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4th Global Summit on

ADVANCES IN EARTH SCIENCE AND CLIMATE CHANGE

Virtual Event

SEP 29-30-OCT 01, 2025

ADV. ESCC 2025

SCIENTIFIC PROGRAM

DAY 01

MONDAY

SEPTEMBER 29, 2025

BST - BRITISH SUMMER TIME (UK TIME)

06:15-06:30	**Welcome Note**

Topics: Earth Science | Climate Change | Ecology | Geology | Environmental Science | Soil Science | Recycling | Renewable Energy | Green Energy | Hydrology | Pollution Control | Biodiversity | Remote Sensing | Atmospheric Chemistry | Natural Hazards | Oceanography | Climate Change Mitigation Strategies | Climate Education and Outreach

Distinguished Speaker Talks

06:30-06:50	Title: Scenario-Based Assessment of Carrying Capacity and Stocking Density to Inform Smart Grazing Strategies in Mongolia **Qinxue Wang,** *Regional Environment Conservation Division, National Institute for Environmental Studies, Japan*
06:50-07:10	Title: Developing a Disaster Resilience and Adaptation Assessment Framework for Vulnerable Island Communities: An Importance–Performance Approach **Bih-Chuan Lin,** *Da-Yeh University, Taiwan*
07:10-07:30	Title: Investigating the Transformation and Development of Traditional Markets Through Community Cohesion: A Case Study of the Nanhmen Traditional Market in Changhua **Ling-Jia Luo,** *Da-Yeh University, Taiwan*
07:30-07:50	Title: Empowering People, Driving Micro-Innovation: Corporate Transformation for Resilient Energy Performance in Indonesia's State Electricity Company **Laila Refiana Said,** *Lambung Mangkurat University, Indonesia*
07:50-08:10	Title: Analyzing Methane Emissions for Mumbai City using TROPOMI Data from Sentinel-5P Satellite and Sustainable Strategies for Control of Methane Gas Emissions **Vikas B. Varekar,** *Veermata Jijabai Technological Institute (VJTI), India*
08:10-08:30	Title: Impact on Human Error, Environmental Factors and Equipment Failure on Mine Accidents: A Case Study in India **Bijay Mihir Kunar,** *National Institute of Technology Karnataka Surathkal, India*

08:30-08:50	Title: Global Trade and Food Security: Navigating Economic Imperatives in a Changing Climate **Sukanya R.,** *CHRIST (Deemed to be University), India*
08:50-09:10	Title: Addressing Water and Wastewater Issues in India: From Resource Assessment to Innovative Management **Shilpa Saha,** *Jadavpur University, India*
09:10-09:30	Title: Emerging Threat of Bluetongue Disease in Ruminants of Eastern and North-Eastern Indian States *vis-á-vis* Changing Climate Scenario **Siddhartha N. Joardar,** *West Bengal University of Animal & Fishery Sciences, India*
09:30-09:50	Title: Assessing Ecological Status and Management Practices of Renuka Wetland a Ramsar Site in India **Deevena Elias,** *Forest Research Institute, India*
REFRESHMENT BREAK 09:50-10:00	
10:00-10:20	Title: Water Hyacinth and Wellbeing of Rural Women in Kerala: A Study of Gender and Nature from a Regenerative Ecosystem Perspective **Ganga. P. Sreenivasan,** *The Gandhigram Rural Institute- Deemed to be University, India*
10:20-10:40	Title: Legally Induced Erosion of Traditional Practices of the Forest Dwellers in Assam, India and its Impact on Sustainable Forestry **Jayanta Boruah,** *Central University of Karnataka, India*
10:40-11:00	Title: Synthesis of Biogenic Nanoparticles and its Application in Water-Based Drilling Fluids **Borkha Mech,** *Dibrugarh University, India*
11:00-11:20	Title: The Formation of Scientific Forestry in Colonial India: The People, Land and the Forests **Sandip Munshi,** *BITS Law School, India*
11:20-11:40	Title: Optimal Temperature Regime for Wheat Growth in the Ukrainian Steppe **Petro Hrytsiuk,** *The National University of Water and Environmental Engineering, Ukraine* **Maryna Nehrey,** *Collegium Helveticum, Switzerland*
11:40-12:00	Title: Intelligent Systems and the Metaverse Renewable Energy Trading: An Open Innovation Modelling Approach **Eleni G. Makri,** *Unicaf, Cyprus*

12:00-12:20	Title: Modification of Grinding Aids: Assessment of Energy Efficiency, Environmental Impacts, and Early-Age Mechanical Performance **Veysel Kobya,** *Uludağ University, Turkey*
12:20-12:40	Title: Simple ODE Models for Interactions of Nature and Society **Marino Badiale,** *Università di Torino, Italy*
12:40-13:00	Title: Novel Concept and Technologies of Sustainable Building Design **Juergen Reichardt,** *MSA | Muenster School of Architecture, Germany*
LUNCH BREAK 13:00-13:30	
13:30-13:50	Title: Plant Breeding Objectives that Address Climate Change Challenges **Patrick Olweny Ayiecho,** *Maseno University, Kenya*
13:50-14:10	Title: Towards the Realisation of Green Infrastructure Projects in Ghana: A Fuzzy Evaluation and Gini Indexation of Key Drivers for Sustainable Resource and Waste Management **Joseph Ignatius Teyey Buertey,** *Pentecost University, Ghana*
14:10-14:30	Title: Design Education: Learning in the Context of Societal Challenges **Carla Cadete,** *Lusófona University, Portugal*
14:30-14:50	Title: Fading Ground: Assessing Soil Degradation and Its Drivers in the Mediterranean Basin **Carla Sofia Santos Ferreira,** *Research Center for Natural Resources, Environment and Society (CERNAS), Polytechnic University of Coimbra, Portugal*
14:50-15:10	Title: Combination of the First and Second Law of Thermodynamics to Assess Environmental Buildings Aiming at Achieving a more Inclusive Environment **Carlos Eduardo Keutenedjian Mady,** *Institute of Energy and Environment of the University of São Paulo, Brazil*
15:10-15:30	Title: Estimation of Raindrop Characteristics for Damage Prevention in Offshore Wind Projects **Karine dos Santos Rodrigues,** *Foundation for Technological Development in Engineering (FDTE), Brazil*
15:30-15:50	Title: Fashion, Textiles and Design for Sustainability: Relationships Mediated by UN Intergovernmental Guidelines and Reviewed in the Context of COP30 in Brazil **Márcia Bergmann,** *Pontifical Catholic University of Rio de Janeiro, Brazil*

15:50-16:10	Title: Modeling a Century of Climate Change: Random Walk with Drift in Earth's Temperature Trends **John Wang,** *Montclair State University, USA*
REFRESHMENT BREAK 16:10-16:20	
16:20-16:40	Title: Climate Change, Truth, and Nonhuman Animals **Michael Allen,** *East Tennessee State University, USA*
16:40-17:00	Title: Generation of Monthly Flows in the Ica River Basin up to the La Achirana Hydrometric Station using the GR2M Precipitation-Runoff Model **Angel Gabriel Ochante Sanchez & Diego Fermin Jonislla Rojas,** *Universidad Privada del Norte, Peru*
17:00-17:20	Title: Energy Optimal Speed Profiles for a Differential Drive Mobile Robot with Payload **Mauricio Fernando Jaramillo Morales,** *Universidad Autónoma de Manizales, Colombia*
17:20-17:30 (E-Poster)	Title: Study of Plastic Waste on the Surface and Soil of a Stream Bank in Argentina **Grigera Paladino Agustina,** *Universidad Nacional del Centro de la Provincia de Buenos Aires (UNCPBA), Argentina*
NETWORKING	
End of Day 1	

SCIENTIFIC PROGRAM

DAY 02

TUESDAY

SEPTEMBER 30, 2025

BST - BRITISH SUMMER TIME (UK TIME)

06:15-06:30	**Introduction**

Topics: Earth Science | Climate Change | Ecology | Geology | Environmental Science | Soil Science | Recycling | Renewable Energy | Green Energy | Hydrology | Pollution Control | Biodiversity | Remote Sensing | Atmospheric Chemistry | Natural Hazards | Oceanography | Climate Change Mitigation Strategies | Climate Education and Outreach

Distinguished Speaker Talks

06:30-06:50	Title: Post-Conflict Economic Recovery and Land Policy in South Korea between 1948 and the Early 1960s **Jungho Park,** *Cheongju University, South Korea*
06:50-07:10	Title: Exploring the Immeasurable Perceptual Dimensions in Louis Kahn's Geometric Spatial Compositions **Pin-Yin Liu,** *Da-Yeh University,Taiwan*
07:10-07:30	Title: Recent Developments of 3R Activities in Indonesia **Endiarjati Dewandaru Sadono,** *Asian Institute of Technology, Thailand*
07:30-07:50	Title: Rights and Resilience: Building a Framework for Indigenous Empowerment **Sarthak Goel,** *School of Planning and Architecture, India*
07:50-08:10	Title: Challenges and Solutions for Water Security and Availability in South America **Navjot Hothi,** *UPES, India*
08:10-08:30	Title: Tracking Plastic Pollution from Land to River along the Ganga Basin **Ekta Sharma,** *Ganga Aqualife Conservation Monitoring Centre, Wildlife Institute of India (GACMC, WII), India*
08:30-08:50	Title: Harnessing the Potential of Millet-Based Microbes: A Sustainable Path for Health and Wellness **Kiran Kumar Mudnakudu-Nagaraju,** *JSS Academy of Higher Education & Research, India*

08:50-09:10	Title: Climate-Resilient Infrastructure and Land use Planning: Synergies for Sustainable Urban Transformation **Aditya Singh,** *Amrita Vishwa Vidyapeetham, India*
09:10-09:30	Title: Material Testing Parameters as a Catalyst for Achieving Sustainable Development Goals **Sunil Kumar Hemanth M,** *Noorul Islam Centre for Higher Education, India*
09:30-09:50	Title: Characterization of Driving Dynamics and Real-World Emissions in Heavy-Duty Vehicles Considering Load-Dependent Variability **Saket Ranjan,** *Indian Institute of Technology Madras, India*
REFRESHMENT BREAK 09:50-10:00	
10:00-10:20	Title: Water Scarcity – Judicial Responses to the Disaster in Making **Priya A Sondhi,** *Sushant University, India* **Anoop Kumar,** *Central Bureau of Investigation, India*
10:20-10:40	Title: How to Benefit From Halophyte Plants Under Global Climate Change? The Road to Using Potential of Salt Tolerant Barley Species to Increase Salinity Tolerance of Rice **Vadim Volkov,** *K.A. Timiriazev Institute of Plant Physiology, Russian Academy of Sciences, Russian Federation*
10:40-11:00	Title: European Baykal and Landscape Society **Nataliya Pozhidaeva,** *The National landscape salvation fund (NLSF) & the International Informatization Academy of the General and Consultative Status of the ECOSOS UN, Russia*
11:00-11:20	Title: (Re-)Circulation of Timber from an Architectural Perspective: A Review of Design Strategies, Opportunities and Challenges **Rafael Novais Passarelli,** *Hasselt University, Belgium*
11:20-11:40	Title: The Challenge of Reducing the Extreme Dependency of Some CRM on Some Suppliers in Spain after the 2024 European Critical Raw Materials Act **Macarena Larrea Basterra & Stephanía Mosquera López,** *University of Deusto, Spain*
11:40-12:00	Title: Integrating Circular Economy Principles in Business Strategies: A Policy-Driven Approach **Williams Chibueze Munonye,** *Linkoping University, Sweden*
12:00-12:20	Title: Higher Order Circularity Strategies in Wastewater Treatment: A Case Study from Vernacular Settlements of Sri Lanka **Kappina Kasturige Kamani Sylva,** *University of Peradeniya, Sri Lanka*

12:20-12:40	Title: The Role and Status of Natural Resources (Mineral, Energy, and Water Resources) in Iran **Mansour Ghorbani,** *Shahid Beheshti University, Iran* **Mohammad Aria Amini,** *Golestan University, Iran*
12:40-13:00	Title: Assessment of Amine-Based Grinding Aids in Terms of Grinding Efficiency, CO_2 Emissions and Environmental Impact **Veysel Kobya,** *Uludağ University, Turkey*
LUNCH BREAK 13:00-13:30	
13:30-13:50	Title: Advancing Sustainability in Fashion Accessories: A Circular Economy Approach **Josephine Aboagyewaa-Ntiri,** *Akenten Appiah-Menka University of Skills Training and Entrepreneurial Development, Ghana*
13:50-14:10	Title: Exploring the Potential of CRMs for Green Transition in Ancient Mine Sites: An Example from Graphite Mines and Granite Quarries of Italian Alpine District **Licia Santoro,** *Università degli Studi di Torino, Italy*
14:10-14:30	Title: *Faber* 4.0: Innovation, Digitalization and Circularity in the Wood-Furniture Sector **Marina Block,** *University of Naples Federico II, Italy*
14:30-14:50	Title: Study of the Relationship between Annual and Extreme Daily Rainfalls in Algeria **Abdelhadi Ammari,** *LGEE. Ecole Nationale Supérieure de l'Hydraulique (ENSH), Algeria*
14:50-15:10	Title: IoT Tank Level Measurement Device for Improving Water Distribution System Operation **Maressa Brandão Ribeiro,** *UFCG, Brazil*
15:10-15:30	Title: Development of Phytoproducts from Agave sisalana Waste Extract **Lucinéia dos Santos,** *São Paulo State University-UNESP, Brazil*
15:30-15:50	Title: Automating Post-Disaster Image Classification for Enhanced Damage Assessment **Sun Ho Ro,** *AEOM, USA*

15:50-16:10	Title: Adoption of Reusable Transit Packaging in US Industries: A Framework for Enhanced Sustainability **Ivan Kudrenko,** *Charleston, USA* **Lindsey Hall,** *Topsham, UK*

NETWORKING

End of Day 2

SCIENTIFIC PROGRAM

DAY 03

WEDNESDAY

OCTOBER 01, 2025

BST - BRITISH SUMMER TIME (UK TIME)

06:00-06:10	**Introduction**

Topics: Earth Science | Climate Change | Ecology | Geology | Environmental Science | Soil Science | Recycling | Renewable Energy | Green Energy | Hydrology | Pollution Control | Biodiversity | Remote Sensing | Atmospheric Chemistry | Natural Hazards | Oceanography | Climate Change Mitigation Strategies | Climate Education and Outreach

Distinguished Speaker Talks

06:10-06:30	Title: Indicators to get you Home **Francis Hubbard,** *Independent Researcher, New Zealand*
06:30-06:50	Title: The Food Crisis in the New Cold War Era and Korea's Response focusing on Food Recycling and Waste Management **Cherl-Ho Lee,** *Korea Food Security Research Institute, Korea University, Republic of Korea*
06:50-07:10	Title: Analyzing Prefabricated Architecture in the Planning of Old Urban Spaces **Kai-Hong Lin,** *DaYeh University, Taiwan*
07:10-07:30	Title: Innovative Timber Architecture: Spatial and Structural Exploration of Shigeru Ban's Works **Yi-Chun Liu,** *Da-Yeh University, Taiwan*
07:30-07:50	Title: Textile Circularity and Planetary Boundaries: Aligning Industry with Europe's Green Transition **Purvi Zaveri,** *Biocare Research (I) Pvt. Ltd., India*
07:50-08:10	Title: Sugarcane Bagasse Valorization for Pesticide Removal from Aqueous Environments **Ashish Kapoor,** *Harcourt Butler Technical University, India*
08:10-08:30	Title: Understanding Consumer Sentiments towards Two-Wheeler Electric Vehicles: Implications for Organizational Sustainability and Corporate Social Responsibility **Sachin Balwantrao Deshmukh,** *MIT World Peace University, India*
08:30-08:50	Title: Patliputra to Patna: Evolution of a Historic City into a Smart City **Rashmi Sharma & Tanvi Ranjana,** *Banasthali Vidyapith, India*

08:50-09:10	Title: Pteridophytes in Phytoremediation and Environmental Sustainability **Nishika Jaishee,** *The University of Burdwan, India*
09:10-09:30	Title: Red King Crab as a Source of Unique Enzymes: Prospects for Waste Processing **Evgeny Sogorin,** *Institute of Biological Instrumentation of Pushchino Scientific Center for Biological Research RAS, Russia*
09:30-09:50	Title: Investigation of Geodynamic Factors Impacted on Radon Emission using a Radiometric System with AI **Azad Bayramov,** *Republican Seismic Survey Center of the Azerbaijan National Academy of Sciences, Azerbaijan*
REFRESHMENT BREAK 09:50-10:00	
10:00-10:20	Title: Investigations of Paraffin Deposition Processes and Development of the Methods to Improve Rheological Parameters of Highly Waxy Oils **Boranbayeva Laura Yergaliyevna,** *Institute of Metallurgy and Ore Beneficiation, Kazakhstan*
10:20-10:30 (E-Poster)	Title: Sustainable Strategies in Traditional Riyadh Housing **Nouf Alaqeel,** *Prince Sultan University, Saudi Arabia*
10:30-10:50	Title: Hydrological Regimes under Future Land use and Climate Change: A Study for Three Watersheds in Iran **Mostafa Naderi,** *Institute for Advanced Studies in Basic Sciences (IASBS), Iran*
10:50-11:10	Title: Impact of Climate Change on the Herpetofauna of Europe: Assessment and Forecasting Using GIS Modelling and Artificial Intelligence **Oksana Nekrasova,** *I.I. Schmalhausen Institute of Zoology of National Academy of Sciences of Ukraine, Ukraine*
11:10-11:30	Title: Impact of Water Temperature on Chemicals Migration from Bottom Sediments under Experimental Conditions **Zhezherya Tetiana,** *Ukrainian Hydrometeorological Institute of the State Emergency Service of Ukraine | National Academy of Sciences of Ukraine, Ukraine*
11:30-11:50	Title: Proposed Study Design for Map-Based Approach to Flood Risk Assessment in Bwaise III in Kampala City, Uganda: An Indicator Approach **Yawe Samuel,** *Rakai District Local Government, Uganda*
11:50-12:10	Title: Zimbabwe's Economy: Four Decades in Perspective (1980-2020) **Kenneth Mahuni,** *University of Mauritius, Mauritius*
12:10-12:30	Title: Developing Relationships for Hydrological Drought Characteristics by Copula Functions **Ibrahim Halil DEGER,** *Hasan Kalyoncu University, Turkey*
12:30-12:50	Title: Integration of Earthen Materials in the Lebanese Construction Industry **Yathreb Sabsaby,** *Beirut Arab University, Lebanon*

LUNCH BREAK 12:50-13:20	
13:20-13:40	Title: Trade-offs between Lean, Green and Agile Practices and their Impact on Environmental and Operational Performance **Akram EL KORCHI,** *IBN ZOHR University, Morocco*
13:40-14:00	Title: Phosphate Glass Electrolytes for Solid-State Lithium-Ion Batteries: A bibliometric Analysis **Hicham Es-soufi,** *National Higher School of Chemistry (NHSC), Ibn Tofaïl University, Morocco*
14:00-14:20	Title: Assessing Landslide Risks and Vulnerabilities in Ghana: A Geospatial Modeling Approach **Julia Quaicoe,** *University of Cape Coast, Ghana*
14:20-14:40	Title: Lifecycle Engineering of Laser Beam Manufacturing Systems for EV Fuel Cells: Driving Cost Savings and Operational Efficiency in Production **Joseph Teye Ignatius Buertey,** *Pentecost University, Ghana*
14:40-15:00	Title: Population Changes and Primary Healthcare Delivery in Ebonyi State, Nigeria **Agatha Arochukwu,** *National Population Commission, Nigeria*
15:00-15:20	Title: Artificial Floating Islands Planted with Polypogon monspeliensis for Phytoremediating Rooftop Rainwater in the SemiArid Urban Area of Tunis (Tunisia) **Soulwene KOUKI,** *Water Researches and Technologies Center (CERTE), Laboratory of Treatment and Valorization of Wastewater, Tunisia*
15:20-15:40	Title: Features of use of the Seismic Isolation Systems in the Conditions of Permafrost Melting **Alexander A. Bubis,** *V.A.Kucherenko of JSC RCC, Russian Federation*
15:40-16:00	Title: Innovative Design Solutions for Sustainable Development of Urban Agriculture by Ecofeminism Perspective **Jing Ruan,** *Nanhai Academy of art at Haikou University of Economics, China*
NETWORKING	

End of Day 3

ADV. ESCC 2025

DAY 01

4th GLOBAL SUMMIT ON

ADVANCES IN EARTH SCIENCE AND CLIMATE CHANGE

SEP 29-30-OCT 01, 2025

DISTINGUISHED SPEAKER TALKS

Scenario-Based Assessment of Carrying Capacity and Stocking Density to Inform Smart Grazing Strategies in Mongolia

Qinxue Wang, Tadanobu Nakayama and **Tomohiro Okadara**

Regional Environment Conservation Division, National Institute for Environmental Studies, Japan

Mongolia's grasslands, which comprise over 70% of the national territory, are integral to both regional climate regulation and pastoral livelihoods. However, these ecosystems are increasingly degraded due to climate-induced aridification, overgrazing, and unsustainable land use. This study presents a scenario-based assessment of Carrying Capacity (CC) and Relative Stocking Density (RSD) across Mongolia's rangelands, offering science-based insights to support climate-resilient grazing strategies.

We developed an integrated modeling framework combining high-resolution climatic, ecological, and socio-economic datasets to estimate CC and RSD at the Soum (district) level between 2000 and 2019. Results show stark spatial variability: northern regions sustain high CC values (up to 2.8 Sheep Units [SU]/ha), while southern arid areas, such as the Gobi, drop to as low as 0.3 SU/ha. Approximately 38.8% of the territory remains within sustainable thresholds (CC > 1.0 SU/ha), whereas 41.7% falls below 0.5 SU/ha, signaling heightened vulnerability to desertification. The national average RSD is 1.07, with local hotspots overstocking near Ulaanbaatar.

We further evaluated adaptation scenarios—including rotational grazing, improved pasture access, and climate-smart mobility systems—that aim to reduce ecological stress while enhancing adaptive capacity. The findings highlight the importance of aligning livestock intensity with ecosystem thresholds under projected climate change scenarios.

This research contributes to Earth system science by linking land-use dynamics, bioclimatic stressors, and anthropogenic drivers in dryland ecosystems. It offers a robust decision-support tool for land managers and policymakers to promote sustainable, climate-adaptive rangeland governance and aligns with the Sustainable Development Goals and Land Degradation Neutrality targets.

Biography

Dr. Qinxue Wang is a Specially Appointed Researcher at Japan's National Institute for Environmental Studies (NIES) with over 30 years of experience in environmental science. His expertise spans ecosystem modeling, climate change impacts, water resources management, and environmental vulnerability assessment across East Asia. Dr. Wang integrates advanced tools such as GIS, remote sensing, and process-based models to evaluate permafrost degradation, grassland sustainability, and hydrological dynamics. He has published more than 100 peer-reviewed articles and led numerous international research collaborations, including projects in Mongolia, China, and Japan. His work supports evidence-based policymaking for climate adaptation and sustainable land use. Dr. Wang has received multiple honors, including Japan's "Frontier Researcher Award" and Mongolia's "Distinguished Scientist Award, " in recognition of his scientific contributions and commitment to regional cooperation.

Developing a Disaster Resilience and Adaptation Assessment Framework for Vulnerable Island Communities: An Importance–Performance Approach

Bih-Chuan Lin

Assistant Professor, Department of Architecture and Interior Design /Graduate School of Architecture, Da-Yeh University, Taiwan

Amid the accelerating impacts of global climate change, small island communities face increasing exposure to extreme weather events and natural disasters. Their geographical isolation, limited infrastructure, and constrained emergency response capabilities make them particularly susceptible to disaster-related risks. This study addresses these vulnerabilities by proposing a comprehensive assessment framework for disaster resilience and adaptation tailored to the unique needs of isolated island communities in Taiwan.

