burial degradation that was performed for 4 weeks. Films were tested to determine swelling and transparency properties. The lipid degradation of meat patties was determined by Thiobarbituric reactive substance (TBARS). SGC-0.4%Eu films exhibited contact angle and swelling rate with 109.01° and 93.44% respectively. The development of lipid oxidation was delayed in the meat patties wrapped with antioxidant films during the storage with the final value of 0.768–0.844mg malondialdehyde/kg sample. Thus, the formulation of SGC-0.4%Eu used in packaging application was proven to be able to be used as an alternative packaging to improve the shelf life of food.

Environmental Remediation



Heavy Metal Contamination and Ecological Risk Assessment in Soils in the Area of the Temporary Municipal Solid Waste Landfills in the City of Botosani, Romania

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Abstract. This study presents the assessment of the ecological risk of soil contamination with heavy metals, respectively zinc (Zn), copper (Cu), cadmium (Cd), nickel (Ni), and lead (Pb) based on the con-tamination factor (CF), pollution load index (PLI), geoaccumulation index (Igeo), and ecological risk index factor (PERIF and ERIF) analyses from the area of the temporary municipal solid waste landfill in the city of Botosani, Romania. The order of occurrence of heavy metals measured in study soils followed the sequence of $Zn > Ni > Cu > Pb > Cd$. The CF for Cd, Cu, Ni, and Zn showed that the soil samples had moderate pollution. The average value obtained of the pollution index (PLI) < 1 indicate non-contamination with heavy metals in the investigated area. The mean values of Igeo for heavy metals followed the decreasing order of $Ni > Cu > Zn > Cd > Pb$. PERIF mean values for Cd, Cu, Ni, Pb, and Zn in all sampling sites were less than 30, indicating that these areas were slightly contaminated. ERIF for heavy metal ranged from 18.84 to 59.19 and in-dicates a low to moderate potential ecological risk in these areas.

GIS & Remote Sensing



Analysis of Vegetation and Land Cover Using the Soil Adjusted Vegetation Index (SAVI) Method

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Abstract. Jembrana Regency is one of the regencies in the Province of Bali and is located in the western part. Jembrana Regency has superior potential in plantation crop commodities, food crop sub-sector commodities, and horticultural crop commodity sub-sectors. In addition to its excellent potential, Jembrana Regency has a high population growth rate. High population growth will affect the rapid increase in infrastructure so that land conversion in the region can occur. Various technological advances in analyzing changes in land use can be used, one of which is remote sensing methods. Remote sensing methods have the advantage of analyzing large areas. One of the media used in remote sensing methods is Sentinel-2 Satellite Image Data. The Sentinel-2 data used is Sentinel-2A Level 2A data in 2022 and 2023. Analysis of vegetation and land cover uses the SAVI method. The results of SAVI's analysis of the data recording on 09 July 2022 showed that the total area in Jembrana Regency was dominated by the area of cover vegetation in the form of coconut plantations, mixed gardens and grassy vegetation of 42.22% (35878.85 Ha). The results of SAVI's analysis of the data recording on 15 May 2023 showed that the total area in Jembrana Regency was dominated by forested vegetation of 45.72% (38851.58 Ha). There is an increase in the area of open land settlements that are coated with asphalt or paving or asphalt roads from 2022 to 2023, namely from 1.58% (1345.44 Ha) to 1.89% (1609.60 Ha).

GIS & Remote Sensing



The Accuracy Verification of Recent Global Geopotential Model based on GNSS/Levelling Data on Ground Control Points in Johor

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Abstract. The external gravitational field of the Earth is mathematically represented using spherical harmonic (SH) coefficients in the global geopotential model (GGM). Hence, the appropriate global geopotential model (GGM) for a region needs to determine a reference surface that refers to geoid heights specific for coastal erosion, flood and many more. The aim of this study is to estimate the best global geopotential model (GGM) model in Johor region which is selected based on satellite only and combined model for the years 2018 until 2022. Next, the global geopotential models (GGMs) are verified with Global Navigation Satellite System (GNSS) levelling data based on root mean square deviation (RMSE) value in Johor region near coastal area. The findings found that EIGEN-GRGS.RL04. MEAN_FIELD has the lowest RMSE values that represent the highest accuracy with 0.1911m than the other models in their respective categories and represent the best adjustment model. In conclusion, the global geopotential model (GGM) is the most suitable used as a reference for future studies in Johor region from the satellite-only model of EIGEN-GRGS.RL04.MEAN_FIELD with the degree and order 300 compared to other models.

GIS & Remote Sensing



Environmental Noise Mapping : GIS-Based Study of Urban Industrial Zones and Traffic Areas

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Abstract. Urbanization and industrialization present significant challenges to public health, particularly in managing environmental noise pollution. This study addresses the critical issue of noise pollution at the study area by developing a comprehensive noise map that encompasses industrial zones, construction sites, and areas with heavy traffic. Utilizing ArcGIS modeling software, the research visualizes the spatial dynamics of noise pollution, resulting in a detailed map that represents noise levels throughout the area. The analysis reveals that noise levels during weekday peak hours average 70.5 dBA, markedly higher than the 65.5 dBA average recorded during weekend peak hours. During weekdays morning peak, noise levels indicate three monitoring points in the red zone, two in the yellow zone, and five in the green zone. Notably, noise levels at all ten monitoring locations during weekdays peak hours exceeded the maximum permissible sound level of 60 dBA set by the Department of Environment for residential and commercial areas. These findings contribute to the development of targeted noise mitigation strategies and serve as a valuable resource for environmental authorities, policymakers, and urban planners. This research underscores the importance of a comprehensive approach to addressing environmental noise pollution and provides a practical framework for urban areas facing similar challenges.

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