Employing the Importance–Performance Analysis (IPA) method, this research evaluates critical factors influencing community-level disaster preparedness and adaptive capacity. A structured survey was conducted among local residents to assess key dimensions, including risk perception, earthquake knowledge, disaster prevention skills, and the role of community networks and information platforms. Among all attributes, residents' understanding of evacuation protocols and access to emergency shelters emerged as the most crucial, with a mean importance score of 4.8 (on a 5-point scale).

The findings reveal significant performance gaps in specific disaster adaptation measures, underscoring the need for targeted policy interventions and capacity-building initiatives. The proposed framework integrates disaster risk reduction with community engagement strategies, offering a practical tool for local governments and planners to enhance the effectiveness of disaster adaptation efforts in island regions.

This study contributes to the growing body of knowledge on climate resilience by presenting a context-sensitive, community-centered framework that addresses the systemic limitations of vulnerable island areas. It offers actionable insights for improving local disaster management strategies and serves as a foundation for future research and policy develop-

ment aimed at strengthening resilience in high-risk, resource-constrained environments.

Biography

Education

- 202306- Institute of Natural Resources and Environment Studies, National Dong Hwa University, Ph.D. Degree.
- 2007-2009 National Cheng Kung University, National Cheng Kung University, Institute of Architecture, Ph.D. Candidate.
- 2000-2004 Kansas State University, School of Architecture, Landscape and Interior, Master of Architecture.
- 1997-1999 Tamkang University, Bachelor of Architecture.

Experience

- 202309-present Assistant Professor, Department of Architecture and Interior Design /Graduate School of Architecture, Da-Yeh University, Taiwan.
- 2015-2023 Jingsi Temple and Tzu Chi Charity Association Architecture (architecture, environmental landscape, interior and overseas clubhouse design).
- 2013-2015 Tzu Chi Charity Foundation Building Planning and Design (including domestic and overseas design).
- 2010-2012, University Visiting Lecturer.
- 2007-2009, Conducted community cultural reproduction planning, General Mansion, Tainan, research on ecological conservation and restoration of Platalea minor.
- 2005-2007 CECI Engineering Division, Design MRT Station to Taoyuan Airport A5.6 two stations, Nanke Healthy Living Museum, First Cosmetics Company Headquarters, Nice Group Development, and so on.
- In 2005, Lecturer at the University Institute of Architecture.
- 2001-2004 K-State University School of Architectural Landscape Interiors - TA & RA.
- 1995-2000 Architectural Designers.

Investigating the Transformation and Development of Traditional Markets Through Community Cohesion: A Case Study of the Nanhmen Traditional Market in Changhua

Ling-Jia Luo[1] and **Bih-Chuan Lin**[2]

[1]Master Student, Graduate School of Architecture, Da-Yeh University, Taiwan
[2]Assistant Professor, Graduate School of Architecture, Da-Yeh University, Taiwan

Traditional markets serve as centers of commerce and vital hubs for community cohesion and cultural continuity. Amidst the growing impact of modern commercial models and evolving consumer behaviors, traditional markets worldwide face unprecedented transformations and challenges. This study investigates the Changhua Nanmen Traditional Market in Taiwan, aiming to explore how market transformation and development can reconstruct community cohesion and stimulate local engagement under the dual pressures of globalization and modernization.

The research first reviews the role and value of traditional markets within communities, followed by an in-depth analysis of the challenges and opportunities faced by the Nanmen market. Utilizing a mixed-methods approach, including literature review, case study analysis, field observation, and spatial design strategies, the study proposes a culturally grounded and community-responsive framework for market renewal. Findings suggest that traditional markets can be revitalized as economic centers and dynamic platforms for cultural exchange and social interaction.

The study offers practical recommendations, including strengthening community service functions, enhancing environmental quality and consumer experience, and promoting collaboration between markets and local communities. These insights provide theoretical foundations and actionable strategies for traditional market transformation and offer replicable experiences for similar communities.

Biography

Ling-Jia Luo is a graduate student at the Graduate School of Architecture at Da-Yeh University in Taiwan. She has a major in interior design but has developed a strong interest in community development and planning, leading her to research this field. Additionally, she is skilled in participating in relevant discussions and thoughtful reflections.

Empowering People, Driving Micro-Innovation: Corporate Transformation for Resilient Energy Performance in Indonesia's State Electricity Company

Laila Refiana Said[1], Adriansyah Ekosaputro[1] and **Hanifah Hanifah[2]**

[1]Lambung Mangkurat University, Indonesia
[2]Institut Bisnis dan Teknologi Kalimantan, Indonesia

Indonesia has achieved near-universal electricity access, reaching 99.79% of households by 2023. Nevertheless, Indonesia's State Electricity Company (PT PLN) faces persistent challenges, including frequent power outages, prolonged outage durations, dependence on coal-based generation, and heightened vulnerability to extreme weather events. While infrastructure expansion remains important, resilience in the power sector ultimately depends on people. The competence and adaptability of PLN's workforce, the quality of leadership, and an organisational culture that fosters accountability and innovation are essential for reliable service and long-term sustainability.

This study investigates the role of psychological empowerment in promoting resilience, focusing on how autonomy, recognition, and confidence enable frontline employees to initiate micro-innovation, defined as small but practical improvements in daily work. Data were collected from 99 frontline technical staff through a structured survey, and the relationships were tested using structural equation modelling.

The results (Table 1) indicate that empowerment enhances the likelihood of micro-innovation, which subsequently improves organisational performance through faster response times and higher service quality. However, empowerment does not directly increase performance; it operates indirectly by facilitating innovation.

Table 1: Path coefficient values of the structural model for direct effects.

Indicator	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T-Statistics (|O/STDEV|)	P-Value
MI->BP	0.452	0.451	0.177	2.551	0.011
PE->BP	0.052	0.048	0.155	0.336	0.737
PE->MI	0.680	0.680	0.085	7.963	0.000
PE->MI	0.680	0.680	0.085	7.963	0.000

The contribution of this study lies in advancing human-centred strategies as a complement to technical and infrastructure-based approaches. By strengthening empowerment and supporting micro-innovation, utilities can build resilience that is cost-effective, scalable, and adaptive to climate uncertainty. For policymakers and industry leaders, the findings underscore that sustainable resilience requires not only technology and capital but also the creativity and problem-solving capacity of the workforce.

Biography

Professor Laila Refiana Said is a faculty member at the Faculty of Economics and Business at Lambung Mangkurat University, Indonesia. She earned her Bachelor's degree from Gadjah Mada University, her Master's degree from the University of Indonesia, and her Ph.D. in Management from the University of Western Australia. Her academic expertise spans research methodology, consumer behavior, digital transformation, and sustainable development. She has published in international journals indexed by Scopus and Web of Science, contributing both theoretical insights and practical applications in management and social sciences. Beyond academia, Professor Said serves as the Head of International Affairs at the Indonesia National Council on Social Welfare, where she develops and strengthens global partnerships in social policy and community development. She is an active reviewer for leading international journals and frequently presents at global conferences. Passionate about mentoring, she continues to guide emerging scholars and foster cross-disciplinary collaborations for sustainable progress.

Analyzing Methane Emissions for Mumbai City using TROPOMI Data from Sentinel-5P Satellite and Sustainable Strategies for Control of Methane Gas Emissions

Vikas Varekar[1], Kiran Kamat[2] and **Anil Sawant[2]**

[1]Assistant Professor, Department of Civil and Environmental Engineering, Veermata Jijabai Technological Institute (VJTI), India
[2]Research Scholar, Department of Civil and Environmental Engineering, Veermata Jijabai Technological Institute (VJTI), India

Urban centers are significant contributors to greenhouse gas (GHG) emissions, with solid waste management systems playing a pivotal role. Metropolitan cities like Mumbai, India, face the dual challenge of catering to a large population while simultaneously generating considerable GHG emissions. Satellite-based methane emission analysis is an emerging technique that offers effective remote assessment of such emissions. However, no prior research has utilized this approach specifically for Mumbai, highlighting the need to explore its application in estimating urban GHG emissions.

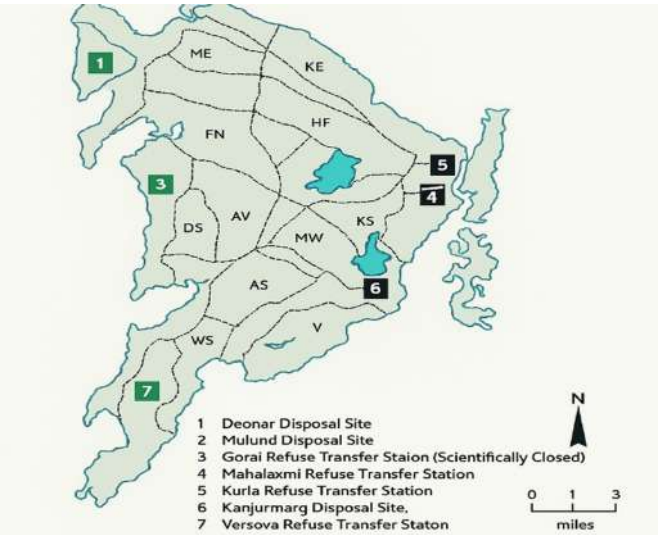

Figure : Mumbai city with locations of Municipal Solid Waste dumping sites

TROPOMI provides XCH_4 (column-averaged dry-air mole fractions of methane) data with a precision of approximately 1–2% and a spatial resolution of 7 × 7 km^2 (post-2020). Average XCH_4 concentrations over urban India typically range from 1930–1950 ppb (Lorente et al., 2021; Schneising et al., 2020). In Mumbai, methane emissions originate from sectors such as water and wastewater treatment, transportation, electricity generation, and landfill operations. These sector-wise estimates form Mumbai's inventory-based methane emission profile. A comparison of satellite-based observations and inventory-based estimates is provided below:

Source	CH_4 Concentration (XCH_4)	Notes
TROPOMI Observation (2022 Avg)	~1930–1950 ppb	Sentinel-5P data for Mumbai region (ESA, 2022)
Inventory-Based Estimate	1944.45 ppb	Based on sectoral emissions and column calculations

The satellite-based and inventory-based estimates show close agreement, with a variation of only 0.2% between the average TROPOMI-derived value and the sector-based emissions. This validates the reliability and novelty of using satellite data for methane emission analysis, which can be further leveraged for decision-making and policy formulation.

Based on national and international guidelines, sector-specific mitigation scenarios were developed to reduce emissions. The following table summarizes the potential reductions and their atmospheric impact:

Sector	Current Emissions (tons/year)	Sustainable Strategies	Reduction (%)	Reduced Emissions (tons/year)	Reduced Emissions (ppb)
Water Treatment	2, 810.50	Anaerobic digesters, bio-covers, improved aeration (IPCC, 2019; USEPA, 2022)	45%	1, 545.78	≈ 0.38
Waste Water Treatment	2, 246.80	UASB reactors, biogas recovery, decentralized systems (UNEP, 2021; IPCC, 2006)	50%	1, 123.40	≈ 0.28
Transportation Sector	74, 964.82	Electric/CNG vehicles, public transport, NMT, traffic optimization (IEA, 2023; MoEFCC, 2020)	35%	48, 726.13	≈ 12.0
Electricity Generation	58.77	Renewables, rooftop solar, net metering (MNRE, 2023; IPCC, 2021)	55%	26.45	≈ 0.01
Landfill Operations		Gas recovery, composting, WtE, segregation (USEPA, 2021; CPCB, 2022)	50%	51, 100.00	≈ 12.48
Total	1, 82, 280.89		~40%	1, 02, 521.76	≈ 25.15

These findings underscore the urgent need for policy interventions and technological upgrades across multiple sectors to achieve significant reductions in urban GHG emissions. This study presents a data-driven framework that can assist urban environmental planners and policymakers in identifying emission hotspots and implementing targeted, sustainable solutions.

Biography

Dr. Vikas B. Varekar earned his Ph.D. from the Indian Institute of Technology Bombay (IITB), Mumbai, India, in 2016. He is currently an Assistant Professor in the Department of Civil and Environmental Engineering at Veermata Jijabai Technological Institute (VJTI), formerly known as Victoria Jubilee Technological Institute (established in 1887), Matunga, Mumbai, India. His research interests encompass a wide range of environmental and civil engineering topics, including Environmental Management, Sustainable Development, Environmental Monitoring, Solid Waste Management, Water and Wastewater Treatment, Air Pollution and Control, GIS and Remote Sensing Applications in Environmental Engineering, Urban Water Resilience etc. Dr. Varekar has an impressive academic and research record, with over 70 publications in reputed journals, book chapters, and international and national conference proceedings. He also serves as a reviewer for leading journals in environmental engineering, including the Journal of Environmental Management (Elsevier).

Impact on Human Error Environmental Factors and Equipment Failure on Mine Accidents: A Case Study in India

Bijay Mihir Kunar[1], Mangalpady Aruna[1] and **Mohit Bekal Kar[2]**

[1]National Institute of Technology Karnataka Surathkal, India
[2]National Institute of Technology Calicut, India

This paper presents a study using the Data Analytics Process (DAP) to understand and prioritize the accidents that have occurred in the Indian mining industry. The data for the study was collected from accident reports submitted to the Directorate General of Mines Safety from 2011 to 2020. The accident information was divided into six categories (i.e., accidents due to ground movement, transport machinery, machinery other than transport, explosives, electricity shock, and fall-of-person). These accidents were considered alternatives in the DAP analysis. Three risk factors (i.e., environment, equipment fault, and human error) that caused the accident were considered as criteria in the DAP analysis. The safety expert carefully examined the pattern of accidents and ranked the relative importance of the alternatives with respect to each criterion. This rank was used to build the DAP model using the R programming language. The results revealed that the highest number of accidents occurred due to the transport machinery (0.30), followed by accidents due to ground movement (0.23), falls of individuals (0.20), machinery other than transportation (0.12), electricity (0.08), and explosives (0.04). In order to identify the contributing risk factors for each type of mining accident, the weight and the rank of the criteria were determined. The result showed that the most accidents in the six accident categories are due to human error (0.26), followed by environmental (0.25) and equipment faults. The finding of the study provides valuable insights for the mining industry to develop effective strategies to mitigate mine accidents.

Biography

Dr. B. M. Kunar joined the Department of Mining Engineering at NITK Surathkal on 23rd September 2013. Before this, he served as an Assistant Professor at ISM Dhanbad and as a Scientist at NIRM, Bangalore. He began his career in 2003 at ACC Limited's Dungri Limestone Quarry and obtained a Second-Class Manager Certificate (Restricted) in 2004. Academically, he holds a B.E. (Mining) from GCE Keonjhar, an M.E. (Mining) from

IIEST Shibpur, and a Ph.D. in Mining Engineering (Mine Safety) from IIT Kharagpur. His expertise includes Mine Safety Engineering, Occupational Health, Safety Data Analytics, Mine Surveying, and Rock Mechanics.

Dr. Kunar has published over 55 research papers in reputed journals. He has worked on various research projects and consulting projects, including a DST-SERB CRG grant (2020), and authored a book on coal miner injury risk analysis. With over a decade of teaching and research experience, he has guided B.Tech/M.Tech students and handled administrative roles in NITK. He has also contributed to executive development programs, R&D and consultancy projects. Recognized for his contributions, he has received several awards and honors in mining engineering.

Global Trade and Food Security: Navigating Economic Imperatives in a Changing Climate

Sukanya R

Assistant Professor, Department of Commerce, CHRIST (Deemed to be University), India

Global trade plays a pivotal role in shaping the contemporary food landscape, acting as both an enabler and a disruptor of food security. This talk explores the complex interface between international trade mechanisms and food security imperatives, particularly in the context of environmental sustainability and climate variability. While trade enhances food accessibility by bridging regional production disparities, it simultaneously introduces vulnerabilities through over-dependence on imports, subsidy distortions, and exposure to geopolitical tensions. Drawing on multidisciplinary insights, the presentation critically examines how climate change amplifies food insecurity by intensifying agricultural risks, destabilizing supply chains, and exacerbating resource inequalities. Key determinants such as infrastructure, governance, environmental degradation, and socio-economic disparities are highlighted as central to understanding this nexus.

Emphasis will be placed on the need for resilient and equitable trade frameworks that integrate sustainability, promote local food systems, and align with the UN Sustainable Development Goals. The session will also propose strategic market solutions, including investment in green logistics, agri-tech transfer, and policy innovations, to mitigate climate-induced trade shocks. By addressing trade as both a transmission belt for resources and a lever for socio-economic resilience, this contribution aims to foster dialogue on inclusive, climate-smart food security strategies. The discussion will be particularly relevant for stakeholders in Earth and environmental sciences, as global food systems increasingly intersect with ecological sustainability and planetary health.

Biography

Dr. Sukanya R. is an assistant professor in the Department of Commerce at Christ University, Bangalore, Karnataka, India. Her research interests lie in the areas of Foreign Direct Investment (FDI), globalization, and economic development. She holds a PhD in Commerce with a specialization in Outward Foreign Direct Investment (OFDI). Her research expertise includes exploring the determinants of India's OFDI, examining its impact on both the home and host economies, and analyzing the intersection of globalization, urbanization, and sustainability in the context of economic development and internationalization.

Addressing Water and Wastewater Issues in India: From Resource Assessment to Innovative Management

Shilpa Saha[1], Malabika Biswas Roy[2], Ratan Mandal[1] and **Pankaj Kumar Roy[3]**

[1]School of Energy Studies, Jadavpur University, India
[2]Department of Geography, Women's College, Calcutta, India
[3]School of Water Resources Engineering, Jadavpur University, India

Water resources are vital for sustaining life, economies, and ecosystems. In India, a nation with vast geographical and demographic diversity, managing water effectively is crucial for sustainable development. This research paper provides a comprehensive assessment of water resources, consumption patterns, and management strategies in India. The study begins by elucidating India's water resources, highlighting the distribution of precipitation, surface water, and groundwater. Despite being endowed with significant water resources, India faces challenges such as spatial and temporal variability in rainfall, overexploitation of groundwater, and inefficient water management practices. The research also explores water consumption patterns in India, particularly in agriculture, industry, and urban areas as well as wastewater issues in India. The paper examines the availability and potential of water resources in India, including wetlands in the city of Kolkata. Moreover, the paper addresses the challenges of water pollution and scarcity, emphasizing the detrimental effects of untreated wastewater discharge on human health and environment. It discusses the urgent need for effective wastewater management and highlights the potential of decentralized and nature-based solutions for urban wastewater treatment. The study concludes by proposing innovative approaches for water management in India, including constructed wetlands. Overall, this research provides valuable insights into the complex dynamics of water resources, consumption, and management in India, offering recommendations for policymakers, stakeholders, and researchers to address the multifaceted challenges facing the country's water sector.

Biography

Ms. Shilpa Saha is a passionate researcher specializing in energy studies with a focus on sustainable energy systems and environmental management. She is currently doing her Ph.D. from the School of Energy Studies, Jadavpur University, India. She has done her M.Phil. and M.Sc. in Geography with a specialization in Geomorphology of Humid Tropics. With a robust academic background, including advanced degrees in science, she is dedicated to exploring innovative solutions for energy efficiency, renewable energy integration, and sustainable development. She has contributed extensively to geoscience writing platforms like the American Geophysical Union. As an accomplished writer and researcher, she has authored various articles in prestigious journals addressing the intersection of energy and environmental sustainability and received the Best Oral Presentation Award in 2023. Recognized for her research on constructed wetlands, she strives to create impactful research that bridges technological innovation and ecological preservation.

Emerging Threat of Bluetongue Disease in Ruminants of Eastern and North-Eastern Indian States *vis-á-vis* Changing Climate Scenario

Siddhartha N. Joardar

Department of Veterinary Microbiology, Faculty of Veterinary and Animal Sciences, West Bengal University of Animal & Fishery Sciences, India

Bluetongue (BT), an arthropod (*Culicoides* midges) vector-borne viral disease, affects domestic as well as wild ruminants. It is commonly seen in sheep, goats and cattle. However, BT infects other domestic and wild animals, *viz*. water buffaloes, camels, elephants, elk, white tailed deer and blesbok. BT is considered endemic in the southern states of India, with sporadic incidences reported from the northern, western and central parts of India. However, the eastern and north-eastern Indian states have not experienced BT so far. In the recent past, an extensive sero-epidemiological investigation was carried out in the eastern and north-eastern Indian states. This sero-surveillance study conducted on the susceptible ruminants showed the presence of substantial amounts (40% on average) of anti-BT antibodies in the sera, indicating a prevalence of circulating BTV in the region. With the aim of getting updated and refined estimates of positivity rates, the sero-surveillance data were analyzed using the Markov chain Monte Carlo (MCMC) method for the first time to calculate the positivity rates of various species across different states and agro-climatic zones. Moreover, in recent years BTV has been isolated from sheep, *Culicoides* midges and goat from this region that substantiate the notion that a complex inter-relation between the virus, vector and host exists in the region. All the epidemiological components of BT, *viz*. susceptible hosts, suitable climatic conditions for propagation of vectors, competent vectors are present that pose emerging disease threat in eastern and north-eastern parts of India. Hence, further surveillance and preparedness are recommended to avoid future BT outbreak, if any, especially in the backdrop of enhanced vector activities with changing climate scenario.

Biography

Prof. (Dr.) S. N. JOARDAR, M.V.Sc., Ph.D., FRSB, FSIIP, FSAB

Dr. Siddhartha Narayan Joardar, Professor in the Department of Veterinary Microbiology, handled 16 research projects, ssupervised 8 Ph.D. and 22 PG students for their theses. He is working as Vice Chairman of the Advisory Committee of Animal and Fishery Sciences of the Department of Science & Technology and Biotechnology, Govt. of W.B. He is a Fellow of 'Royal Society of Biology, London (UK)' 'Society of Immunology and Immunopathology (India)' and 'Society for Applied Biotechnology (India)', Honorary Member of National Academy of Veterinary Sciences (India) and Life Member of 6 professional societies. He wrote 5 books and has got one patent. Dr. Joardar published 198 research papers in various International and National journals of repute. He is a recipient of several national awards including 'Best Teacher Award', 'Best Paper Award' and 'Lifetime Achievements Award'. He is Associated Member of Indian Journal of Animal Health and Editorial Board member of various journals.

Assessing Ecological Status and Management Practices of Renuka Wetland a Ramsar Site in India

Deevena Elias[1], Keely Mills[2] and **Tara Chand[1]**

[1]Forest Ecology and Climate Change Division, Forest Research Institute, India
[2]British Geological Survey, UK

Wetlands are important ecosystems providing multifunctional resources and play a critical role in watershed management. The Renuka Wetland is the largest, natural freshwater lake in Himachal Pradesh, India. The lake has high Natural Capital, including religious and ecological significance. The wetland is at risk from anthropogenic impacts, including that arising from an annual fair held on the shores of the lake attracting thousands of people. This study aims to assess the health and management of the wetland using the Pressure State and Response (PSR) Model and the Ramar Management Effectiveness Tacking Tool (RMETT). Ten indicators were identified, and Analytic Hierarchy Process (AHP) was used to assign weights to the indicators. The wetland health index of Renuka wetland is 0.35, indicating that the lake is in poor condition exhibiting degraded functioning, high external pressure, low vigor, poor resilience, and stability. RMETT is one of the many tracking tools used for the evaluation of management practices with an aim to recognise the strengths and gaps reduce threats, promoting transparency for the conservation of wetlands and protected areas. The authorities related to the site and other stakeholders associated with the wetland were involved in the assessment of tracking tool. The overall management effectiveness score was 54.4% indicating basic management with significant deficiencies. The site scored minimum in output and maximum in planning. The study also concludes that protected areas having international status *viz*., Ramsar site and World heritage site does not guarantee effective management of the site. Indicator system and assessment methodology should be widely applied to different wetlands to make the health assessment framework more scientific and wetland management more efficient. The study contributes to Sustainable Development Goal 6.6 that focuses on protecting and restoring water related ecosystems and aims at healthier ecosystems.

Biography

Deevena Elias is an environmental researcher with a strong focus on wetland ecosystems and their conservation. She has recently submitted her PhD thesis in Forest Ecology and Environment at the Forest Research Institute, Dehradun, India. Her doctoral research centers on assessing the ecological status and management strategies of Renuka Wetland, a Ramsar site in Himachal Pradesh, India.

Deevena holds a Master's degree in Environmental Management and has worked on several national projects, including initiatives under climate change commitments and capacity building for watershed management. Her research interests lie in understanding human interactions with watersheds and exploring community perceptions toward their conservation.

With expertise in sustainability, wetland management, ecosystem health, and diatom research, Deevena excels at integrating scientific approaches with community participation to enhance ecosystem resilience against climate change impacts. She is deeply committed to promoting conservation practices that safeguard ecosystem integrity while fostering sustainable, community-driven outcomes.

Water Hyacinth and Wellbeing of Rural Women in Kerala: A Study of Gender and Nature from a Regenerative Ecosystem Perspective

Ganga. P. Sreenivasan and **M. Hilaria Soundari**

Department of Applied Research, The Gandhigram Rural Institute- Deemed to be University, India

Water hyacinth fibre crafts, based on a weed widely growing in the water bodies on the west coast of Kerala, the southernmost district in India, are providing a sustainable source of income to a large number of families in the area. Water hyacinth infestation weakened the systemic interactions in the rural ecosystem of the area. The infestation of this plant has been affecting the fishermen's communities and their food supply. But the rural women who were affected created a green regenerative crafts model which didn't limit itself to merely alleviating the negative environmental outcomes of the infestation, by utilising the weed for creating value-added products, but was successful enough to achieve positive socio-economic-psychological benefits through this process. The objectives of the study were to list the value-added products made from the water hyacinth; to portray the linkages of dimensions of the wellbeing of rural women and nature (i.e., water hyacinth); and to present the prominent factors of the regenerative ecosystem of the water hyacinth fibre crafts. The study was conducted in the fibre craft cluster located in Kodungallor in Thrissur district, in the state of Kerala. It highlighted that the regenerative ecosystem created by the crafts minimised harm to the local ecology and maximised the well-being of the rural women. Ganga P Sreenivasan is currently pursuing Ph.D from The Department of Applied Research, Gandhigram Rural Institute- Deemed to be University, Tamil Nadu, India in the field of Health and Wellbeing of rural women workers. She has a Post Graduate degree in Rural Development Studies from Gandhigram Rural Institute- Deemed to be University, Gandhigram and a bachelor's degree in Political Science from the University of Calicut. She has qualified for University Grants Commission- National Eligibility Test (UGC-NET) in 2020 and has been awarded with PhD Doctoral Fellowship of the Indian Council for Social Science Research (ICSSR) for the academic year 2023-24.

Biography

Ganga P Sreenivasan is currently pursuing Ph.D from The Department of Applied Research, Gandhigram Rural Institute- Deemed to be University, Tamil Nadu, India in the field of Health and Wellbeing of rural women workers. She has a Post Graduate degree in Rural Development Studies from Gandhigram Rural Institute-Deemed to be University, Gandhigram and a bachelor's degree in Political Science from the University of Calicut. She has qualified for University Grants Commission- National Eligibility Test (UGC-NET) in 2020 and has been awarded with PhD Doctoral Fellowship of the Indian Council for Social Science Research (ICSSR) for the academic year 2023-24.

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Legally Induced Erosion of Traditional Practices of the Forest Dwellers in Assam, India and its Impact on Sustainable Forestry

Jayanta Boruah[1] and **Junu Das**[2]

[1]Department of Law, Central University of Karnataka, India
[2]Department of Law, North-Eastern Hill University, India

Assam, a State in the North-East of India, was a land of jungles till the British Colonial Invasion, which systematically, through legal interventions, initially for revenue collection and later for commercial exploitation, excluded the local people from the forests and established state-based mechanisms. This led to the degeneration of traditional, eco-friendly practices that allowed humans to co-exist with nature in harmony. Such colonial legacies continued even after independence, which adversely impacted both the livelihood of the forest dwellers as well as the forest ecosystem against the principles of sustainability.

Objective: The paper aims to study how systematically the cultural and spiritual values of the rural forest dwellers have been degraded by the legal framework and how such degradation has impacted both the livelihood of the forest dwellers and the health of the forests.

Methodologies Adopted: Historical content and textual analysis methods have been applied to understand the nature of cultural and spiritual activities practiced by the rural tribes and their relation to forest management and the chronology of events that led to the degeneration of such values. Furthermore, a comparative analysis of the forest cover in Assam across different timelines has been made to understand the change in the forest cover. In addition, ethnographic research with empirical data has been done to introspect the present scenario of the forest dwellers to understand the impact of such degeneration on the livelihood of the rural forest dwellers.

Major Findings:

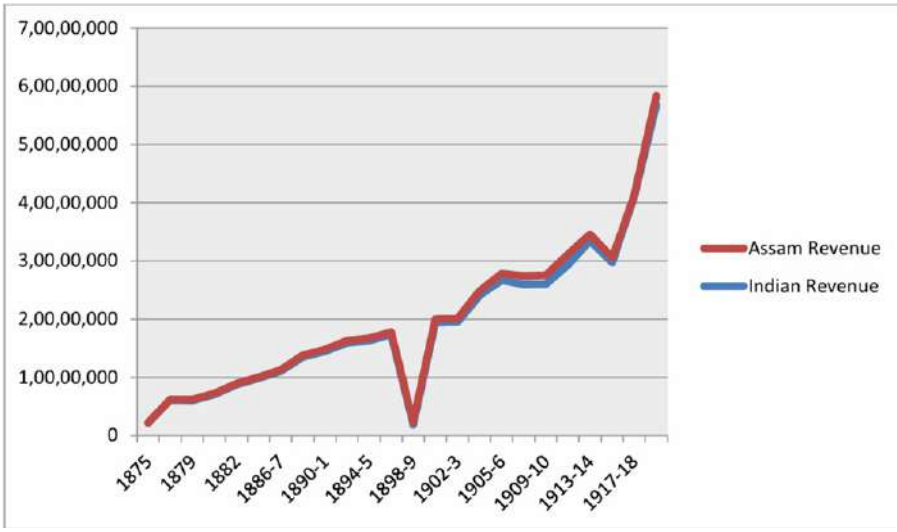

Figure 1: Year-wise Revenue Collection from Forest Areas in India and Assam through Legal Interventions during Imperial Rule

Phase	Process	Results
Initial Stage	Surveys were conducted in search of revenue potential	Deforestation through Tea Estate Expansion, Industrial Expansion, etc.
Second Stage	Establishing Timber Trade	Deforestation by the Public Works Department, Railway Companies.
Third Stage	Reservation of Forests through Enforcement of Law in the Name of Conservation of Forests and established Forest Departments	To facilitate timber supply and to establish a colonial monopoly by excluding the local population from the forests through “People-Free-Zone” Policies.
Fourth Stage	Legal support for hunting wild animals to protect agricultural fields and livestock from them. Also, inducing migration of labourers from outside Assam to boost tea and jute industries.	Wildlife suffered severely, calling for immediate actions like Game Reserves. Initiated a never-ending political conflict between locals and outsiders. Revenue from agriculture gained priority over forests, causing massive deforestation
Final Stage	De-reservation to meet the increasing demands of land.	Over-exploitation and land conflicts. Local forest dwellers are now legally declared encroachers.
After Independence	Production forestry for industrial expansion with full state control.	Local forest dwellers lost their rights and forests, and their traditional sustainable practices got lost.

From 1970 to-90's	Protection of Forests, Recognition of Community Participation for Sustainable Forestry	Still failed to provide absolute ownership to local forest dwellers and to rejuvenate traditional institutions.
Contemporary Phase	Forest Dwellers' Rights are recognized with their community institutions.	But the inter-community conflicts have made it impracticable to determine original beneficiaries and because of long dettachments, the traditional institutions have lost its existence.

Table: Summary of the Major Findings

Conclusion: It has been observed that legally induced exclusion of local forest dwellers from the forests have led to the erosion of traditional sustainable practices that have further negatively impacted both the forest dwellers and the forest health against the principles of sustainability.

Biography

Dr. Jayanta Boruah

Presently serving as an Assistant Professor at Central University of Karnataka. He did his in Forest Laws and is a Gold Medalist in LLM. And also a Gold Medalist in MA (Sociology). He has cleared UGC Net, All India Bar Exam, and also the Common Law Admission Test. He has done LL.M. in Environmental Law, MA in Sociology, BA.LL.B., BA in Political Science, Diploma in IPR, Certificate Courses in Human Rights, Human Rights Law and Criminal Justice, Access to Justice, International Humanitarian Law, and Space Law. He has published 3 ISBN books as an Author and edited many ISBN Books. He has published around 50 papers in reputed journals, books, and conference proceedings.

Ms. Junu Das

Presently pursuing her Ph.D from NEHU, Shillong. She has cleared the UGC Net and All India Bar Examination. She has authored 2 ISBN Books and has around 10 publications in reputed international and national journals, edited volumes, and conference proceedings. She has also formerly served as the Teaching Associate for Dhubri Law College.

Synthesis of Biogenic Nanoparticles and its Application in Water-Based Drilling Fluids

Borkha Mech and **Debashree Dutta**

Department of Petroleum Technology, Dibrugarh University, India

Objective & Scope of the work: The synthesis of biogenic nanoparticles (BNPs) has drawn a lot of interest because of their sustainable, economical, and environmentally beneficial qualities. To amalgamate these nanoparticles, biological sources like plant extracts are used. These sources serve as stabilizing and reducing agents. Plants are inexpensive and environmentally benign sources which include a variety of phytochemicals, including phenols, flavonoids like quercetin, and aliphatic primary amines, which make them suitable for use as both a capping agent and a reducing agent during the synthesis process.

Methods used: The study incorporates the analysis of plant leaves *viz*., Tea, Mango, Curry, Neem, Tulsi, and Guava for synthesis of biogenic iron oxide, copper oxide and silver nanoparticles. The synthesized nanoparticles are characterized using particle size analyser, scanning electron microscope to determine the size and shape. The formulation and interpretation of rheological and filtration properties of drilling fluids were done with the addition of synthesized nanoparticles.

Results: The particle size of iron oxide, copper oxide and silver nanoparticle synthesized are shown in Table 1, which depicts that the particle size of copper oxide nanoparticle is lowest. Plastic viscosity is highest for TLE, where it increases from 15 cp (base mud) to 18 cp. The filtration properties also enhanced specifically with the addition of copper oxide nanoparticle from TLE and MLE.

Conclusion: The biogenic nanoparticles proved to enhance the properties of drilling fluid, thereby increasing the drilling efficiency.

Table 1: Particle size of BNPs

Sl. No.	Agent	BNPs synthesized	Particle Size (nm)
1	Tea	Ag	91.28
		Fe_2O_3	41.83
		CuO	18.79
2	Mango	Ag	90.07
		Fe_2O_3	68.06
		CuO	66.64
3	Curry	Ag	99.19
		Fe_2O_3	91.28
		CuO	41.83
4	Neem	Ag	95.03
		Fe_2O_3	8.796
		CuO	1.356
5	Tulsi	Ag	124.30
		Fe_2O_3	107.30
		CuO	103.30
6	Guava	Ag	223.90
		Fe_2O_3	192.50
		CuO	149.70

Biography

Dr. Borkha Mech is an Assistant Professor in the Department of Petroleum Technology at Dibrugarh University and Coordinator of Diploma program in Oil Well Drilling Technology. She is having 16 years of experience as an Assistant Professor. She has done her B.Tech in Mechanical Engineering from Jorhat Engineering College and M.Tech & Ph.D in Petroleum Technology from Dibrugarh University. She has completed four projects, one UGC and three AICTE sponsored projects. She has 12 patents, 20 numbers of Journal publications, 5 conference proceedings, 3 books and 15 book chapters. She has received “Young Researcher Award 2020” by Institute of Scholars InSc. She has served as faculty advisor of Society of Petroleum Engineers, Dibrugarh University Student Chapter from 2019 to 2023 and received five awards during the tenure. She is also serving as faculty advisor of Federation of Indian Petroleum Industry, Dibrugarh University Student Chapter from 2020.

The Formation of Scientific Forestry in Colonial India: The People, Land and the Forests

Sandip Munshi

BITS Pilani Mumbai, BITS Law School, India

This paper seeks to problematize the development of the knowledge base of scientific forestry in colonial India. By tracing the developmental phase of scientific forestry in British India, following the official, institutional, and unofficial forestry literature, this paper is going to show how the Indians contributed significantly to developing the knowledge base of scientific forestry despite colonial administrative and racial constraints. The empire implemented scientific forestry to make the colonial forest policy in India with specific commercial and imperial goals in mind, however, the knowledge base of forestry evolved in a rather different way than the empire expected. Far from being passive receivers of Western knowledge, Indian subjects, the land and the forests shaped the knowledge formation of scientific forestry through acts of acceptance and resistance. While Indian forest officials were using the colonial administrative space to create their literature on scientific forestry, at the same time Indian writers, scholars, and nationalists were creating voices of resistance against the colonial forest policy. This paper is going to discuss how these pre-independence acts of acceptance and resistance influenced the post-independent official forest policy and the voices of resistance that bolstered forest conservation movements like CHIPKO.

Biography

Dr. Sandip Munshi is an Assistant Professor of History at the Birla Institute of Technology and Sciences (Mumbai Campus), affiliated with BITS Law School. He completed his PhD in 2024 from Queen's University Canada, supported by the Ontario Trillium fellowship. His research focuses on global economic history, global history, science and technology history, environmental history, Anthropocene, and capitalocene. He holds a bachelor's, masters and MPhil in history from Jadavpur University, specializing in Indian economic history.

Optimal Temperature Regime for Wheat Growth in the Ukrainian Steppe

Petro Hrytsiuk[1], Maryna Nehrey[2] and **Maksym Havryliuk[1]**

[1]The National University of Water and Environmental Engineering, Ukraine
[2]Collegium Helveticum, Switzerland

This study aims to investigate the effect of the temperature regime on wheat growth in the steppe zone of Ukraine. Our previous research has highlighted the importance of accounting for the nonlinear impact of climatic factors on wheat yield. In the current analysis we use 150 samples containing statistical climate data for April, May, and June, and wheat yield data for 2000–2024.

Our first approach combines statistical machine learning methods—specifically, the construction of a quadratic regression function for yield—with multivariate nonlinear optimization techniques. Based on mathematical reasoning, we identified temperature values for different stages of the vegetative cycle that ensure maximum wheat yield.

As an alternative, we employed a hybrid approach integrating machine learning algorithms such as Random Forest or Support Vector Machine with the Differential Evolution (DE) optimization technique. In this framework, the machine learning model serves as a predictor, while DE functions as a metaheuristic optimizer. This methodology leverages the entire dataset and, consequently, yields more robust solutions to the optimization problem.

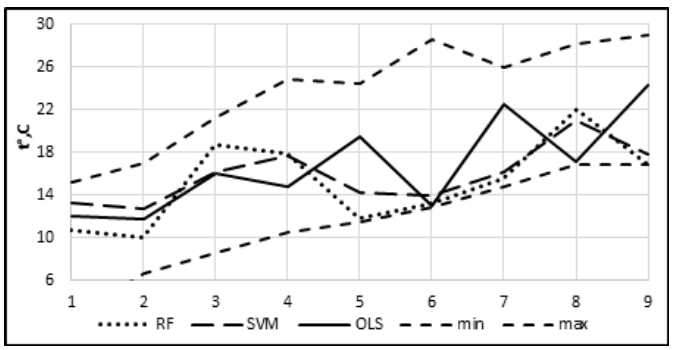

Fig. 1. The solid line shows the optimal temperature trajectory from the quadratic regression model, the thick dashed line from the SVM method, and the dotted line from the RF method. Dashed lines indicate the corridor of observed temperatures.

By applying these methodologies, we obtained multiple solutions to the optimization problem involving a multivariate nonlinear function defined within a constrained temperature domain T (Fig. 1). Analysis of the resulting temperature trajectories revealed that a key prerequisite for high wheat yield is an April temperature close to the midpoint of the permissible range, accompanied by relatively low temperatures in May and June. The methodology we developed enables early yield forecasting with a prediction horizon of three months and can also be applied to forecasting the yield of other agricultural crops.

Biography

Petro Hrytsiuk

Petro Hrytsiuk was graduated from the Faculty of Mathematics and Physics at Ternopil State Pedagogical University. In 1987, he earned the degree of Candidate of Physical and Mathematical Sciences, and in 2011, the degree of Doctor of Economic Sciences. He was awarded the academic title of Professor in 2013.

Since 1986, he has been working at the National University of Water and Environmental Engineering (NUWEE, Rivne). In 2013, he became Head of the Department of Economic Cybernetics, and since 2019, he has

been leading the Department of Computer Technologies and Economic Cybernetics.

Professor Hrytsiuk is the author of over 200 scientific and methodological publications. His research focuses on modeling and forecasting the dynamics of agricultural economic systems using machine learning and artificial intelligence.

He is a member of two specialized academic councils at NUWEE and serves on the editorial boards of two scientific journals.

Maryna Nehrey

A passionate scientist dedicated to promoting a sustainable future through research and education, with extensive experience in research, educational innovation, and digital transformation advocacy. She has worked at ETH Zurich and other universities, with expertise in economics, agriculture, finance, sustainable development, and economic cybernetics.

Recently, as a Senior Fellow at Collegium Helveticum and Visiting Professor at the AECP Group, ETH Zurich, she focused on digital technology and sustainable agricultural development through a Swiss National Science Foundation–funded project. Recognized as a Leader in Student Scientific Performance and one of the TOP 20 Inspiring Women, she has demonstrated excellence in mentoring, project leadership, and advancing digital agriculture policy and practice.

Intelligent Systems and the Metaverse Renewable Energy Trading: An Open Innovation Modelling Approach

Eleni G. Makri

Faculty of Business, Unicaf, Cyprus

The decentralized future Metaverse consumer-to-consumer energy trading might be envisioned to be practiced through virtual energy marketplaces. Customers as energy consumers and suppliers as energy vendors might negotiate inclusive deals and exchange energy. In the current state, the accelerating growth of research, inflow and outflow innovation (i.e. open innovation) of Metaverse ecosystem(s) tends to be rather steadily rising, yet still scarce in scope and range. The "projected" intelligent network(s) energy trading Metaverse might be envisaged to adopt more eco-friendly (i.e. renewable resources) infrastructure(s). The Smart Grid, the Internet of (Energy) Things (IoET), the Non-Fungible Tokens (NFTs) stored on the Blockchain platform (BP), the Smart Contract(s) (SC), the Digital Twins (DT), the Sensing Smart Technologies and the Virtual Energy Plants (VEPs) might be visualized as robust intelligent ecosystems that can be contemplated to integrate a distributed eco-friendly resource-based modelling that leverages sustainable energy trading. First, we outline this Metaverse-driven, open innovate-first sustainable energy exchange ecosystem framework. Second, we articulate the considerable benefits of this decentralized peer-to-peer "alternative sustainable future" Metaverse-driven energy trading approach. Third, we navigate throughout the wins that this dispersed Metaverse-led "smarter" energy trading infrastructure might entail for transferable eco-innovation energy exchange. Forth, we reveal the ways this Metaverse-fused energy trading approach might support a speedy, stable, reliable, visible, scalable, and secure open innovation-primed "Energyverse vending" framework. Lastly, we highlight a number of enduring open research challenges that seem to trigger our Metaverse-Energy Intelligent Trading current and future reflection.

Biography

Dr. Eleni G. Makri is affiliated with Unicaf. Previously connected to Unicaf/UEL, CUC/LMU, H2020 Newton, and UCD/Insight SFI RCDA H2020 Opening Doors. Her profile includes UK graduate studies in social and organizational psychology, and the best PhD thesis psychology award. Lecturing, assessing and mentoring throughout transdisciplinary postgraduate levels. Prior involved with FP7 Metalogue and H2020 Newton. Metalogue delivered a personalized multimodal ECA's system with metacognitive abilities for L&D on integrative negotiation and challenge management to support transdisciplinary education/transferable professional practice. Newton deployed AI/VR/AR/XR, fab labs, mulsemedia, learning games for STEM/STEAM education triggered by innovative pedagogy across diverse learners (SEN). Her research focuses on learning games vs traditional learning for open science (research excellence and ethics), open innovation, inclusive negotiation and conflict management, global citizenship, and environmental sustainability and resilience (natural risk management, water/waste management, sustainable/renewable energy, etc.). Expanded to Metaverse and Open Innovation, Metaverse, Ecological Sustainability and Adaptability, Smart Grid and Metaverse. Scholar Google profile: https://scholar.google.com/citations?hl=el&user=T0i- PfYAAAAJ

Modification of Grinding Aids: Assessment of Energy Efficiency, Environmental Impacts, and Early-Age Mechanical Performance

Veysel Kobya, Yahya Kaya and **Ali Mardani**

Uludağ University, Turkey

Cement production is an energy-intensive process, with approximately two-thirds of the total energy consumption occurring during the clinker and gypsum grinding stage. To reduce this energy demand, amine- and glycol-based grinding aids (GAs) are commonly employed. These additives can also enhance the particle size distribution and surface morphology of the resulting cements. However, GAs may adversely affect certain properties of cementitious systems, such as setting time and workability. Therefore, modification of GAs is necessary to mitigate these drawbacks. In this study, triethanolamine (TEA), a widely used amine-based GA, was chemically modified using two different organic acids to enhance both grinding efficiency and product performance. To evaluate the effectiveness of the modified TEAs (M-TEAs), three different GAs—including unmodified TEA—were used at a dosage of 0.03% by weight of clinker and gypsum during the grinding process. Alongside a control cement produced without any GA, three additional cement types were prepared. Grinding efficiency was assessed based on the time required to achieve a target Blaine fineness of 4000 ± 100 cm^2/g. Furthermore, the setting time and 1-day compressive strength of paste and mortar specimens prepared with these cements were measured. The modification of TEA resulted in an approximate 5% improvement in energy efficiency. Additionally, early-age compressive strength increased by about 6% in cementitious systems incorporating M-TEA. On an environmental scale, it was estimated that the energy savings associated with TEA use could prevent roughly 124, 000 tons of CO_2 emissions annually. This reduction could rise to approximately 213, 000 tons per year when modified TEA is used.

Biography

Dr. Veysel Kobya received his PhD in Civil Engineering from Uludağ University in 2023, specializing in construction materials. His doctoral research, supported by the TÜBİTAK 1001 project, focused on the impact of polycarboxylate ether (PCE) chain length on cement-admixture compatibility across varying C_3A contents. He has published extensively in SCI-indexed journals on topics including PCEs, fiber-reinforced concrete, and sustainable construction. As a postdoctoral researcher, he contributed to the TÜBİTAK 1001 project titled "Developing Grinding Aids with Water Reduction Ability Compatible with Pozzolanic Systems, " and collaborated on projects addressing chloride resistance and 3D-printable concrete. He holds 18 national and international patent applications for novel grinding aids. Dr. Kobya has worked with distinguished researchers from institutions in Taiwan, Hong Kong, Lebanon, and beyond. His research interests include cement-admixture interactions, durability, eco-efficient concretes, and additive manufacturing. In 2024, he also lectured in the Faculty of Architecture and continues his postdoctoral work at Uludağ University.

Simple ODE Models for Interactions of Nature and Society

Marino Badiale and **Isabella Cravero**

Dipartimento di Matematica, Università di Torino, Italy

Soil erosion is the most important land degradation process and it We introduce some low dimensional nonlinear ODE systems intended to describe some aspects of the interaction between human societies and natural resources.The starting point of our research is the HANDY model, introduce in 2014 by S.Motesharrei, J.Rivas, E.Kalnay. In the different models that we have worked out, we adopt the assumption that renewable resources are led by a logistic dynamics, while non renewable ones can be replenished thanks to human ingenuity. For all the different models we obtain some general asymptotic properties of the solutions, then we compute the equilibrium points and study their stability. A general result that we obtain is that in our models there is no way to get a stable indefinite growth in wealth and population, while there are stable equilibrium points with positive values for those variables. This suggests that a steady state economy could be a wise choice for human society.

Biography

Marino Badiale is Full Professor in Mathematical Analysis at the Department of Mathematics of the University of Turin. He has taught at the University of Padua and at Scuola Normale Superiore in Pisa. His research deals with nonlinear elliptic PDE and nonlinear ODE.

Isabella Cravero is a university researcher in Numerical Analysis at the Department of Mathematics of the University of Turin. Her research focuses on approximation techniques for PDEs and for nonlinear ODE.

Novel Concept and Technologies of Sustainable Building Design

Juergen Reichardt[1], Indranil Bhattacharya[2] and **Upendra Rajapaksha[3]**

[1]MSA | Muenster School of Architecture, Germany
[2]RV College of Architecture, Bangalore, India
[3]Department of Architecture, Moratuwa University, Sri Lanka

"What are the current digital and / or innovations driving sustainable architecture? What could be the suggestions for a more holistic approach?"

Sustainable design parameters may be visualized as the 'genetic code'of a building's specific performance requirement – similar to the DNA of all living entities. This "*Building DNA*" could provide comprehensive "Performance" parameters; further could be programmed to be SMART – Sensible, Meaningful, Adaptive, Realistic and Time-cost effective. Back in 2001, a highly networked, expertise-orientated, integrated design strategy of "Form Follows Performance" was coined for our workspaces and research in India, Sri Lanka and Germany largely for industrial projects and passive housing. In planning process, "Virtual Twins" apply the state of the art of 3D- BIM modelling for architecture, structure and utilities integrated with dynamic climatic simulations and CFD analysis, sustainable parameters and 'cradle to grave' life-cycle systems. Furthermore, Programming has become an all-important task, as specific parameters of geography, climate, topography, culture, process, technology, and logistics are key forces driving innovative and integrated architecture from a preliminary stage. While we are shaping out "Passive" sustainable design solutions for site, volume, structure, envelope, interiors, we are minimizing the need for "Active" utilities. It is vital that the ecological responsibility lies in '*designing sailboats and not motorboats in architecture*'.

The German government BMBF, Federal Ministry of Education and Research, and DAAD, German Academic Exchange Service, funded program culminated in a web-portal and app "*climatehub.online*" (fig.1) holistic design strategies and academic research created a broader audience, a collaborative and deeper understanding of the topics on hand and

a one-of-a-kind E- Learning Platform - Program. We believe that Individual approaches of experts should be linked together for a 'synergetic' approach. It is believed that this combined effort across OUR PLANET could be more productive than addressing the issues individually / locally.

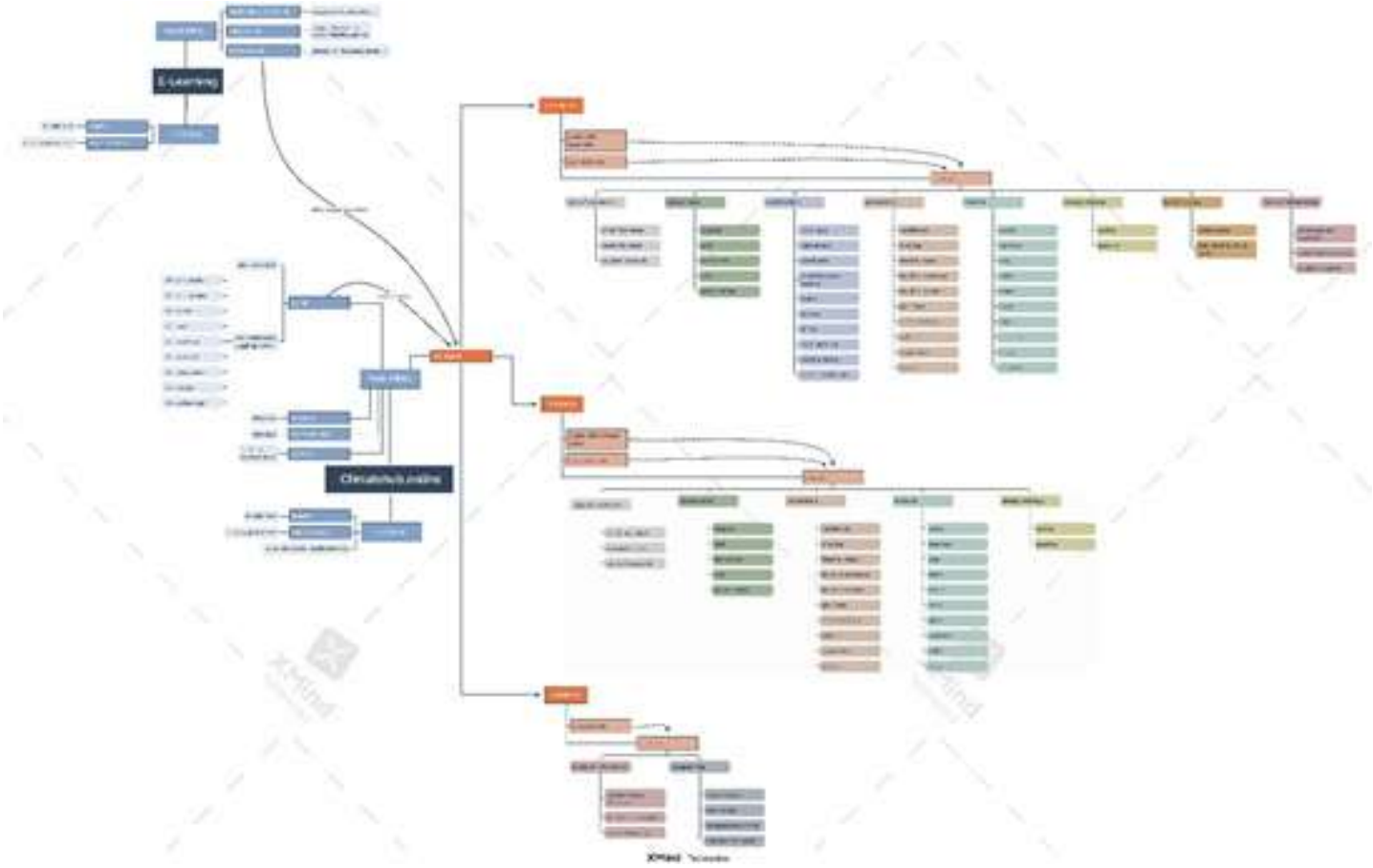

Fig.1: Mind map building sustainability grammar interdependcies.

Biography

Prof. Dipl.-Ing. Architect BDA Jürgen Reichardt born in 1956, studied Architecture at the University of Karlsruhe and Brunswick, Germany. From 1988 to 1995, he was project director for design and implementation of complex industrial buildings at agiplan AG in Mülheim/Ruhr. In 1992, he founded his office Reichardt Architects with a focus on planning of industrial plants and logistics centers for various reputed clients in Germany, Europe and Asia. From 1995 till present he taught as Professor, now Senior Professor, at MSA Muenster school of architecture. Since 2008 he operates as partner in RMA Reichardt-Maas-Associated Architects GmbH & Co. KG in Essen, Germany, and is partner of BR Architects & Engineers Pvt. Ltd. in Bengaluru, India. He won many prizes for architectural designs, published books in several languages, and is guest editor for Applied Sciences and MDPI.

Plant Breeding Objectives that Address Climate Change Challenges

P. O. Ayiecho and **J. O. Nyabundi**

Maseno University, Kenya

Plant breeding objectives focus on development of appropriate crops and crop varieties to alleviate food insecurity and malnutrition through development of high yielding varieties with desired qualities, resistance to abiotic and biotic stresses and climate change resilience. Recent emerging challenges to food security are associated with climate change necessitating the breeders to align breeding objectives and methods to address such problems. The climate change challenges lead to low crop production, poor produce quality and food insecurity, particularly under rain-fed agriculture. Climate change associated prolonged droughts induce water stress and lead to low seed germination, field crop stand, poor plant growth and development and ultimately reduced crop yield. High temperatures due to intense solar radiation associated with climate change are damaging to plants due to negative effects of high temperatures on plant growth, development, biomass and seed/fruit yield. Elevated temperatures and other conditions associated with climate change make plant pathogens more virulent and insect pests more aggressive causing serious damage to the crop plants. Parasitic weeds cause more damage to crops under drought stress. Stormy excessive rains also cause damage to crops in the field due to torrential surface runoff washing down the crops, waterlogging and submergence. Breeding objectives can be aligned to address challenges associated with climate change. Breeders should can and develop crops and crop varieties that have mechanisms to resist or tolerate stress, accumulate biomass and produce sufficient economic yields despite drought or heat stress. Breeders should aim at developing crop genotypes that escape terminal drought, plants that recover from water stress and heat damage when rains return, plants with mechanism to withstand waterlogging, and elite genotypes with diverse genes for resistance to insect pests, diseases and parasitic weeds for fast-tracking resistant varieties development.

Biography

Dr. Patrick Ayiecho Olweny is a Kenyan agriculturalist, plant breeder, and geneticist with over three decades of experience in agricultural research, teaching, and policy. He earned his Ph.D. in Genetics from the University of California, Davis, an M.Sc. in Plant Breeding, and a B.Sc. in Agriculture from the University of Nairobi. His academic career includes professorships at Maseno University and the University of Nairobi, where he taught genetics, plant breeding, and crop science, and supervised numerous graduate students.

Prof. Olweny's research has focused on sesame, sorghum, barley, amaranths, and oil crops, with notable achievements in developing sesame cultivars and production packages for diverse agro-ecological zones. He has worked extensively with Kenyan farming communities, particularly women farmers, to improve agricultural practices and food security.

Beyond academia, he served as Member of Parliament for Muhoroni Constituency (2003–2013) and as Assistant Minister for Education (2008–2013), contributing significantly to Kenya's education and agricultural sectors.

Towards the Realisation of Green Infrastructure Projects in Ghana: A Fuzzy Evaluation and Gini Indexation of Key Drivers for Sustainable Resource and Waste Management

Joseph Teye Ignatius Buertey

Department of Built and Sustainable Environment, Pentecost University, Ghana

Although global efforts to adopt sustainable green infrastructure are rapidly progressing, some less developed countries, such as Ghana, may require targeted attention in areas including the circular economy and waste reduction. The inherent multifunctionality of systems like GI often results in diverse understandings among stakeholders, which can affect their potential contributions to broader environmental objectives. The study will examine the relationship between these attributes and sustainable resource and waste management objectives. Using the Cochran (1977) methodology, a sample size of 97 was determined, and structured questionnaires were distributed to sustainability experts in Ghana, achieving a response rate of 62%. Using a combination of the Gini coefficient and fuzzy synthetic evaluation, this research provides an in-depth analysis of professionals' perceptions of GI multifunctionality. The findings indicate that the key aspects that environmental experts in Ghana should promote for GI development, such as reducing urban heat islands and enhancing ecosystem services, are crucial for managing environmental externalities and conserving resources, thereby aiding in reducing energy waste and naturally filtering out pollutants. Integrated green-grey infrastructure systems are a key approach to managing water in GI projects, helping to reduce the amount of treated wastewater and control runoff pollutants while enhancing insulation through GI to achieve thermal objectives and minimize energy waste. This study makes a significant contribution by delineating key multifunctional factors that support GI adoption and successful implementation in Ghana, offering insights into its potential for advancing resource and waste management practices in developing regions.

Biography

Prof Joseph Teye Ignatius Buertey has two PhDs and several professional certifications. He has lectured for the past twenty years at several universities. He is currently the Dean of the Faculty of Engineering Science

and Computing. He manages several grant projects at Pentecost University, including LaSoMa, Lase4netZero, and NEDMEV, among others. He is a member of the Licensing and Registration Technical Committee of the Engineering Council of Ghana, a Fellow of the Engineering Institute of Technology, a Fellow of the Ghana Institution of Surveyors and a certified PMP. He is the Chairman of the Research Committee for the Ghana Institution of Surveyors and serves on several committees at Pentecost University. He has published over 50 peer-reviewed papers in reputable journals and conferences and has served as an editorial board member and reviewer for several journals.

Design Education: Learning in the Context of Societal Challenges

Carla Cadete

Lusófona University, Portugal

Designers are increasingly seen as agents of change for a sustainable and socially responsible world. They face challenges such as climate change, ecology, migration, terrorism, poverty, aging populations, chronic diseases, and disabilities. Design is one of the most powerful tools of our time. It is necessary to challenge design schools to review the process by which they socially introduce students to the world of Design, helping them carry out work both inside and outside the classroom. Higher Education Institutions must equip the next generation of designers not only with technical skills but also with a profound sense of social responsibility, develop competencies in sustainability within design education, promoting critical thinking and ability to implement innovative solutions; the potential of co-creation to generate contexts for change'; the need for more open and flexible educational approaches, promoting shared understanding and active engagement. Our curriculum emphasizes interdisciplinary collaboration, real-world engagement, and a deep understanding of the cultural and social dimensions that shape our world. At Porto Lusófona University, the Communication Design Bachelor program integrates guest lectures, seminars, competitions, and exhibitions to enhance student learning. The course emphasizes collaboration among students and stakeholders, other faculties, NGOs, and for-profit organizations, preparing students to address diverse real-world challenges. This approach equips graduates with skills for both academic and professional success, encouraging purpose-driven learning beyond traditional coursework.

The presentation will highlight some case studies, successful collaborations between the academy and stakeholders through *Design Thinking* methodology. These initiatives illustrate the potential of universities to become spaces for sustainability worldwide and opening space for experimentation and communication for young people and community. The results emphasize that the training of students and futures professionals in design should

include the development of competencies in sustainability, encouraging critical thinking and ability to design for change.

Biography

Carla Cadete completed a PhD in Design at Aveiro University [2009] and a Bachelor in Communication Design at the University of Porto, Faculty of Fine Arts [1991]. Course leader [2015–2023] and Associate Professor [since 2017] of Communication Design undergraduate degree at Lusófona University of Porto (Portugal). Researcher at the Hei-Lab Centre. Principal Investigator of *Design as a medium of preventing childhood obesity* [DOIT4Children], supported by Pedro Hispano Hospital. The research project won the FAZER + 2022 Award – Science and Innovation Support Program for Good Research Practices in Teaching, and its high scientific and pedagogical quality. Mascot, author of Pediatric Service from Pedro Hispano Hospital [2022]. Design for Social Impact researcher who has written several articles on pedagogical practices in an academic context with multidisciplinary teams and stakeholders. Since 2016, curated several exhibitions, involving undergraduate design students, ONGs, international universities and the local community. Graphic Designer and Illustrator, since 1992.

Fading Ground: Assessing Soil Degradation and its Drivers in the Mediterranean Basin

Carla S. S. Ferreira[1], Marijana Kapović Solomun[2], Rares Halbac-Cotoara-Zamfir[3] and **Zahra Kalantari[4]**

[1]Research Center for Natural Resources, Environment and Society (CERNAS), Polytechnic University of Coimbra, Portugal
[2]Department of Forest Ecology, Faculty of Forestry, University of Banja Luka, Bosnia & Herzegovina
[3]Faculty of Civil Engineering, Polyethnic University of Timisoara, Romania
[4]Department of Sustainable Development, Environmental Science and Engineering, KTH Royal Institute of Technology, Sweden

Soil is a non-renewable natural capital, fundamental to sustaining life, securing food production, and providing essential ecosystem services. Yet, in the Mediterranean Basin, the Europe's most vulnerable region to soil degradation and desertification, this vital resource is under growing threat. Climate change, combined with intense human activity, is pushing soils toward critical thresholds, jeopardizing their capacity to deliver key functions for the environment, society, and the economy. This presentation offers a comprehensive synthesis of current knowledge on the status, drivers, and future trajectories of soil degradation in the Mediterranean region. We examine both direct drivers (e.g. extreme weather events, land use intensification, abandonment, and mismanagement) and indirect drivers, including demographic trends, market dynamics, technological gaps, and political frameworks. Special attention is given to three major degradation categories: physical (erosion, sealing and compaction), chemical (loss of soil organic matter, contamination and salinization), and biological (loss of biodiversity). Despite growing awareness, large knowledge gaps remain, particularly in understanding less-visible degradation processes and their spatial extent, such as soil biodiversity. This work highlights the urgent need for a harmonized soil monitoring framework at national and regional levels to track degradation trends and inform evidence-based decision-making. Looking ahead, projections under current climate and land use trajectories suggest that soil degradation will continue or worsen unless counteracted. Integrated, cross-sectoral approaches that promote sustainable land management,

restoration practices, and policy coherence are essential. By synthesizing scientific literature and official reports, this presentation provides more effective strategies to achieve land degradation neutrality and contribute to the broader Sustainable Development Goals in the Mediterranean context.

Biography

Carla Ferreira holds a European Doctorate in Environmental Science and Engineering from the University of Aveiro. She is currently an Auxiliary Researcher at the Polytechnic University of Coimbra, Portugal. Previously, she worked as a researcher at Stockholm University, Sweden, and Swansea University, UK. She serves on the Executive Committee of the CERNAS Research Centre and was, until recently, the Research Area Leader for Environment and Society. In addition, she is a Committee Member of the Soil System Sciences Sub-division "Soil Erosion and Conservation" within the European Geosciences Union. She has contributed to numerous national and international research projects, some of which she coordinated as lead scientist. Her research focuses on soil and water management, land degradation, ecosystem services, and the implementation of nature-based solutions to enhance climate resilience. She is also actively involved as an expert evaluator for various funding programs, including Horizon Europe, and serves on the editorial boards of some high-impact international scientific journals.

Combination of the First and Second Law of Thermodynamics to Assess Environmental Buildings Aiming at Achieving a more Inclusive Environment

Carlos Eduardo Keutenedjian Mady[1] and **Débora Silva Molliet**[2]

[1]Institute of Energy and Environment of the University of São Paulo, Brazil
[2]School of Mechanical Engineering of University of Campinas, Brazil

The Predicted Mean Vote (PMV) and Percentage of People Dissatisfied (PPD) evaluate thermal comfort conditions from the energy point of view. By analyzing the destroyed exergy and the exergy transferred to the environment, it is possible to evaluate the human thermal model with a higher degree of precision to different aspects of environmental parameters. Thus, phenomenological models were adapted to represent men (one dressed in a full suit and the other in lighter clothes) and women (in luteal phase and in follicular phase, with the same clothing pattern) from computational simulations to compare the thermodynamic behavior for different reference environments. The Cooling Load Temperature Difference method was used to model a building and evaluate the energy expenditure required for its cooling, considering the models of the human body as occupants. A vapor compression refrigeration cycle was modeled to evaluate the exergy destruction associated with the air conditioning system. The exergy-based indicators were compared with PMV and PPD. The thermal comfort points obtained using both methods are, 23.5/24 °C for men in suits, 25/25 °C for men in lighter clothing, 25.5/26 °C for women in the follicular phase; and 24.8/25.5 °C for women in the luteal phase. Women demand higher comfort temperatures than men during the follicular phase. During the luteal phase, the thermal comfort temperatures are close to that of men in light clothing and lower than for the follicular phase. We observed that the energy consumption decreases linearly with the increase in the operating temperature of the air conditioning and that the increase in the operating temperature from 23.5 °C (close to the comfort temperature of men in suits) to 25.5 °C (close to the comfort temperature observed in women and men with light clothing) implies a reduction of 4.1% of the cooling thermal load, representing a daily energy savings of 0, 585 kWh.

Biography

Dr. Carlos Eduardo Keutenedjian Mady obtained his undergraduate degree in Mechanical Engineering from the University of São Paulo (2009) and a PhD in Mechanical Engineering from the University of São Paulo (2013). His experience is in Thermodynamics, Second Law Analysis, Sectorial (residential, transportation, industrial, and other energy conversion processes), and Energy Planning. He was a Professor at UNICAMP (School of Mechanical Engineering) from 2015 to 2021 and at the FEI University Center from 2021 to 2023. From 2023 forward, He became a Professor at the Institute of Energy and Environment of the University of São Paulo. In 2024, he became an Associate Professor at the Institute of Energy and Environment of the University of São Paulo through the Habilitation Public Concur in Mechanical Engineering at the University of São Paulo.

Estimation of Raindrop Characteristics for Damage Prevention in Offshore Wind Projects

Karine dos Santos Rodrigues[1], Luis Manoel Paiva Nunes[2], Gilmara Duarte Lima Furtado[1], Marcelo Andrioni[3], Eric Oliveira Ribeiro[3], Wellington Ceccopieri Belo[3] and **Ricardo de Camargo[2]**

[1]Foundation for Technological Development in Engineering (FDTE), Brazil
[2]Institute of Astronomy, Geophysics and Atmospheric Sciences (IAG-USP), Brazil
[3] Petrobras R&D Center, Brazil

Offshore wind energy has established itself as a strategic alternative in the context of the energy transition towards renewable sources with a reduced environmental impact. However, the full viability of this technology depends on overcoming challenges related to operation under normal and severe environmental conditions, among which is constant exposure to precipitation. The impact of raindrops on wind turbine blades can accelerate surface wear and erosion processes, compromising their structural integrity, functionality and efficiency, in addition to significantly increasing equipment maintenance costs. In view of this problem, a methodology was developed to quantify the size and frequency of raindrops in offshore regions, intending to contribute to prevention and mitigation of structural damage to wind turbines, especially their blades. The methodology initially consisted of adjusting precipitation estimates from the Integrated Multi-satellitE Retrievals for GPM (IMERG) version 7 based on rainfall data measured on offshore platforms. Subsequently, the precipitation was distributed by intensity ranges and analyzed according to its frequency of occurrence. For each range, the formulation proposed by Best (1950) was applied, enabling the estimation of the raindrop size distribution and, finally, the quantification of the annual total of raindrops per square meter. The initial application of this approach focused on an offshore area located on the southeast coast of Brazil, resulting in the development of tables detailing the quantity and diameter of raindrops. The results obtained represent relevant parameters for engineering, providing insights that can be incorporated as criteria for more robust wind projects suitable for the specific climatic conditions of the studied region.

Biography

Karine Rodrigues holds a bachelor's and a master's degree in Meteorology from the Federal University of Rio de Janeiro (UFRJ), and a technical degree in Electrotechnics from the Technical School Support Foundation (FAETEC). She is currently a researcher at the Foundation for Technological Development in Engineering (FDTE), conducting research in meteorology and renewable energy, with a focus on supporting offshore operations of Petróleo Brasileiro S.A. (PETROBRAS). She is an active member of the Research and Development project "*Methodologies in meteoceanography applied to the O&G industry and renewable energies*" a collaboration between the Institute of Astronomy, Geophysics and Atmospheric Sciences at the University of São Paulo (IAG/USP) and the *Petrobras R&D Center* (CENPES/PETROBRAS).

Her areas of expertise include Meteorology, Data Processing, Numerical Modeling, Renewable Energy, Energy Efficiency, and Technological Innovation.

Fashion, Textiles and Design for Sustainability: Relationships Mediated by UN Intergovernmental Guidelines and Reviewed in the Context of COP30 in Brazil

Márcia Bergmann, Cláudio Magalhães and **Carlo Franzato**

Department of Arts and Design, Pontifical Catholic University of Rio de Janeiro, Brazil

New paradigms, including intergovernmental guidelines for sustainable development and Circular Economy, require a strategic review of the textile and apparel industry, and expand the complexity of design processes related to environmentally responsible production and consumption. Sustainable development is a very challenging objective for Fashion, considering production is constantly increasing and clothes are underused. However, the assumption here is that Design can create convergent alternatives for sustainability and circularity. Thus, the objective of this study was to characterize a Design guided by environmental concerns and active in the garment sector of the textile and apparel industry. The study contains a literature review and a case study. Qualitative research was conducted and based on the design, environmental and fashion/textile triad, connected with United Nations documents: Agenda 21, Agenda 2030, the Sustainable Fashion Communication Strategy, the Ten Challenges of the UN's Decade of Ocean Science for Sustainable Development, and other documents published by The UN Alliance for Sustainable Fashion. At the same time, the Brazilian textile and apparel industry is addressed due to its economic and environmental relevance. The contributions include essentially the development of a theoretical and conceptual framework enabling the proposal of three design strategies for the targeted environmental dimension of sustainable development for the referenced industry, and prepare a panoramic outlook of this industry in Brazil. All of this reviewed and contextualized from the perspective of the 30th United Nations Climate Change Conference (COP30), to be held in Belém, Brazil, in November 2025.

Acknowledgment:

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E- 26/205.926/2022, SEI-260003/019703/2022). Carlo Franzato has a scholarship in Research Productivity granted by CNPq (Conselho Nacional de Desenvolvimento Científico e Tecnológico) No. 314437/2023-1). The authors are also funded by FAPERJ as part of the "Support Program for Thematic Projects in the State of Rio de Janeiro" (Projeto Gávea Lab No. E-26/210.079/2023).

Biography

PhD in Design and a postdoctoral researcher in the Department of Arts and Design at PUC-Rio. Her research is linked to the Laboratory of Design Management (LGD).

Modeling a Century of Climate Change: Random Walk with Drift in Earth's Temperature Trends

John Wang

Montclair State University, USA

The American healthcare system allocates significantly greater financial resources than other developed nations; however, its health outcomes, particularly life expectancy, remain notably lower. Despite continuous advancements in medical technology and increased spending, the system faces persistent challenges related to cost efficiency, accessibility, and overall effectiveness. This study investigates the long-term trajectory of healthcare expenditures as a percentage of Gross Domestic Product (GDP), identifying key drivers behind the rising costs and assessing the critical juncture at which intervention may be necessary to curb this unsustainable trend.

To provide a comprehensive analysis, this research employs advanced machine learning methodologies, including Random Forest and Support Vector Regression (SVR), alongside traditional statistical forecasting models. By integrating these approaches, the study aims to enhance predictive accuracy and uncover patterns that might be overlooked through conventional methods alone. The findings offer valuable insights into the future dynamics of healthcare spending, highlighting the potential economic and policy implications of continued growth in expenditures.

Furthermore, this study underscores the crucial role of healthcare analytics in deciphering systemic inefficiencies and informing evidence-based decision-making.

Understanding these trends is essential for policymakers, healthcare administrators, and economists seeking to implement effective strategies that balance cost containment with quality care. The research ultimately emphasizes the urgency of data-driven policy interventions to address the escalating financial and public health challenges posed by the current trajectory of healthcare spending in the United States.

Biography

Dr. John Wang, a professor at Montclair State University, USA, earned his PhD in Operations Research from Temple University after receiving a prestigious scholarship to study in the United States. His exceptional contributions to academia were recognized with two special range adjustments, exceeding the expectations of his role as a tenured full professor.

With over 100 refereed publications and seventeen books to his name, Dr. Wang has also developed computer software programs derived from his research findings. He serves as Editor- in-Chief for 11 Scopus-indexed journals, including the *Int. J. of Sustainable Society (IJSSoc) (www.inderscience.com/ijssoc), Int. J. of Business Analytics* (IJBAN) (www.igi-global.com/ijban), and *Int. J. of Information and Decision Sciences* (IJIDS) (www.inderscience.com/ijids), among others. Additionally, he oversees several encyclopedias covering Data Science, Machine Learning, Business Analytics, and Optimization.

Dr. Wang's research interests lie at the intersection of operations research, machine learning, and cybernetics, reflecting his commitment to advancing knowledge in these dynamic fields.

Climate Change, Truth, and Nonhuman Animals

Michael Allen

Department of Philosophy and Religious Studies, East Tennessee State University, USA

I consider the role of nonhuman animals in a Gandhian devotional democracy based on the popular sovereignty of Truth. Such a democracy is based methodologically on a philosophical reconstruction I developed in my recent book, *Gandhi's Popular Sovereignty of Truth* (*GPST*) of neglected passages from Gandhi's writings concerning the people's voice as God's voice. The people speak God's voice of Truth not through voting, or even public discussion, but rather through everyday devotion to spiritual practices and community participation. In *GPST*, I enlarge the scope of devotional democracy to include the 'spiritual practices' of nonhuman domesticated animals as co-participants in speaking God's voice of Truth. This draws upon not only the extraordinary history of spirit in stories of human to animal avatars, but also recent scientific work in cognitive ethology attributing moral and spiritual capacities to animals. It further draws upon recent work in political philosophy on domesticated animals as co-citizens of an interspecies Zoopolis. Indeed, it reinterprets Gandhi own vision of animals as poems of pity by instead envisioning them as co-equal devotional participants in realizing Truth. After laying out the position I developed in *GPST*, I turn to the question of climate change. What are the conceptual and practical implications of this Gandhian vision of democracy for the ethics of climate change not just from the perspective of human but also nonhuman animal participants in realizing an interspecies sovereignty of Truth? .

Biography

Michael Allen is a professor in the Department of Philosophy and Religious Studies at East Tennessee State University. He is the author of Gandhi's Popular Sovereignty of Truth and Civil Disobedience in Global Perspectives, in addition to many articles on various aspects of political philosophy, the philosophy of nonviolence, the philosophy of war and peace, and political animal ethics.

Generation of Monthly Flows in the Ica River Basin up to the La Achirana Hydrometric Station using the GR2M Precipitation-Runoff Model

Angel Gabriel Ochante Sanchez, Diego Fermin Jonislla Rojas and **Abel Carmona Arteaga**

Universidad Privada del Norte, Peru

Due to historical problems, such as river overflows in the Pacific slope basins, this study focuses on the Ica basin, which has recently experienced clima-tological disasters. The main objective is to generate monthly flows over a period of 32 years using the GR2M model, of which we will also explain its limitations, from the basin to the La Achirana hydrological station. Results showed an R2 of 0.85 and a Nash-Sutcliffe efficiency of 0.78, indicating a good fit between observed and simulated data. The GEE platform was used to obtain temperature (ERA5) and precipitation (RAIN4PE) data. The calibration and validation of the model was carried out using daily flow data (monthly averages) from the Water Obser-vatory (ANA) of the La Achirana hydrological station between September 2013 and December 2015. This methodology aims to offer a comprehensive examina-tion of the interaction between climatic variables and river flows, with important implications for the management and forecasting of extreme hydrological events.

Biography

Angel Gabriel Ochante Sanchez

Angel Gabriel Ochante Sanchez is a graduate in Civil Engineering from the Universidad Privada del Norte. An achievement that makes him proud is the certification received for the research article accepted and supported at the 15th International Conference on Environmental Science and Development (ICESD2024), as well as the indexing in the prestigious international SCOPUS repository: "Generation of Monthly Flows in the Ica River Basin up to the La Achirana Hydrometric Station Using the GR2M Precipitation-Runoff Model."

Diego Fermin Jonislla Rojas

Diego Fermin Jonislla Rojas is a final-year Civil Engineering student at Universidad Privada del Norte (UPN), Peru. His main academic and research interests focus on hydrology, hydraulic structures, and water resources

management. Diego has participated in research projects related to river basins and has developed experience with precipitation–runoff models such as GR2M and digital platforms like Google Earth Engine for hydro-climatic analysis. His work is motivated by the need to provide sustainable solutions for water management and disaster risk reduction in vulnerable regions of Peru. In addition to his academic training, Diego has worked in construction projects, strengthening his practical knowledge in civil engineering. His career goal is to contribute to the development of resilient hydraulic infrastructure and effective water management strategies in Peru.

Energy Optimal Speed Profiles for a Differential Drive Mobile Robot with Payload

Mauricio F. Jaramillo-Morales[1], Sedat Dogru[2] and **Lino Marquez[2]**

[1]Universidad Autónoma de Manizales, Colombia
[2]University of Coimbra, Portugal

Mobile robots are being increasingly used in various environments, including households, hospitals, agriculture, and industry. In these settings, robots often need to cover long distances, sometimes carrying heavy payloads, which results in high energy consumption. To address this, the paper presents a set of novel optimal speed profiles for two-wheel differential drive robots. These profiles are derived using Hamiltonian formalism, leading to closed-form speed profiles for both straight and rotational motions. The derivation utilizes a power model that explicitly accounts for robot and motor dynamics, as well as external payloads.

The energy consumption of a commercial two-wheel differential drive robot was experimentally evaluated using various trapezoidal and proposed optimal speed profiles (fig1). The results demonstrated significant energy savings with the new profiles. Notably, the savings were positively correlated with the payload—i.e., the heavier the robot or the load it carries, the greater the benefit from optimization. This feature makes the optimization method easily adaptable to logistics solutions in warehouses with mobile robots.

Relative energy savings were observed to be more significant along shorter path segments. This is because, as the path length increases, the relative contributions of the start and end segments (where accelerations occur) to the total energy consumption decrease. Nevertheless, the savings remained substantial for path segments up to at least 8 meters. For rotational trajectories, energy savings were also considerable, particularly when compared with the default trapezoidal speed profile.

The proposed optimal speed profiles, which incorporate all relevant motor and robot parameters, facilitate easy adaptation to different differential drive platforms with minimal

effort. Additionally, the paper presents an analysis of how trajectory times and maximum speeds vary with changing payloads.

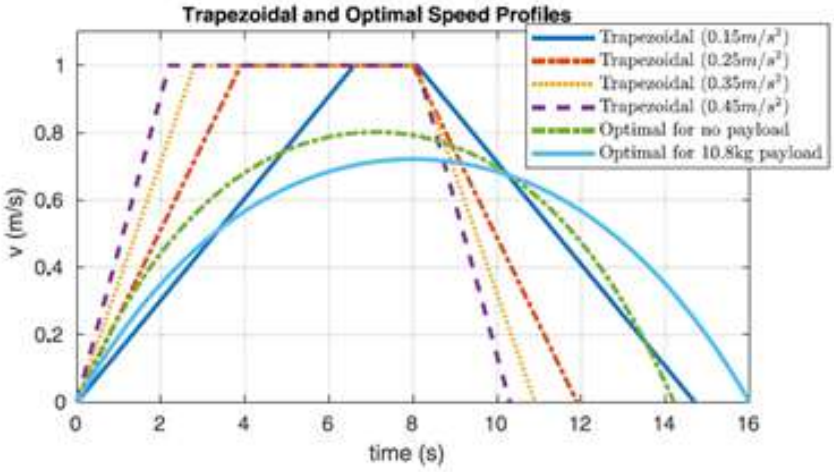

fig1. Different speed profiles used in the tests for the 8m long trajectory.

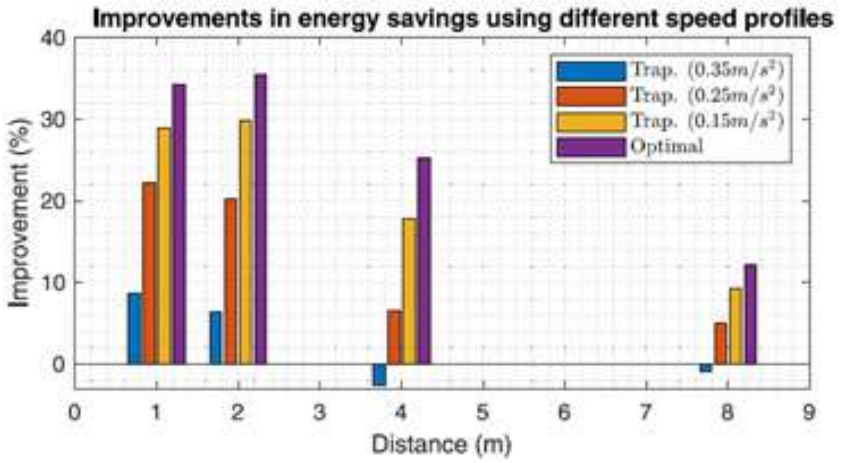

fig2. Energy savings (in %) along different paths compared with the default speed profile with 10.8 kg payload.

Biography

Dr. Mauricio Fernando Jaramillo Morales is a robotics researcher focused on mobile robots, energy estimation, and optimization. He holds a degree in Electronic Engineering, a Master's in Industrial Automation, and a PhD in Engineering with an emphasis on Automation, all from the National University of Colombia. His doctoral thesis received distinction. In 2018, he completed a research internship at the University of Coimbra, Portugal, where he validated mathematical optimization models in mobile robotics. The results were presented at major European robotics conferences and published in scientific robotic and optimization journals. He also participated in an international educational project co-funded by the European Union, during which he served as a lecturer at the University of Warmia and Mazury in Olsztyn, Poland, in the Faculty of Mathematics and Computer Science. There, he taught the courses of Phyton and R computer language.

Study of Plastic Waste on the Surface and Soil of a Stream Bank in Argentina

A. Grigera[1], S. Montecinos[1, 2, 3] and **S. Tognana[1, 2, 4]**

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[2]CIFICEN (UNCPBA-CICPBA-CONICET), Argentina
[3]CONICET, Argentina
[4]CICPBA, Argentina

Plastic pollution is increasing, especially in water bodies and their banks, which represents a risk to aquatic ecosystems and human health. Therefore, determining the presence, quantifying and characterizing plastic waste present in waterways and surrounding areas is essential to identify sources of pollution and develop mitigation strategies. This study analyzed the presence of mesoplastics and macroplastics on the surface and in the soil of the banks of a contaminated area of the Langueyú stream, located in the Pampas Region of Argentina, with sampling carried out in four defined areas. The combined area of plastic debris collected from the surface represented 19.4% of the total sampled area, and 70.7% of these corresponded to single-use plastics, with bags being the most prevalent. A total of 331 plastics were extracted from the soil, 93.7% of which were mesoplastics, primarily bags, threads, and rigid plastics. Among the macroplastics, the most common categories were threads, wrappers, and bags. Approximately 73.6% of the plastics debris extracted, both from the surface and macroplastics from the soil, were white or transparent, and around 40% of the debris had areas smaller than 10 cm^2. The meso/macroplastic quantity ratio was 0.07 on the surface and 14.76 in the soil. The macroplastics present on the surface of the riverbank would probably come from flooding events and inappropriate waste disposal. Wind could also play a role by transporting macroplastics trapped in vegetation into the water or away from the banks. Another important process observed was the burial of macroplastics in the banks and their degradation into mesoplastics. The results were analyzed within the framework of local and national environmental regulations and compared with current legislation on single-use plastics in other countries in the region and abroad.

Biography

Agustina Grigera Paladino holds a degree in Environmental Technology from the Universidad Nacional del Centro de la Provincia de Buenos Aires, Argentina. Her undergraduate thesis focused on the characterization and distribution of macro- and mesoplastics in the Langueyú stream basin, located in Tandil, Buenos Aires. She has practical experience in environmental research, data analysis, and environmental regulations, and is particularly interested in plastic pollution in aquatic environments. This work contributes to the understanding of the impacts of poorly managed plastic waste on urban waterways. Agustina is also engaged in sustainability projects and is currently improving her English communication skills to expand her international academic involvement.

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Post-Conflict Economic Recovery and Land Policy in South Korea between 1948 and the Early 1960s

Jungho Park[1], Manhee Han[2] and **Youngjae Lee[3]**

[1]Cheongju University, South Korea
[2]University of Seoul, South Korea
[3]LX Spatial Information Research Institute, South Korea

A multiplicity of issues impact upon post-conflict economic recovery, one of which is land policy. Depending on the policy adopted, it could promote post-conflict economic growth, but it could also hinder the economy. This study reviews post-conflict economics and land conceptually and analyses the effect of land policy on post- conflict economic recovery in South Korea. Conceptually, post-conflict economy and land are interrelated in terms of security of land tenure, the land market, land (taxation) reform and revenue. Land tenure is secured through land reform in post-conflict situations. Security of land tenure stabilises and revitalises the land market, which leads to an increase in land tax. In addition, land taxation reform provokes an increase in land tax, and land tenure needs to be secured to maximise land tax collection through land taxation reform. The revenue collected through revitalisation of the land market and land taxation reform is utilised to stimulate post-conflict economic recovery. However, the South Korean case is not completely in line with the conceptual relationship. First, land taxation reform in South Korea resulted in an increase in public revenue, and the government was able to spend this revenue in supporting the war and partially stimulating post-conflict economic recovery. On the other hand, land tax reform could promote post-conflict economic recovery at the national level, while at the same time causing poverty at the individual level. Second, the South Korean case suggests that the foundation for the land market was laid during the post-conflict period and an increase in revenue through the revitalisation of the land market mainly contributed to economic development after the post-conflict period. In South Korea, land taxation reform

had been more important than the land market for post-conflict economic recovery.

Biography

Ph.D at University of Birmingham, UK (2016-2019).

Teaching fellow at Cheongju University, S.Korea (2020-2021).

Teaching fellow at University of Seoul, S.Korea (2021-2022).

Senior researcher at LX Spatial Information Research Institute, S.Korea (2021-2024).

Assistant professor at Cheongju University, South Korea (2024-present).

Exploring the Immeasurable Perceptual Dimensions in Louis Kahn's Geometric Spatial Compositions

Pin-Yin Liu[1], Chin-Feng Lin[2] and **Bih-Chuan Lin[3]**

[1]Master Student, Graduate School of Architecture, Da-Yeh University, Taiwan
[2]Assistant Professor, Department of Architecture and Interior Design, Dayeh University, Taiwan
[3]Assistant Professor, Graduate School of Architecture, Da-Yeh University, Taiwan

Louis I. Kahn, one of the most influential architects of the twentieth century, redefined modern architectural language through a profound re-engagement with geometry, spatial order, and metaphysical sensibility. Central to his architectural thinking is that a building begins with the immeasurable, proceeds through measurable processes during design, and ultimately returns to an unmeasurable perceptual experience. This study investigates how Kahn's architecture—through rigorous geometric form-making and poetic spatial articulation—evokes sensory and spiritual dimensions that transcend functionalism and rationalism. Drawing upon Kahn's theoretical statements and a close reading of his built works, this research adopts a qualitative, interpretative methodology incorporating architectural drawings, spatial analysis, and phenomenological insights. The study mainly focuses on how Kahn utilizes pure geometric forms—cubes, voids, circles, and symmetrical arrangements—to construct formally powerful and emotionally resonant spaces. These forms often organize space through the interplay of solids and voids, establishing a dynamic between light and shadow, weight and lightness, and presence and absence.

A key aspect of Kahn's spatial logic lies in the distinction between "served" and "servant" spaces, reflecting his pursuit of architectural clarity and human-centered experience. The "served" space refers to the primary programmatic functions, while the "servant" space includes circulation, structure, and support elements. Through geometric manipulation, Kahn integrates these layers into a spatial hierarchy that is both legible and poetic. The result is an architecture that invites the user to inhabit, reflect, and perceive space on both a physical and metaphysical level. The research also explores how Kahn's manipulation of natural light—channeled through calculated geometric apertures and structural devices—

heightens spatial perception. Light, for Kahn, was not merely functional but a material of architecture, shaping atmospheres, revealing material textures, and creating moments of revelation. Geometry, in this context, becomes not just a compositional tool but a vehicle for transcendence, guiding perception beyond the visual toward the spiritual. Ultimately, this study argues that Kahn's geometric compositions are exercises in formal clarity and embodied spatial experiences that construct a layered and immeasurable world of perception. His architecture challenges the limits of rational design, reasserting architecture's capacity to evoke awe, introspection, and a sense of timelessness. By reinterpreting geometry as structure and spirit, Kahn's work offers a powerful model for rethinking architectural meaning in the modern age.

Biography

Pin-Yin Liu is a graduate student at the Graduate School of Architecture at Da-Yeh University in Taiwan. She majors in architecture design but has developed a strong interest in modeling, particularly by using Sketchup and UNREAL Engine to create realistic representations. This interest has led her to focus on this area. Additionally, she excels in participating in relevant discussions and engaging in thoughtful reflections.

Recent Developments of 3R Activities in Indonesia

Endiarjati Dewandaru Sadono

Asian Institute of Technology, Thailand

Although the regulations on 3R activities are currently enacted, however, in practice, the dominant method for waste handling in Indonesia is still collect-transport-dispose. This creates problems in the landfill sites. Waste banks and TPS3R are a form of community-based 3R activity that is expected by the government to reduce waste that goes to landfill sites. However, previous studies mainly discussed waste banks or TPS3R at the regional level. This study seeks to discuss the performance of waste banks and TPS3R at the national level using the latest data from the Ministry of Environment and Forestry. This study shows that both waste banks and TPS3R contribute to a decrease in waste entering landfills. This study also finds that waste banks perform better than TPS3R in terms of capacity to treat waste, whereas TPS3R performs better than waste banks in operational sustainability. However, there is still a huge amount of waste that cannot be treated by both entities, and the amount of waste continues to increase during the COVID-19 pandemic. Therefore, this study draws policy recommendations based on these results, such as enhancing the performance of waste banks and TPS3R and increasing public participation in waste separation at the source.

Biography

Endiarjati Dewandaru Sadono is a PhD student at the Asian Institute of Technology, Thailand. He obtained his master degree from Universitas Gadjah Mada, Indonesia in 2016, majoring development economics. Since 2016, he worked as a researcher at the Center for Energy Studies, Universitas Gadjah Mada. During that time, he actively involved in various research project related on energy and environmental economics and policy in Indonesia. He also published several scientific papers in peer-reviewed journals during his time at the Center of Energy Studies, Universitas Gadjah Mada.

Rights and Resilience: Building a for Framework Indigenous Empowerment

Sarthak Goel[1] and **Amanjeet Kaur**[2]

[1]Postgraduate Student, Department of Building Engineering and Management, School of Planning and Architecture, India

[2]Assistant Professor, Department of Architecture, National Institute of Technology, India

Indigenous architecture stands as a profound expression of cultural identity, heritage, and the deep-rooted connection between communities and their natural environments. It reflects not only the tangible aspects of construction but also the intangible values, beliefs, and traditions that shape indigenous ways of life. Despite this rich cultural significance, indigenous communities across the globe continue to grapple with a range of enduring challenges. These include cultural erosion, forced displacement, economic inequalities, environmental degradation, health disparities, legal marginalization, discrimination, social fragmentation, and political underrepresentation. Collectively, these issues threaten the resilience, autonomy, and overall well-being of indigenous populations.

While various laws and policy instruments have been introduced to protect and support indigenous communities, there remains a notable absence of a unified and structured framework that holistically addresses their development and rights. This study responds to that gap by emphasizing the urgent need for a comprehensive and inclusive approach. Employing qualitative content analysis, the research undertakes an extensive literature review, analysing and comparing a wide array of legal and policy measures aimed at indigenous empowerment. The analysis identifies critical gaps, inconsistencies, and areas where existing frameworks fall short in ensuring long-term resilience and justice.

Based on the findings, the study proposes a comprehensive, adaptable framework that integrates legal, social, cultural, and environmental dimensions of indigenous resilience. This framework is intended to serve as a guide for policymakers, community leaders, researchers, and organizations committed to indigenous empowerment. Ultimately, the re-

search aspires to contribute to a more just, inclusive, and sustainable future for indigenous communities worldwide.

Biography

Sarthak Goel is a postgraduate student in Building Engineering and Management at the School of Planning and Architecture, New Delhi, with a background in Architecture (B.Arch.) from NIT Hamirpur. His work focuses on amalgamating traditional and modern construction practices to develop a sustainable society, with a strong interest in policy, resilience, and community-centric design. Deeply committed to research that bridges governance and indigenous knowledge systems, he aims to strengthen built environment responses to social and environmental challenges.

He was awarded Best Paper for “Formulating Framework for the Resilience of Indigenous Communities, ” published in a Scopus-indexed Springer volume. His recent research on wildfires investigates policy gaps, land-use transitions, and built environment vulnerabilities in rural–urban fringe areas.

His other contributions include a Springer book chapter on wetland conservation, studies on sustainable development in hill towns, and socially inclusive streetscape design in hilly regions. Sarthak leverages interdisciplinary research to influence development policies, promote environmental stewardship, and drive inclusive, context-sensitive solutions for long-term societal impact.

Challenges and Solutions for Water Security and Availability in South America

Navjot Hothi

UPES, India

Water is a fundamental resource for sustaining life and promoting sustainable development, yet access to clean and safe water remains a persistent challenge across South America. Despite the region's rich hydrological assets—such as the Amazon and Paraná Rivers—water security is increasingly compromised by rising demands from agriculture, industrialization, and rapid population growth. Compounding these pressures are widespread issues of water contamination stemming from mining operations, inadequate sanitation infrastructure, and unchecked industrial discharges, posing serious threats to both ecosystems and public health. Countries like Peru and Bolivia face acute water scarcity, particularly in rural and high-altitude regions, where infrastructure gaps are pronounced. In response, many indigenous communities have preserved and adapted traditional water management practices that offer sustainable and culturally appropriate solutions. This paper explores the multifaceted challenges of water security in South America and highlights community-driven and policy-based approaches to improve water availability and quality across the region.

Biography

Dr. Hothi is a distinguished Theoretical High Energy Physicist, specializing in the field of Quantum Chromodynamics and Regge Trajectories and Exotic Hadrons. Her research interests also extend to Physics Education Research and Environmental Sciences. Dr. Hothi is passionate about promoting Physics education and has created approximately 25 audio and video lectures covering various topics in Physics to further this endeavour. Dr. Navjot's remarkable academic journey includes receiving the Junior Research Fellowship (JRF) and Senior Research Fellowship (SRF) from UGC under the Research Fellowship in Science for Meritorious Students (RFSMS) scheme during her Ph.D. pursuit. She also received a prestigious cultural fellowship from the Ministry of Culture for "Sitarwaden, " a recognition she held for three years.

Tracking Plastic Pollution from Land to River along the Ganga Basin

Ekta Sharma[1, 2], Ruchi Badola[1], Syed Ainul Hussain[1] and **Heather Koldewey[3, 4]**

[1]Ganga Aqualife Conservation Monitoring Centre, Wildlife Institute of India (GACMC, WII), India
[2]Forest Research Institute Deemed to be University (FRIDU), India
[3]Department of Conservation and Policy, Zoological Society of London (ZSL), UK
[4]Centre for Ecology and Conservation, University of Exeter (UOE), UK

The Ganga River, a vital freshwater artery sustaining millions, is increasingly threatened by pervasive plastic pollution resulting from widespread consumption and inadequate waste disposal systems. Despite growing attention to marine plastic pollution, freshwater ecosystems, particularly in the Global South, remain critically understudied, obscuring key insights into terrestrial, aquatic plastic leakage pathways. This study addresses this research gap by characterising the magnitude and typology of plastic debris in both urban and underexamined rural communities along the Ganga River in India, with an emphasis on identifying source-reduction strategies. Using a stratified random sampling framework, plastic waste was systematically documented through transect-based surveys and categorised by item type. A total of 37, 730 plastic items were collected, predominantly consisting of packaging materials (52.46%), plastic fragments (23.38%), tobacco-related waste (5.03%), and single-use disposables (4.73%). Litter density in floodplain zones was substantially higher, nearly 28- fold, compared to riverbanks (6.95 items/m^2 vs. 0.25 items/m^2), with marginal variation between high- and low-population-density areas (7.14 vs. 6.7 items/m^2). No statistically significant differences in plastic density were observed between rural and urban zones (V = 41, p = 0.19), with mean values of 0.87 and 0.81 items/m^2, respectively. Similarly, seasonal variation was not significant (V = 13, p = 0.30), although treatment site differences were pronounced (Chi^2 = 10.667, p = 0.004), largely attributed to flood-related redistribution. These findings highlight the pressing need for integrated, context-specific waste management interventions encompassing decentralised governance, industrial responsibility, and community engagement. To mitigate plastic leakage from riverine to marine environments,

strengthened baseline data, robust monitoring, and the enforcement of Extended Producer Responsibility (EPR) frameworks are essential for safeguarding freshwater ecosystems.

Biography

Ekta Sharma is an applied environmental researcher with over ten years of experience in community-based conservation and plastic pollution assessment in freshwater systems. As Principal Project Associate at the Wildlife Institute of India, she leads field- intensive community-based conservation initiatives and livelihood-based interventions under the National Mission for Clean Ganga. She is currently pursuing a Ph.D. in Forestry, with a research focus on the challenges and context-specific solutions to plastic pollution in riverine communities along the Ganga Basin. Her work integrates spatial mapping, household waste characterisation, and socio-behavioural analysis to investigate plastic leakage pathways. A contributing member of global collaborations such as the National Geographic “Sea to Source" expedition, she brings grounded evidence from remote geographies to inform sustainable river management and policy design.

Harnessing the Potential of Millet-Based Microbes: A Sustainable Path for Health and Wellness

Kiran Kumar Mudnakudu-Nagaraju

Department of Biotechnology & Bioinformatics, School of Life Sciences, JSS Academy of Higher Education & Research, India

Background: Millets offer a viable platform for the isolation of beneficial microbes that promote health, especially lactic acid bacteria (LAB), due to their resilience, nutritional value, and low ecological footprint.

Objective: This study is to investigate, describe, and evaluate the probiotic potential of LAB strains isolated from different millets in order to provide cost-effective and sustainable probiotic substitutes that are suited to local dietary requirements.

Methodology: LAB stains were isolated from nine different millet grains and characterized them for potential probiotic activity by analysing its fermentation potential, acidification, utilization of different carbohydrates, citric acid uptake, pectinolytic activity, phytic acid degradation and diacetyl production. Two strains, *Lactococcus lactis* and *Pediococcus pentosaceus*, were chosen for preclinical study in a murine model of allergic asthma. Briefly, Balb/c mice was sensitized with cockroach allergens whole body extract (CWE) and treated them with prebiotic, prebiotic-probiotics formulation and postbiotics. Further, the effects of treatments were studied by analysing the cellular infiltrations in bronchoalveolar lavage fluid and lung, CWE-specific IgE and IgG1 levels in serum, inflammatory cytokine levels, Treg cell population in spleen and mesenteric lymphnodes and expression levels of IL-10, IL-4, IL-5 and Muc5ac in lungs.

Results: Out of 268 bacterial isolates from millet grains, seven LAB strains qualifying under the Qualified Presumption of Safety (QPS) list were further characterized. L. lactis and P. pentosaceus were prioritized for in vivo evaluation based on their superior fermentation profiles. Notably, treatment with a millet-based prebiotic + L. lactis formulation significantly attenuated hallmarks of allergic asthma, including eosinophilic infiltration, lung inflam-

mation, elevated CWE-specific IgE/IgG1, and increased IL-4, IL-5, and Muc5ac expression. A similar immune- protective effect was observed with the W. coagulans formulation, although reductions in IgG1 and TH2 cytokines were less pronounced.

Conclusion: Millet-derived LAB strains demonstrate excellent probiotic attributes, highlighting their potential in developing indigenous, sustainable functional foods that support gut health and immune modulation. This approach aligns with One Health and UN SDGs by promoting local agrobiodiversity and affordable healthcare solutions.

Biography

Dr. Kiran Kumar M.N. is an Assistant Professor based in JSS Academy of Higher Education & Research, Mysuru, Karnataka, India, with over 15 years of experience in immunology, allergic diseases, allergen-specific immunotherapy, millet-based functional foods and probiotic research. He earned his Ph.D. in Immunology and allergy from the Technical University of Berlin. Later, Postdoctoral work was carried out from Harvard Medical School, USA and InStem, Bengaluru, India. His work includes isolating and characterizing lactic acid bacterial starins from traditional millet grains and fermented foods, leading to several recognized strains with antioxidant, antimicrobial, and gut-health benefits. Currently, Dr. Kiran Kumar leads projects on sustainable probiotic development, food security, and value-added nutrition funded by Indian Council for Medical Research, GoI, India. He has over 30 peer-reviewed publications, patent, and delivered talks at national and international conferences. He mentors doctoral students, emphasizing cross-disciplinary approaches in Immunology, functional foods, and public health. Dr. Kumar's efforts support UN Sustainable Development Goals by promoting affordable nutrition, preserving agrobiodiversity, and science-driven innovation.

Climate-Resilient Infrastructure and Land use Planning: Synergies for Sustainable Urban Transformation

Aditya Singh

Amrita Vishwa Vidyapeetham, India

The extremities in the climate across the globe had been occurring without a stoppage, which has become a serious matter, and that has raised the requirement for infrastructure which could not only withstand, but also adapt as well as recover from environmental shocks, even more at present in comparison to past. The vulnerabilities worsen due to simultaneous poor land use decisions, rapid urban expansion in addition to fragmented governance. This study explores the intersection of climate-resilient infrastructure as well as adaptive land use plan as a dual method to develop sustainable, comprehensive as well as future-proof cities. The study further considers the gaps in the current literature, as well as covers real world instances from Asian and European countries. Moreover, flood resilient drainage systems, green buffer zones, in addition to heat resilient housing models incorporated within strategic zoning policies. More focus is given on the mechanisms of governance, financing models, and stakeholder coordination, especially climate bonds and blended finance. This study will further help in offering a multidimensional understanding of the way resilient infrastructure, when incorporated within proactive land use frameworks, could make gushing advantages across environmental equity, economic stability, disaster preparedness, and health. Then, some supporting graphical analysis will be performed to assist this study and understand the future climate resilient infrastructure. This integrated lens could guide urban planners, policymakers and researchers in designing highly adaptive systems which could resist climate shocks and catalyze long-term systemic resilience.

Biography

Er. Aditya Singh is an Independent Researcher, Editorial Review Board Member in 6 American International Journals (IJSSMET, IJSDS, IJPAE, IJESGT, IJDSST, IJRLEDM), Reviewer in 9 American, 5 Singaporean & 1 Indonesian based International Journals (IJUPSC, IJCVIP, IRMJ, JTA, IJAIBM, JITR, IJSSSP, IJAIEF, IJEOE, JDSIS, AAES, JCCE, SWT, JOPR, IJEECS), Research Mentor at Academy Innova World, India, Alumni Mentor registered by

Amrita University Alumni (Amrita Vishwa Vidyapeetham, India), & Ex- Alumni Mentor (LPU) at present. He had completed his regular B. Tech degree in Civil Engineering from Lovely Professional University, India, in 2020, completed M.Tech in 2025 from Amrita Vishwa Vidyapeetham, while working globally continuously from 2020 onwards. He is affiliated with Amrita Vishwa Vidyapeetham, India. He has 31 publications under his name, in which he is a single author in 22 of them. Most of his publications are Indexed in Scopus. He had also worked as a Reviewer/Editorial Review Board Member for 166 times in the evaluation of manuscripts so far in international conferences, international books and international journals. He had also won 2 International Awards((Thailand) & (Cambodia)) as a Reviewer in 2023. He had worked on 60 positions so far in his professional career, including Journals, Conferences, Research Books of International stature.

Material Testing Parameters as a Catalyst for Achieving Sustainable Development Goals

Sunil Kumar Hemanth M and **Jai Aultrin K S**

Noorul Islam Centre for Higher Education, India

In pursuit of sustainable engineering solutions, aligned with United Nation's Sustainable Development Goals (SDG), this research evaluates four agriculture waste materials of oil residues like Coconut (COR), Groundnut (GOR), Sesame (SOR) and the combination of three materials (CGS) for material testing. To determine the suitability for environmentally conscious applications in mechanical sectors, various material tests are conducted. These materials manufactured through compression moulding and then tests like tensile, wear, hardness and flexural strength with results analyzed to identify the optimal use cases which supports SDG 9, SDG11 and SDG 12. From the testing results, each of the material gains scope in applying properties like GOR exhibited the highest tensile strength of 22N/mm^2 and flexural strength of 100 N/mm^2 making it ideal for load bearing components such as brackets and light weight mounts, while its elevated wear loss of 0.025g suggests the need of surface treatments or hybrid integration to enhance durability. CGS material explored superiority in hardness testing of 41 HRM and minimal wear loss of 0.003g, indicating strong potential for high impact wear resistant applications like brake pad back plates and machinery guards. COR, with lowest wear loss of 0.002g and moderate flexural strength of 75N/mm^2, which is suited for low-load interior components, promotes longevity and reduced material turnover. SOR offered balanced properties which is viable for enclosures, light duty gears and sustainable packaging goods. These applications suggestions were mapped to each of the strengths and limitations with SDG goals perspective that guides with responsibility. To maximize sustainability impact, this research explores the usage of materials COR and CGS that requiring low wear and long life, Material GOR for strength and critical applications with wear mitigation strategies and hybrid assemblies to balance performance and resource efficiency. By aligning material selection with mechanical performance and sustainability criteria, this research supports the development

of durable, resource efficient which reduces environmental impact and extend product life cycle aims to contributing to broader framework for responsible engineering in happening climatic issues.

Table 1: Material Comparison for application based on results.

Characteristics	Material COR	Material GOR	Material SOR	Material CGS
Strength	Lowest Wear loss, Average Flexural strength	Highest Tensile strength and flexural strength	Balanced Mechanical properties	High hardness, low wear
Limitations	Low tensile strength and hardness	Highest Wear loss	Moderate wear and hardness	Lowest flexural strength
Suggested Applications	Interior automotive components, low-load housings	Structural brackets, load bearing parts	Battery casings, electronic enclosures	Brake pad back plate, tool handles
SDG Alignment	Promotes material efficiency and low wear – SDG 12	Supports durable infrastructure and light weight transport - SDG 9, SDG 11	Enables responsible production with moderate durability – SDG 12	Enhances longevity and safety in harsh environments – SDG9, SDG 2

Biography

Sunil Kumar Hemanth M, holds a Bachelor of Engineering (BE) in Mechanical Engineering, completed between 2010 and 2014, and a Master of Engineering (ME) in Engineering Design, earned from 2014 to 2016. Currently, Sunil is pursuing research in Computer-Aided Design (CAD) and Computer-Aided Engineering (CAE), with a focus on eco-friendly materials. With approximately seven years of professional experience as a Design Engineer in the automotive industry, Sunil has developed extensive expertise in using advanced design software tools such as UGNX and CATIA. Additionally, Sunil is proficient in handling a variety of CAD and CAE packages, including ANSYS, showcasing a versatile skill set in engineering design and analysis. Sunil's work is characterized by a commitment to sustainable and innovative engineering practices, contributing to the development of environmentally friendly materials and technologies.

Characterization of Driving Dynamics and Real-World Emissions in Heavy-Duty Vehicles Considering Load-Dependent Variability

Saket Ranjan and **Shiva Nagendra S.M**

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Heavy-duty vehicles (HDVs) represent a relatively small fraction of the vehicle fleet, they contribute disproportionately to air pollution. However, published data on emissions from heavy-duty vehicles in India remain limited, and real-world measurement of emission factors for both regulated and unregulated pollutants pose considerable challenges. Accurate estimation of vehicle activity is therefore essential for reliable emission assessments. This study investigates the real-world emission characteristics of NOx, unburned hydrocarbons (HC), CO, and CO_2, along with the driving behavior of diesel HDVs compliant with Indian emission standards. Vehicles were tested under different loading conditions using a portable emissions measurement system (PEMS) to evaluate operational emissions. On-road emission factors (EFs) measured under empty load (with and without trailer) were compared with those at full load capacity. The results showed that driving patterns varied across load conditions, leading to higher emissions. Emissions increased by approximately 12% for CO, 19% for HC, 38% for NOx, and 34% for CO_2 when shifting from an empty trailer to full load capacity. Real-world emissions exhibited a polynomial trend, with regression fitting effectively capturing the initial rise with speed and stabilization beyond moderate speeds (10–20 km/h). Acceleration increased emissions by 25–37%, while cruising led to a 15–19% rise compared to idling. The findings include vehicle attributes, acceleration and speed activity profiles derived from real-world data, as well as potential factors influencing emission factors. The estimated emission factors exceeded Bharat Stage (BS) III and BS IV standards by 8-fold and 14-fold, respectively. By examining emission characteristics under real operating conditions, the study could assist policymakers in developing realistic and effective emission baselines, while emphasizing the need for improved transit management strategies to mitigate vehicular emissions in urban environments.

Biography

Saket Ranjan is a Research Scholar at the Indian Institute of Technology Madras, India. His research focuses on real-world emissions from heavy-duty vehicles (HDVs), machine learning–based emission modeling, and sustainable freight transport solutions. Expertise spans field-based observation, data-driven modeling, and policy-relevant emission and health assessments. He has authored peer-reviewed publications and actively engages in conferences and workshops to promote low-emission transport solutions.

Water Scarcity – Judicial Responses to the Disaster in Making

Priya A. Sondhi[1] and **Anoop Kumar**[2]

[1]Professor and Dean in School of Law, Sushant University, India
[2]Public Prosecutor, Central Bureau of Investigation, India

The emergence of green jurisprudence marks a significant development in environmental law, yet its true effectiveness depends on both awareness and implementation, which remain pressing concerns. Understanding the evolution of this jurisprudence is essential to bring meaningful change in the present context, where environmental protection has become a matter of urgent global importance. A lack of awareness regarding these evolving legal principles not only risks injustice to nature and living beings but also leads to unnecessary multiplicity of litigation.

In this regard, it becomes imperative to examine the extent of knowledge and awareness among key stakeholders of the legal system, including law students, practicing lawyers, members of the lower judiciary, and law teachers. Their understanding of environmental precedents and principles plays a crucial role in ensuring that the objectives of green jurisprudence are realized in practice. Without adequate awareness, the potential of judicial innovations in this field remains underutilized, thereby weakening the larger cause of environmental protection.

In the present paper, the authors seek to analyze the contribution of the judiciary in advancing environmental jurisprudence while simultaneously assessing the level of awareness among these stakeholders. The study is grounded in a twofold methodology: first, a critical examination of existing legal principles and judicial precedents in the realm of environmental law; and second, an analysis of empirical data that reflects the degree of awareness among the identified groups. Through this approach, the research aims to highlight both the progress made and the challenges that remain in embedding green jurisprudence within the fabric of legal education, practice, and adjudication.

Biography

Prof.(Dr.) Priya A Sondhi

Prof.(Dr.) Priya A Sondhi is currently Professor and Dean in School of Law, Sushant University, Gurugram. She was Associate Professor at Bennett University, Greater Noida and formerly the Associate Dean (Academics) at Asian Law College (ALC), Noida. Dr. Sondhi has more than fourteen years of progressive teaching experience which includes teaching graduate and post graduate course in law. She has taught at some of the most reputed law colleges in India like SLS (Pune), ILS Law College (Pune), and NALSAR University of Law (Hyderabad) prior to joining Bennett University. Her insights and training in Disaster Management Law were recognised by the Government of Maharashtra and she was made a Member of State Government Committee for formulation of Rules under the Disaster Management Act 2005. She has three co-authored books and one coedited book to her credit. The book is one of the most well-read books in the subject.

Dr. Sondhi has numerous publications and paper presentations to her credit, and many of her papers have been published in reputed law journals.

Anoop Kumar

Anoop Kumar is currently posted as Public Prosecutor in the Central Bureau of Investigation (CBI), ACB, New Delhi. He is also pursuing Ph.D in law from Bennett University, Greater Noida, U.P. he has also worked as Assistant Prosecution Officer (APO) for the Government of Bihar. He completed B.A. LL.B. (Hon.) from Dr. Ram Manohar Lohiya National Law University, Lucknow, and LL.M. from NALSAR University of Law, Hyderabad. He has qualified UGC-NET. He has many publications in law journals and books. He is the co- author of books The Code on Industrial Relations 2020, Laws Relating to Life of a Woman and Protecting Little Angles: An Insight Into Child Rights and Laws. He won 3rd prize at Ejurix National Essay Writing Competition (2008). Also, he won 3rd prize at 7th and 8th Independent Thought National Legal Essay Writing Competitions.

How to Benefit From Halophyte Plants Under Global Climate Change? The Road to Using Potential of Salt Tolerant Barley Species to Increase Salinity Tolerance of Rice

Vadim Volkov[1] and **Yizhou Wang**[2]

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Objectives: Climate change within the 20th century led to the global mean surface temperature increase which caused melting of polar ice caps and rise of water level in oceans, by about 20 cm. Ongoing climate change results in the further rise of sea level, flooding of large territories, salinization of agricultural lands, shortage of freshwater and desertification. Salinization of agricultural lands and subsequent migrations of populations may result in food insecurity and social disasters. At present, salinization costs over 27 billion USD to world agriculture only per a year.

Methodology: The analysis of salinity tolerance of main agricultural plants under increasing land salinization questions whether and how the problem of food security under global climate change could be released. Global production of wheat makes about 100 kg/(person per a year) (https://www.statista.com/topics/1668/wheat/), rice yields to 65 kg/(person per a year) (https://worldpopulationreview.com/country-rankings/rice-production-by-country), barley production is 18 kg/(person per a year) (https://worldpopulationreview.com/country-rankings/barley-production-by-country) (2022-2023). Wheat and more vulnerable rice essentially reduce productivity at moderate soil salinities over 50-100 mM NaCl, cultured barley is among the more salt tolerant plants. Salt tolerant halophyte wild species of barley (*Hordeum murinum* and especially *Hordeum marinum*) grow at salinities up to seawater.

Results: The present research results describe the effects of salinity on tolerance and productivity of cultured barley *Hordeum vulgare* and its more salt tolerant wild relative *Hordeum murinum* with attention to molecular mechanisms underlying the tolerance. Essential rise of salinity tolerance in rice is expected by means of modern tools of breeding and molecular biological intervention to plant genome based on known results from more salt tolerant monocot barley.

Conclusions: Though the undisputable only solution of global warming and its consequences is the abrupt decrease in emissions of greenhouse gases, still the developing agriculture may provide certain buffering capacity to ensure global food security.

Biography

Vadim Volkov is currently a Leading Research Scientist in K.A. Timiriazev Institute of Plant Physiology, Russian Academy of Sciences. He graduated from the Moscow State University and got his PhD at the age of 32 years from Russian Academy of Sciences in 1990s during the difficult times after collapse of the USSR and after his obligatory military service which interrupted his University studies. He worked in biomedicine over 15 years in the UK and the US. His main research interests include mechanisms of salinity tolerance in plants; electrophysiology and structure of ion channels with applications in cellular cardiology and nephrology; mechanisms of vision at the level of photonics. He is a member of editorial boards of 4 international journals (all top 25% in the corresponding areas); Co-Editor of two Books on the subjects described above, Author of 5 Book Chapters and over 30 publications in journals.

European Baykal and Landscape Society

Nataliya Pozhidaeva and **Victor Pozhidaev**

The National landscape salvation fund (NLSF) & the International Informatization Academy of the General and Consultative Status of the ECOSOS UN, Russia

Structuring biosphere through suggested approach and using only 2 key indicators of sustainable development, we can ensure its practice. "Territories of sustainable development" (foreseeable achievable result) - instead of "sustainable development of territories" (an indefinitely long process). The project is based on N. Pozhidaeva research "Formation of national socio-natural (and natural) landscapes system - a real path to sustainable development", unanimously approved by PACE as a pan-European program and numerous international conferences.

The goal is to demonstrate such practice at the initial, local level. The cartographic method, comparative analysis, phenological observations, surveys, statistics were also used. The awareness of the lack of alternatives of balanced development in the mass consciousness is carried out primarily at the initial level: man - landscape. Usually, local people know nothing about this problem: importance for life's quality, their corresponding joint activity capabilities. In 2016 the socially depressed mini-town Przhevalskoye (Smolensk region) in high quality natural territory (UNESCO biosphere reserve) was elected.

German landscape science and then Russian landscape science are original. The joint publication in Springer "The European Baykal – regional development, inspired by the European Landscape Convention" became the result of Russian-German conference, Przhevalskoye, (2018).

The startup includes:

1. The author's strategy for Przhevalskoye, approved by the administration and deputies.
2. Golden Age Museum and park of Nataliya & Victor Pozhidaev. Landscape society layouts:

Earth, Australia, Russia, Przhevalskoye; 365 Landlongevity passports, the book- map “The soul of landscape”, with doll’s parade “The Patron of technocrats against the Knight of Landscapes”, 12 month’s houses layouts, 7 harmony apple-trees, etc, terrain curs. Scientific research+ game scenario=synergetic effect.

3. The Landlongevity sessions for residents, tourists, decision makers, scientists. Leading Russian geographies, psychologists, etc were included in Scientific council.

Conclusions: The sustainable development practices are effective by offered landscape approach. The local level is especially important for start.

Biography

Nataliya Pozhidaeva – graduated from Moscow state university, economic geographer, the president of NLSF, full member, leader of department of the International Informatization Academy in General ECOSOS UN Status, initiator and one of developers of the draft law "On the National Landscape" (approved by the State Duma Council) the member of working group of Ministries of Economic development Science and Natural resourses, prepared Russian strategy of sustainable development, expert for spatial and landscape planning, journalist. Her development was assessed by the government as an "another cross-section of all sustainable development problem". Papers at INTO Conferences - Edinburgh, Washington (key reporter), New-Delhi. UN Information Center, Moscow, assessed Nataliya &Victor Pozhidaev exhibition “Landscape society” as "a truly innovative project". Together they organised and participated in about 7 official parliamentary meetings, devoted to the sustainable development and innovation landscape approach.

(Re-)Circulation of Timber from an Architectural Perspective: A Review of Design Strategies, Opportunities and Challenges

Rafael Novais Passarelli

Faculty of Architecture & Arts, Hasselt University, Belgium

The transition to a circular economy is gaining momentum as an alternative to the linear take-make-use-dispose model. Timber-based building materials have received renewed attention due to their role in both natural renewable and technical cycles, offering lower embodied energy than conventional materials, such as concrete, steel or masonry. Moreover, academics and practitioners are investigating methods to implement Design for Circularity strategies to extend material lifespans, reducing the need for virgin resources and minimizing environmental impact. The circulation of structural timber is, therefore, essential to maximize the long-term benefits of grey energy invested in harvesting, transporting and processing timber, as well as its CO_2 storage capacity. This study explored key prerequisites for the circulation of structural timber, including production processes, architectural adesign concepts, and environmental considerations. These fundamentals were examined alongside a comprehensive literature review to identify opportunities, challenges, and critical knowledge gaps. The goal was to support increased and more effective circulation of structural timber in future construction practices.

Biography

Rafael Passarelli is an architect, researcher and educator with an interest in timber architecture, design for circularity and life cycle thinking. Passarelli currently holds a position as Assistant Professor in Belgium, where he contributes to interdisciplinary teaching and research in the field of sustainable timber architecture and construction. His current research explores the integration of Design for Disassembly and Life Cycle Assessment (LCA) in timber buildings, aiming to support more sustainable design strategies through simulation studies and prototyping.

The Challenge of Reducing the Extreme Dependency of Some CRM on Some Suppliers in Spain after the 2024 European Critical Raw Materials Act

Macarena Larrea Basterra and **Stephanía Mosquera López**

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The drastic reduction of greenhouse gas emissions for the transition to sustainability necessitates a growing supply of critical raw materials (CRMs) to shift towards a greater presence of clean technologies. While all countries require CRMs for decarbonisation, only a few possess the world's most significant mineral deposits or control refining capacities. The European Union (EU) dependency on China's exports of a large number of CRM is extreme in the case of light and heavy rare earths and magnesium, and quite large for scandium and tungsten. The European industrial ecosystem is particularly concerned about this situation.

The EU has been promoting various initiatives aimed at reducing excessive dependence on specific countries and ensuring the resilience of supply chains for nearly two decades, from the 2011 CRM list to the CRM Act of 2024 (Regulation EU 2024/1252). This Act will strengthen the various stages of the strategic raw materials value chain through various measures, aiming to ensure that, by 2030, the EU's annual consumption of each strategic raw material is no more than 65% dependent on supply from any one territory.

The objective of this study is to analyse, understand, and present Spain's situation in terms of its dependence on a set of CRMs, highlighting the evolution of exports and imports of these products between 2015 and 2023. The information used for this purpose is obtained from customs declarations (available at Agencia Tributaria), which, despite some availability limitations, provides a great deal of detail on imported and exported products.

Biography

Macarena Larrea-Basterra

Macarena Larrea-Basterra received a Ph.D. in Business Promotion and Development from the University of the Basque Country (2010). She has a Master's degree in Port and Maritime Businesses and a Degree in Busi-

ness Administration and Management from the University of Deusto. Since 2012, she has been a Researcher at the Energy and Environmental Lab at Orkestra, where she has worked on energy transitions and decarbonization processes from regulatory, economic, and geopolitical perspectives. Since 2021, she has also worked on the regulation, geopolitical risks, and economics (prices and trade) of critical raw materials, contributing to books, book chapters, articles, and presentations.

Stephanía Mosquera-López

Stephanía Mosquera-López (Colombian) received a Ph.D. in Industrial Engineering from Universidad del Valle, Colombia (2018). From 2018 to 2020, she was a lecturer in the Economics Department of the Universidad del Valle—Cali, Colombia. From 2020 to October 2022, she held the position of assistant professor at the School of Economics and Finance at the Universidad EAFIT—Medellín, Colombia. She is currently a Postdoc Researcher at Orkestra—Basque Institute of Competitiveness, Bilbao, Spain, where she works on research projects related to electricity markets and energy transition and decarbonisation processes. Her most recent publications are “Weather conditions, climate change, and the price of electricity” (2024, Energy Economics); “Critical Raw Materials and Strategic Relations between the EU and China: The Role of the EU Critical Raw Materials Act” (2025, Palgrave).

Integrating Circular Economy Principles in Business Strategies: A Policy-Driven Approach

Williams Chibueze Munonye

Linkoping University, Sweden

Integrating circular economy principles into business strategies is facilitated by supportive policies. Drawing from various insights and contexts, this analysis discusses the role of regulatory frameworks, such as the EU's Circular Economy Action Plan and Extended Producer Responsibility, in guiding sustainable practices. Green taxation, including carbon and landfill taxes, incentivizes circular business models by internalizing environmental costs and offering tax breaks. Effective implementation relies on consistent enforcement and global policy alignment, enabling businesses to enhance sustainability and drive innovation for long-term benefits.

Biography

Williams Chibueze Munonye is a sustainability scholar with a multidisciplinary foundation in industrial engineering and a master's degree in science for Sustainable Development from Linköping University, Sweden. His research explores the intersection of circular economy, energy transitions, and public policy, with a focus on urban resilience and environmental justice. Munonye has led and co-authored peer-reviewed publications on topics ranging from renewable energy governance to circular infrastructure design. His academic work interrogates the socio-technical dynamics of just transitions, the integration of digitalization in sustainable urban planning, and the role of financial institutions in enabling regenerative economies. He brings a systems-thinking approach to examining climate risk, supply chain sustainability, and energy equity in Sub-Saharan Africa and beyond. His current research interests include circular energy systems, policy frameworks for large-scale sustainability transitions, and geospatial analysis for climate adaptation. He is passionate about leveraging interdisciplinary methods to support inclusive and transformative sustainability pathways.

Higher Order Circularity Strategies in Wastewater Treatment: A Case Study from Vernacular Settlements of Sri Lanka

K. K. K. Sylva

University of Peradeniya, Sri Lanka

Wastewater treatment methods aim to protect public health and the environment by removing contaminants and preventing water pollution of natural water bodies. Most existing treatment methods, including the costly high-tech methods, focus primarily on single-objective, end-of-pipe solutions devised under a linear production and consumption framework. Such approaches are categorized as lower-order strategies under the concept of circular economy. Higher-order circularity strategies are proposed to maximize resource efficiency while minimizing waste generation effectively. This chapter focuses on opportunities for applying higher-order circularity strategies in wastewater treatment and demonstrates its viability via a case study from vernacular settlements of Sri Lanka, the *Ellangava* system. An *Ellangava* system is an ensemble of multi-objective, ecologically comprehensive, expansive subsystems that employ cost-effective ecological services to enhance water quality and ensure its availability throughout the year. The *Ellangava* system is a series of lakes created for water preservation, and human settlements and related anthropogenic activities are based on the availability of water. Natural treatment methods are used when releasing water for the consecutive subsystem. The essential features to note in this system are the whole system thinking and blending with the natural ecosystem for the survival of life on land and below water. The discussion is extended to identify the advantages of subsystems' contribution to achieving the ecosystem sustainability goals in wastewater treatment through a roadmap that could be applied to the present context.

Biography

Ms Kamani Sylva, a senior lecturer attached to the Faculty of Engineering at the University of Peradeniya, Sri Lanka, contributes to research in sustainable development through the circular economy and social resilience. She has obtained her BSc (honors in Civil Engineering) from the University of Peradeniya and master's degrees in Geotechnical Engineering (AIT, Bangkok), Business Administration (PIM, Sri Lanka) and Energy Systems (Gävle, Sweden). She is the Deputy Director (Research and Environmental Management) at the Center for Environmental Sustainability, University of Peradeniya, Sri Lanka.

The Role and Status of Natural Resources (Mineral, Energy, and Water Resources) in Iran

Mansour Ghorbani[1] and **Mohammad Aria Amini**[2]

[1]Professor of Petrology and Metallogeny, Shahid Beheshti University, Iran
[2]Bachelor's Student in Geology, Golestan University, Gorgan, Iran

The Iranian Plateau, located in the southwestern part of the Asian continent and constituting a segment of the extensive Iranian plateau, occupies a unique geographic and geological position. Covering an approximate area of 2, 600, 000 km^2, it encompasses 1, 648, 195 km^2 of present-day Iranian territory, representing about 3.7% of Asia and 1.1% of the Earth's continental landmass. Geotectonically, the Iranian Plateau is part of the northern Gondwana fragments that, following separation, migrated towards Eurasia and accreted through multiple orogenic phases. This orogenic evolution has resulted in the development of complex and distinctive geological structures that host diverse natural resources and bio-geological phenomena.

From a resource perspective, Iran harbors substantial fossil fuel reserves, including nearly 157 billion barrels of proven oil and 36 trillion cubic meters of gas, with projections indicating potential increases to 200 billion barrels and 50 trillion cubic meters, respectively. Additionally, over seventy metallic and non-metallic mineral commodities have been identified and exploited, with significant contributions to global copper, lead, zinc, iron, chromium, and gold reserves. For instance, the Iranian Plateau contains approximately 10% of the world's copper, lead, and zinc reserves, about 2% of the iron and chromium reserves, and more than 1, 000 tons of gold reserves that may be scalable up to 5, 000 tons.

These data underscore the Iranian Plateau as a mineral and energy-rich region, providing substantial capacity for national economic development. Furthermore, ongoing exploratory studies in deeper geological settings and emerging areas such as eastern Iran hold promise for significant future discoveries. Geological, stratigraphic, magmatic, structural, geodynamical, and metallogenic evidence collectively indicate that Iran represents an undeveloped province with considerable potential in mineral, metallic, non-metallic, and energy resources.

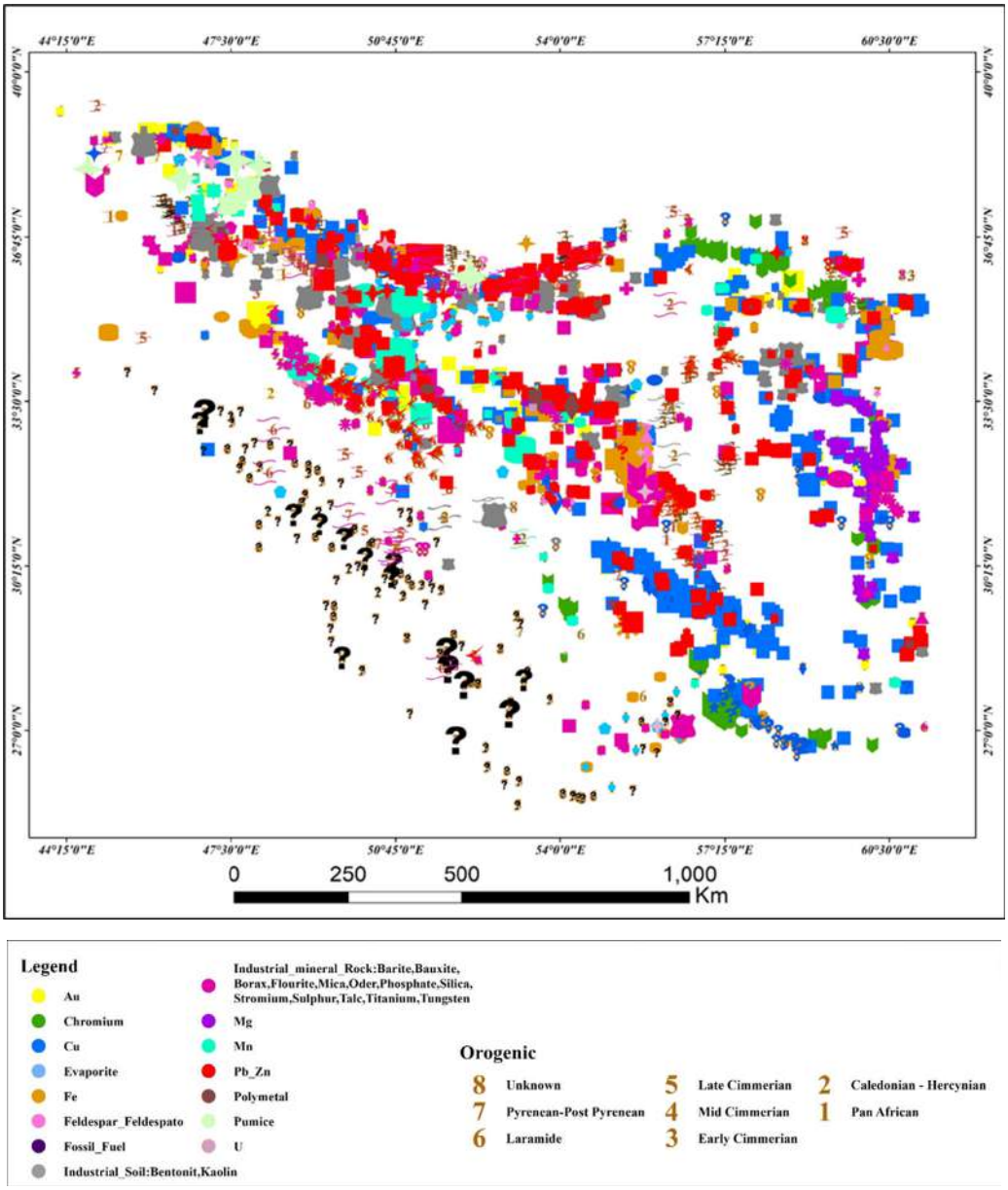

Figure 1: Iran Metallogenic Map indicating regions of metallogenic significance.

Biography

Dr. Mansour Ghorbani

Dr. Mansour Ghorbani is a full professor of geology at Shahid Beheshti University, Iran. He received his M.Sc. and Ph.D. degrees in petrology and metallogeny from the same university and has over 30 years of teaching and research experience. Dr. Ghorbani has authored 42 books and published more than 200 scientific papers in the fields of economic geology, metallogeny, mineral resources, environmental geology, environmental hazards, and natural resources of Iran. His research encompasses comprehensive studies on mineral exploration and geological processes related to tectonic and volcanic evolutions. He has supervised over 100 master's and doctoral theses and has managed numerous national and international research projects in collabora-

tion with mining, oil, and gas companies as well as the Geological Survey of Iran. Dr. Ghorbani is the founder of Pars Geological Research Centre (Arian Zamin), which is active in geoscience research and publication.

Mohammad Aria Amini

Mohammad Aria Amini is an undergraduate student of Geology at the University of Golestan, where he has distinguished himself as the top-ranked student of his cohort in Geology and second-ranked among all incoming students across the entire university. His academic journey has been marked by both excellence and dedication, reflected in the authorship of a scholarly book and the presentation of three research papers at national scientific conferences in Iran.

Beyond academia, he has actively engaged in research and innovation, currently serving as a researcher in knowledge-based and scientific companies with a focus on Earth sciences. His interests span across geology, mineral resources, and applied geoscientific methods, where he strives to bridge the gap between theoretical advancements and practical applications. Mohammad Arya Amini continues to pursue his path as a committed young scholar with the vision of contributing to the advancement of Earth sciences both nationally and internationally.

Assessment of Amine-Based Grinding Aids in Terms of Grinding Efficiency, CO_2 Emissions and Environmental Impact

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Uludağ University, Turkey

The cement industry is one of the most environmentally damaging sectors in terms of energy, raw material consumption, and CO_2 emissions. A considerable amount of the energy used in cement production is consumed during the clinker grinding stage. For this reason, grinding aids (GAs) are used to ensure energy efficiency during clinker grinding. Amine-based GAs is among the most preferred types of GAs in practice. This study aimed to assess the individual and combined effects of two different amine-based GAs on grinding efficiency, CO_2 emissions, and environmental impact, calculated based on CO_2 emissions and electrical energy consumed during grinding. For this purpose, 100% triethanolamine (TEA), 100% triisopropanolamine (TIPA), and a mixture of 50% TEA and 50% TIPA were utilized as GA at two different utilization rates (0.05% and 0.1% of the combined weight of clinker and gypsum). Thus, six cements were produced in addition to the reference cement containing no GA. The cements produced with and without GAs were analyzed for grinding efficiency, CO_2 emission, and environmental impact based on the target Blaine fineness (4000±100 cm^2/g). The study revealed that varying the utilization rate did not significantly affect the grinding performance of different types of GAs. Regarding grinding efficiency, the GAs were ranked in the following order: 100% TEA > 50% TEA and 50% TIPA > 100% TIPA.

Biography

Dr. Veysel Kobya received his PhD in Civil Engineering from Uludağ University in 2023, specializing in construction materials. His doctoral research, supported by the TÜBİTAK 1001 project, focused on the impact of polycarboxylate ether (PCE) chain length on cement-admixture compatibility across varying C_3A contents. He has published extensively in SCI-indexed journals on topics including PCEs, fiber-reinforced concrete, and sustainable construction. As a postdoctoral researcher, he contributed to the TÜBİTAK 1001 project titled “Developing Grinding Aids with Water Reduction Ability Compatible with Pozzolanic Systems, ” and collaborated on projects addressing chloride resistance and 3D-printable concrete. He holds 18 national and international

patent applications for novel grinding aids. Dr. Kobya has worked with distinguished researchers from institutions in Taiwan, Hong Kong, Lebanon, and beyond. His research interests include cement-admixture interactions, durability, eco-efficient concretes, and additive manufacturing. In 2024, he also lectured in the Faculty of Architecture and continues his postdoctoral work at Uludağ University.

Advancing Sustainability in Fashion Accessories: A Circular Economy Approach

Josephine Aboagyewaa-Ntiri

Akenten Appiah-Menka University of Skills Training and Entrepreneurial Development, Ghana

The circular economy is an essential concept in achieving sustainability. The fashion industry creates an enormous amount of waste that ends up in landfill sites. Therefore, through the circular economy, the fashion industry can reduce the quantity of waste generated. The purpose of this study was to demonstrate the practical application of the circular economy in the fashion accessories sector in Ghana. Using pull tabs from used cans, beads, combined with thread and using crocheting techniques. The paper adopted a qualitative research design and studio-based research approach. The paper demonstrates a practical use of a circular economy approach in designing and making fashion accessory products in Ghana. In total, six products were designed and created from pull tabs from used cans, bead and thread. The products were tested to ensure that they were suitable for use as a fashion accessory. It was suggested that these designs and products could be commercialised within the Ghanaian society as they represent a traditional style of fashion accessories. Besides, due to the low-cost nature of the whole product design and making of the necklaces and earrings, it was suggested that those doing craftwork in low-socioeconomic areas may use it as an economic activity. Again, the policymakers and the government of Ghana should develop policies that will make it attractive for craft makers to adopt such practices. This can attract industry leaders in the Ghanaian fashion accessories sector to consider the outcomes of this study.

Biography

Josephine Aboagyewaa-Ntiri is a senior lecturer at the Fashion Design and Textiles Education, Akenten Appiah-Menka University of Skills Training and Entrepreneurial Development (AAMUSTED), Ghana. She is the current Dean of the Faculty of Vocational Education. She has a fashion technology background, with a Master of Arts in fashion and textiles from Nottingham Trent University (NTU), UK and a PhD in fashion and textiles from the Royal Melbourne Institute of Technology University (RMIT), Australia. She has over 18 years of teaching experience in fashion and textiles in tertiary institutions in Ghana and abroad. Her research interest is in inculcating traditional ideas, especially symbols, into modern garments to preserve the symbols and promote their usage.

Exploring the Potential of CRMs for Green Transition in Ancient Mine Sites: An Example from Graphite Mines and Granite Quarries of Italian Alpine District

Licia Santoro

Department of Earth Sciences, Università degli Studi di Torino, Italy

The goal of achieving climate neutrality by 2050 has raised global concerns about the long-term availability of raw materials due to potential resource shortages. In particular, attention has focused on “Critical Raw Materials” (CRMs), essential for various industrial sectors but marked by high supply risk, as they are largely imported and often lack viable substitutes. Graphite and rare earth elements (REEs) are especially important for green energy technologies. However, EU production remains limited despite the presence of ancient graphite mines and potential REE sources in several mineralized districts. In this context, renewed exploration of historical extractive sites and mining waste is essential for identifying new CRM sources. This study investigated graphite mineralization in the Chisone and Germanasca Valleys and waste material from the Monte Orfano granite quarry (Piedmont, Italy), using a combination of OM, SEM-EDS, BSE, μRaman, XRPD, ICP-OES/MS, and INAA analyses. Graphite from the valleys shows variability: it occurs as either high-purity, fine-grained or low-purity, coarse-grained crystals in shear zones. Based on crystallinity, three graphite types were identified—high (Type I), intermediate (Type II), and poor (Type III)—suggesting different genetic conditions. These results enhance understanding of local metallogeny and have implications for targeted exploration, since graphite purity and crystallinity influence its applications. The Monteorfano granite waste was found to contain abundant monazite, a key REE-bearing mineral, primarily hosted in biotite. Lab-scale beneficiation using magnetic separation at various grain sizes increased REE concentration from ~200 ppm in raw granite to 1800 ppm. This highlights the potential to improve CRM recovery through optimized beneficiation and promotes sustainable waste reuse within a circular economy framework.

Biography

Tenure track Researcher at the Department of Earth Sciences (University of Turin, Italy); Professor of Geo-resources and Economic Geology in BSc and MSc program at Faculties of Natural Science, Agricolture and Geology. MSc degree in Applied Geological Sciences at the University of Naples, succeeded European PhD with in Economic Geology on a research project focused on Pb-Zn ore deposits in Turkey, Alaska, and Yemen, using advanced analytical techniques. Post-Doc researcher at the Natural History Museum of London and at the GEMME Lab of the University of Liège. In 2017, she was awarded a Marie Skłodowska-Curie Individual Fellowship (H2020) for a project on critical elements in unconventional minerals. Collaboration with private companies and international universities (Rio de Janeiro, Lubumbashi, Liège, Yaoundé, Dumlupinar). She is the author of several peer-reviewed scientific articles and a member of various professional societies in the fields of Mineralogy and Economic Geology.

Faber 4.0: Innovation, Digitalization and Circularity in the Wood-Furniture Sector

Marina Block

DiARC Department of Architecture, University of Naples Federico II, Italy

The *Faber* 4.0 project aims to train a new generation of skilled professionals capable of integrating traditional craftsmanship with advanced digital technologies to enhance productivity and reduce environmental impact in the wood-furniture sector. Rooted in a glocal approach, the project fosters the convergence of local artisanal traditions with global innovation trends. Key objectives include promoting the adoption of digital tools such as CAD/CAM systems and IoT devices to optimize manufacturing processes, and encouraging circular economy practices, with a strong emphasis on resource efficiency and waste reduction. Additionally, the project seeks to valorize traditional woodworking knowledge by involving local artisans and integrating their cultural heritage into modern, sustainable production models.

A fundamental component of the initiative is its commitment to social inclusion, particularly through the engagement of marginalized groups including NEETs (Not in Education, Employment, or Training), migrants, and incarcerated individuals. These participants will benefit from targeted training programs and job placement pathways, fostering social cohesion and professional growth.

The primary beneficiaries are young students, technicians, and artisans from diverse social backgrounds who wish to acquire both traditional and advanced skills. Anticipated impacts include increased youth employment, strengthened collaboration between universities, enterprises, and research institutions, and enhanced international competitiveness through the promotion of high-quality, circular "Made in Italy" products.

Ultimately, the project envisions the creation of a permanent Academy in the inner areas of Campania, structured as a horizontal network among academia, industry, and artisans. This collaborative ecosystem will support sustainable innovation while preserving and revitalizing Italy’s artisanal heritage.

Biography

Dr. Marina Block is a contract professor and postdoctoral researcher in Architectural Technology at DiARC, University of Naples Federico II. She has authored over 30 academic papers and has actively participated in numerous national and international conferences, both as a speaker and organizer. Her research focuses on the integration of digital technologies, sustainability, and socio-cultural dimensions in architecture and urban regeneration. With a strong interdisciplinary background and international engagement, she contributes to advancing innovation in architectural education and practice.

Study of the Relationship between Annual and Extreme Daily Rainfalls in Algeria

Abdelhadi Ammari[1], Djamel Boutoutaou[2] and **Houari Zeggane[2]**

[1]LGEE. Ecole Nationale Supérieure de l'Hydraulique (ENSH), Algeria
[2]Laboratoire d'Exploitation et de Valorisation des resources Naturelles en Zones Arides, Kasdi Merbah University, Algeria

The good knowledge of the daily, maximum and frequency rain-fall is of great interest for the design engineer and the water re-sources decision makers especially for urban hydrology tasks, civil engineering structures and protection against floods. When the rainfall data is unavailable, the estimation of the return period rainfall becomes complicated. The main idea of the present research work is to estimate the maximum rainfall for any re-turn period starting from the mean interannual rainfall at any location over the whole Algerian territory. The analysis of the rainfall data showed a good correlation between the mean inter-annual rainfall and the maximum daily rainfall, which allows us to develop a simple formula between these two parameters. The last one was used to estimate the maximum rainfall of any re-turn period using a statistical approach, regional parameters were developed to estimate the frequential maximum daily rain-fall. We found that the errors follow a normal distribution. The maximum errors didn't exceed 15 % for 100 years return period. The developed approach is very useful for ungauged basins, where the estimation of the extreme rainfalls can be complicated, and can give an acceptable max rainfall value to be used in flood forecasting or structures design.

Biography

Professor Abdelhadi Ammari is a highly accomplished hydraulics expert and associate professor at the Ecole Nationale Supérieure d'Hydraulique (ENSH) in Algeria. He earned his Ph.D. in Hydraulics from Biskra University in 2012 and holds a Master of Science in Water Resources from Mosul University. With over two decades of experience, he has lectured extensively on topics including hydraulics, advanced hydraulics, and river engineering.

In addition to his teaching roles at ENSH, Professor Ammari has held leadership positions, serving as Head of the Urban Hydraulics Department and Deputy Director of Studies. He is a prolific researcher, with numerous publications in prestigious journals focusing on river discharge measurement, groundwater contamination, and the application of entropy theory in hydrology. His international experience includes visiting professorships at universities in Kinshasa, Uganda, and at the Pan-African University of Water and Energy.

IoT Tank Level Measurement Device for Improving Water Distribution System Operation

Maressa Brandão Ribeiro, Elis Gean Rocha, Igor Antônio de Paiva Brandão, Roberta Lima de Lucena, Dayse Luna Barbosa and **Andréa Carla Lima Rodrigues**

UFCG, Brazil

In the current scenario of increased water demand and climate change, the risks of water scarcity are greater, especially in the semi-arid region of Brazil, highlighting the need for efficient management of water resources. Faced with this challenge, this study developed a prototype for the automated measurement of water volume in distribution reservoirs aiming to control losses and assist management in supply systems. The device integrates an ultrasonic sensor with a NodeMCU microcontroller, programmed in C + + using the Arduino Integrated Development Environment (IDE), to collect and transmit data to the IoT ThingSpeak platform. The prototype was installed in the reservoirs of the Water Supply System of the campus Sede of the Federal University of Campina Grande, Paraíba and data were collected between 24/09/2023 and 19/10/2023. The data analysis allowed us to calculate the minimum and maximum levels of the reservoirs to meet the demand and maintain the pressure in the network and determine the useful volume. The device performed well, enabling the researchers to observe that manual management of the reservoirs resulted in irregular daily volume variations, dependence on the operator's experience and availability, and water losses due to spillover. The volume in one of the reservoirs remained constant, negatively affecting water quality, while the other reservoir exhibited significant variations, with a mean daily demand of 91 m3. Low-pressure points were also identified in the network. The data collected by the sensor indicate the necessity of automated control to reduce water losses and maintain an efficient and sustainable water supply.

Biography

Maressa Brandão Ribeiro holds a Bachelor's degree in Civil Engineering from the Federal University of Campina Grande (UFCG), Brazil, where she is currently pursuing a Master's degree in Civil and Environmental Engineering. Her research is focused on the field of Environmental Sanitation and Water Resources. Since her undergraduate studies, she has been working on the development and implementation of automation solutions for water supply systems, aiming to improve operational efficiency and resource management. Her academic and professional interests lie at the intersection of engineering innovation and sustainable water infrastructure.

Development of Phytoproducts from *Agave sisalana* Waste Extract

Lucinéia dos Santos

São Paulo State University, Unesp, Brazil

Sisal, the primary hard fiber produced worldwide, is extracted from the leaves of the *Agave sisalana* Perrine plant. Brazil is currently the world's largest producer of sisal, with an average annual production of approximately 100.000 tons of its hard fiber. The fiber unraveling of the sisal leaves yields 5% of hard fibers. The remaining residue, approximately 1.900.000 tons, is normally discarded in Brazil as mucilage, composed of solid waste and liquid [1]. In addition, in areas where sisal is cultivated, the roots of the plant are often left in the field after they have served their useful purpose or to prevent an excessive number of new seedlings [2]. Considering that sisal production stands out for its capacity to create jobs and is crucial for the socioeconomic development of the semi-arid region in the state of Bahia, which accounts for 95% of its production, alternative methods for reusing and reducing waste from sisal are necessary. Thus, to take advantage of the residues of the sisal leaf and its root, different extracts were produced in our laboratory, and pharmacological, phytochemical, and toxicological studies carried out have already confirmed the following activities: 1) antioxidant, photoprotective and anti-aging for the sisal root [3]; 2) anti-inflammatory [4] and antifungal, against *Candida albicans* and *Trichophyton rubrum* [5], for the mucilage and 3) acaricidal for the fermented mucilage against the mite that attacks the orange [6]. These extracts have already been incorporated into formulations, the pharmacological activities confirmed and the patents filed with the National Institute of Industrial Property - INPI. This project sought a technical-scientific, economically viable solution for the use of sisal waste and the sustainable development and social promotion of the sisal region, one of the poorest in Brazil.

Biography

Lucinéia dos Santos has completed her PHD from University of São Paulo, Brazil. Professor of the Department of Biotechnology at the São Paulo State University, Unesp, Assis Campus and permanent member of the postgraduate programs in Biomaterials and Bioprocess Engineering at Unesp in Araraquara and in Sciences, area of Biomaterials, at Unesp in Araçatuba. Conducts research in the area of ethnopharmacology, with emphasis on the use of agro-industrial waste, aiming at the evaluation of its phytochemical, pharmacological and toxicological activities and the development of new phytoproducts. She has 30 articles, 2 books and 5 chapters published, and 9 patents filed, which have been cited over 670 times. He has been serving as a reviewer member of reputed journals.

Automating Post-Disaster Image Classification for Enhanced Damage Assessment

Sun Ho Ro

AEOM, USA

Image data collected after natural disasters serves a critical purpose in analyzing structural failures. However, handling and organizing the vast amount of post-disaster imagery remains a complex and time-intensive task. Often, users must invest considerable effort to sift through decades of archived images to locate those relevant to specific disaster types. This study introduces an innovative approach that automates the classification and labeling of extensive post-disaster image datasets. By leveraging pre-trained computer vision models alongside a natural language processing model, the method incorporates an ontology specifically designed for natural disasters, enabling efficient retrieval and categorization of relevant imagery. The system assigns each image five core labels along with similarity scores, reflecting its content based on a custom-developed word-embedding framework. Validation of this method was conducted using ground-level panoramic images of residential buildings affected by Hurricane Harvey. This adaptable solution not only streamlines the image classification process but also offers widespread applicability across diverse industries and domains. Furthermore, its flexible design ensures it can be continuously refined and improved to align with the evolving demands of future applications, making it a valuable asset for advancing research and practical use cases.

Biography

Sun Ho Ro, a South Korean-born Civil Engineering professional, holds a Ph.D. in Civil Engineering from Rutgers University. His research specialized in natural disaster damage assessment, data information, and remote sensing. He is currently employed as a Geospatial Specialist at AECOM.

Adoption of Reusable Transit Packaging in US Industries: A Framework for Enhanced Sustainability

Ivan Kudrenko[1] and **Lindsey Hall**[2]

[1]Charleston, USA
[2]Topsham, UK

This study explores the adoption of reusable transit packaging in the U.S. aerospace, machinery, and automotive industries, focusing on current perceptions, barriers, and strategies for broader implementation. Using surveys, interviews, and a literature review, we find that packaging choices are critical for sustainability goals. Key obstacles include limited policies, complexity, capacity constraints, and cost. Organizations already using reusable packaging are likely to expand, underscoring the importance of both internal motivation and external drivers (e.g., regulations, industry initiatives). Furthermore, we highlight the role of stakeholder collaboration in knowledge sharing and technology adoption. This collaboration can align environmental objectives with cost-effectiveness, promoting standardized approaches that benefit the entire supply chain. Finally, we propose a policy- and technology-driven framework to address these challenges, offering a roadmap to accelerate the transition to reusable packaging and advance global sustainability objectives.

Biography

Ivan Kudrenko

Ivan Kudrenko graduated with a bachelor's degree in electrical engineering, a master's degree in electrical engineering, and a master's degree in business administration (MBA) from the University of Michigan with a concentration in operations and supply chain management. Having spent a decade managing supply chain operations and continuous improvement projects in the manufacturing and aerospace industries, Ivan focuses on researching cutting-edge sustainable supply chain management practices and innovations in operations and supply chain management. Currently, Ivan is a senior supply chain analyst at Boeing (USA).

Lindsey Hall

Lindsey has fourteen years of experience helping organisations to improve their sustainability performance by implementing operational efficiencies. She has provided sustainability consultation to a range of both public and private sector organisations, helping them to:

- Streamline their operations and cut operating costs

- Implement green fleet practices

- Successfully transition their fleet to electric

- Design waste out of their processes and supply chains

- Create a culture of sustainability throughout their organisation

- Plot an achievable route to net zero emissions

Prior to creating the sustainability consultancy firm Green Steps (https://www.green-steps.org/), Lindsey worked as Operations Director for Recorra, one of London's largest commercial recycling and waste management service providers.

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The Food Crisis in the New Cold War Era and Korea's Response focusing on Food Recycling and Waste Management

Cherl-Ho Lee

Korea Food Security Research Institute, Korea University, Republic of Korea

This paper reviews the causes and consequences of the recent world food crises, such as the 2007/2008 world grain price hike, and the subsequent food crises caused by extreme weather, the prevalence of infectious livestock diseases, the COVID-19 pandemic, and the Ukraine-Russian war. The food security situation in Korea is assessed and the measures to prepare for the anticipated food crisis are suggested. Korean Peninsula has been divided into South and North in 1945 and in the state of cease fire since Korean war. South Korea has achieved rapid economic growth over the past half century and its per capita income reached over $30, 000. However, its grain self-sufficiency rate has fallen below 20%, making the country the most vulnerable food security nation among OECD countries. The Korea Food Security Research Foundation is urging that a stockpiling of 1.2 million tons of rice in preparation for the unification of the Korean Peninsula and that a free rice support system for low-income households be implemented first in South Korea. The Foundation is carrying out a campaign to reduce food waste and is continuing efforts to reduce food waste by half and increase the food energy self-sufficiency rate of Korea from 32% to 50%. Food recycling and waste management are important policy issues in Korea, and various ministries are taking interest and implementing various projects. This paper introduces examples of food recycling and waste management being implemented by the Korean government and food companies.

Biography

Cherl-Ho Lee has been teaching Food Engineering at Korea University for 30 years since 1979. He graduated from Korea University, Department of Agricultural Chemistry and received his Ph.D. at the Royal Veterinary and Agricultural University of Denmark, and was a post-doctorate research associate at MIT, Cambridge, US. He established Korea Food Security Research Foundation in 2010 and served as chairman/honorary chairman until 2024. He has published over 250 research papers, five books in English edition, eight books in Korean, and has co-authored or edited 30 books in Food Science and Technology and Food Security.

Analyzing Prefabricated Architecture in the Planning of Old Urban Spaces

Kai-Hong Lin[1], Bih-Chuan Lin[2] and **Hong-Xuan Lai[3]**

[1]Master Student, Graduate School of Architecture, DaYeh University, Taiwan
[2]Assistant Professor, Graduate School of Architecture, DaYeh University, Taiwan
[3]Project Assistant Professor-Level Professional Technic, Department of Architecture and Interior Design, Dayeh University, Taiwan

The accelerated pace of urbanization globally, particularly in densely populated regions such as Taiwan's western corridor, has resulted in a critical need for effective spatial planning and sustainable development strategies. Taiwan faces unique urban challenges stemming from rapid growth, spatial limitations, and a large stock of aging buildings. Nearly 40% of residential units are over 30 years old, and approximately 70% are concentrated within the six major metropolitan areas. The increasing pressure on land use, infrastructure, and environmental resources necessitates innovative architectural approaches that are adaptable, efficient, and responsive to urban transformation.

This research investigates integrating prefabricated architecture in the regeneration of old urban spaces, proposing adaptive reuse as a key strategy to optimize land use and reduce the environmental and economic burdens of demolition and new construction. By referencing Japan's Metabolism movement—a postwar architectural philosophy centered on modularity, organic growth, and the flexible evolution of built environments—this study examines how prefabricated systems can respond dynamically to contemporary urban demands. Reusing existing structural frameworks (e.g., beams, columns, slabs) in older buildings, supplemented with prefabricated modular units, offers a viable solution for creating new residential and public functions within limited urban contexts.

Through literature analysis and case studies, this study aims to articulate a planning methodology that leverages prefabricated architecture to revitalize underutilized urban assets. The research explores how such an approach may address housing shortages, high construction costs, environmental degradation, and socio-spatial inequality—ultimately con-

tributing to creating resilient, inclusive, and livable cities. The proposed model advocates for an urban renewal paradigm that is not only efficient but also ecologically and socially conscious.

Biography

Kai-Hong Lin is a graduate student at the Graduate School of Architecture at Da-Yeh University in Taiwan. He specializes in construction and supervision, with a strong interest in the adaptive reuse of existing buildings. He is also skilled at engaging in relevant discussions and reflections.

Innovative Timber Architecture: Spatial and Structural Exploration of Shigeru Ban's Works

Yi-Chun Liu[1] and **Bih-Chuan Lin**[2]

[1]Master Student, Graduate School of Architecture, Da-Yeh University, Taiwan
[2]Assistant Professor, Graduate School of Architecture, Da-Yeh University, Taiwan

As global warming accelerates and environmental sustainability gains increasing attention, the architectural industry—one of the most significant contributors to global energy consumption and carbon emissions—faces mounting scrutiny. According to the International Energy Agency (IEA) 2022 report, the building and construction sector accounts for 37% of global carbon emissions, with 74% stemming from operational activities and 26% from material production and construction. Among these, reinforced concrete alone contributes approximately 9% of total global emissions, highlighting the urgent need for sustainable alternatives in architecture.

Material selection and construction methods have become central to sustainable architectural design in this context. Timber, a renewable and environmentally friendly material, has re-emerged as a viable alternative in contemporary architecture. Renowned architect Shigeru Ban has pioneered innovative timber construction techniques, redefining its potential in modern design by challenging conventional constraints and demonstrating adaptability across diverse architectural contexts.

This research investigates timber architecture's spatial characteristics and atmospheric qualities through a detailed case study analysis of Shigeru Ban's projects. The methodology integrates 3D simulations and ONREAL visualization tools to examine Ban's construction techniques, spatial compositions, and their interaction with surrounding environments. The study focuses on three key aspects: (1) assessing the environmental and design benefits of timber construction; (2) extracting core design principles and innovative strategies from Ban's representative works; and (3) evaluating the feasibility and adaptability of timber architecture in contemporary practice through case-based simulations.

This study advocates for environmentally responsible, low-carbon, and sustainable building practices by deepening the understanding of timber architecture among architects and scholars. Furthermore, it positions timber construction as a viable response to climate change and environmental challenges, promoting the development of greener, healthier, and more resilient built environments.

Biography

Yi-Chun Liu is a graduate student at the Graduate School of Architecture at Da-Yeh University in Taiwan. Although she majored in Japanese, she has developed a strong interest in timber architecture and has begun researching this field. Additionally, she is skilled at participating in discussions and contemplations related to her studies.

Textile Circularity and Planetary Boundaries: Aligning Industry with Europe's Green Transition

Purvi Zaveri[1], Priya Patel[2], Rushika Patel[3] and **Nasreen S. Munshi[2]**

[1]Biocare Research (I) Pvt. Ltd., India
[2]Institute of Science, Nirma University, India
[3]Varahi IO, USA

The textile industry is becoming a key hotspot in crossing planetary boundaries as Europe pursues its green transition. Responsible for almost 10% of all greenhouse gas emissions, vast amounts of freshwater abstraction, and growing solid waste, the sector is directly contributing to climate change, loss of biodiversity, and chemical pollution. Without systemic change, the textile industry will continue to expedite crossing of these boundaries, which erodes both ecological resilience and socio-economic stability. This summary, taken from chapter Sustainability and Circular Economy in the Textile Industry, analyzes the ways in which circular economy strategies can redirect the industry toward climate and sustainability objectives. Breaking out of the linear "take–make–dispose" paradigm, textiles can implement practices of water recycling, waste valorization, and innovation in recycling—anything from RFID-sorting to enzymatic processing. These measures not only decrease pollution but also open up new value chains.

Stakeholders have a critical role to play, policymakers need to set enabling frameworks, manufacturers need to incorporate sustainable materials and processes, and consumers need to adopt responsible consumption. International cases show how extended producer responsibility in Europe and nascent initiatives in India capture the potential and challenge of systemic change. Placing textiles in the global sustainability agenda makes us see the double promise of circularity: reducing environmental damage while unlocking socio-economic avenues for innovation, employment, and sustained growth. This lecture dives into understanding balance requires cooperation across supply chains, consumer markets, consumers and systems of governance. By taking up circularity, the textile sector can play

an active role in the green transition, creating a world in which fashion becomes reconciled with planetary health.

Biography

Dr. Purvi Zaveri is an environmental microbiologist and sustainability expert with over a decade of experience in research, consulting, and policy engagement. Holding a Ph.D. in microbiology, she has authored publications on sustainability, waste management, and the circular economy. Her work spans consulting for environmental firms in India, leading baseline studies on health and water management, and contributing to global forums such as the UN Water Conference. She is serving as Sustainability Co-Chair at YPFP and engages with youth climate leadership networks including LCOY Japan. She also founded *Talk2Hope*, addressing climate-related anxiety and resilience.

Sugarcane Bagasse Valorization for Pesticide Removal from Aqueous Environments

Ashish Kapoor

Department of Chemical Engineering, Harcourt Butler Technical University, India

The increasing contamination of water bodies by pesticides necessitates the development of sustainable and efficient remediation strategies. This study focuses on the valorization of sugarcane bagasse, an abundant agro-industrial waste, for the removal of chlorpyrifos pesticide from aqueous environments. Initially, sugarcane bagasse was converted into biochar through pyrolysis and systematically characterized. Laboratory-scale batch adsorption experiments were conducted to evaluate the performance of the biochar, and key operational parameters, such as contact time, pH, initial pesticide concentration, and adsorbent dose, were optimized to maximize chlorpyrifos removal. The adsorption kinetics and isotherm models were applied to understand the underlying mechanisms. Subsequently, a bench-scale continuous adsorption system was developed using fixed-bed column studies to simulate real-world treatment scenarios. Critical aspects, including breakthrough curves, bed depth, and flow rates, were analyzed to support future scale-up and field deployment of the system. To further enhance the efficiency and sustainability of the process, mixed matrix membranes incorporating sugarcane bagasse biochar were fabricated and tested. These systems demonstrated potential for intensified pesticide removal and consistent water purification performance. Overall, the study presents a comprehensive approach to converting sugarcane waste into value-added materials for water treatment, offering insights into both fundamental adsorption behavior and practical system development. The outcomes suggest a promising, low-cost, and environmentally friendly route for mitigating pesticide pollution in water using agro-industrial waste derived materials, contributing to sustainable waste management and circular bioeconomy.

Biography

Dr. Ashish Kapoor is Professor and Head, Department of Chemical Engineering at Harcourt Butler Technical University, Kanpur, India. He holds B.Tech and M.Tech degrees in Chemical Engineering from IIT Madras and a Ph.D. from the University of Illinois Urbana-Champaign, USA. He has previously worked at Lam Research Corporation, USA, and SRM Institute of Science and Technology, India. With about 14 years of academic and industrial experience, he has authored more than 75 international publications and has been granted one patent. His research interests include microfluidics, lab-on-a-chip sensors, wastewater treatment, and waste biomass valorization.

Understanding Consumer Sentiments towards Two-Wheeler Electric Vehicles: Implications for Organizational Sustainability and Corporate Social Responsibility

Sachin Deshmukh

Dr. Vishwanath Karad-MIT World Peace University, India

Electric vehicles (EVs) are essential to reducing greenhouse gas emissions and combating climate change. Despite being the world's fifth-largest car market, India's adoption of electric mobility lags behind other nations. For instance, in Germany, 26% of vehicles are electric, compared to 18% in France and the UK, and 14% in Beijing (Singh et al., 2021). In stark contrast, the Indian EV market shows significantly lower penetration, with sales figures trailing far behind these countries (Gambhir, 2017). In the fiscal year 2021, India produced 22.65 million vehicles, with 81% being two-wheelers, underscoring the nation's preference for this mode of transport (Jain, 2022). However, only about 1.3% of these were electric two-wheelers.

This study examines the perceptions of young Indian consumers towards electric two-wheelers using sentiment analysis on Twitter data. We identified key concerns and positive attitudes towards electric two-wheelers by analyzing tweets collected with relevant hashtags. The findings reveal a growing interest in EVs, yet significant barriers such as battery life, cost, and performance persist. These insights are crucial for policymakers and manufacturers to address consumer apprehensions and enhance EV adoption. The research underscores the importance of understanding consumer sentiment in shaping corporate social responsibility (CSR) initiatives and promoting pro-environmental behavior among employees. By leveraging these insights, organizations can develop targeted strategies that align with consumer expectations, foster a culture of sustainability, and contribute to a greener future. The study's implications extend to HR and marketing strategies, providing a foundation for developing comprehensive sustainability policies and innovative product development initiatives.

Biography

Dr. Sachin Balwantrao Deshmukh is an accomplished academician, researcher, and author with over two decades of rich experience spanning academia and industry. He is currently serving as an B at the School of Law, **MIT World Peace University, Pune**, where he has been contributing for the past three years. Prior to this, he dedicated **13 years** to reputed management institutes and spent **7 years** in the insurance and pharmaceutical sectors, bringing a unique blend of academic insight and industry expertise to his work.

Dr. Deshmukh earned his **Doctorate in Philosophy (Ph.D.) in Management Science** in 2019 from **Dr. Babasaheb Ambedkar Marathwada University, Aurangabad**. His research and teaching interests are complemented by a strong record of scholarly contributions, including **7 published books** (ISBN registered) and **2 published patents**.

An active researcher, Dr. Deshmukh has published **6 papers in Scopus-indexed journals, 1 in Web of Science**, and **12 papers in UGC CARE**-listed journals. His academic footprint extends to prestigious platforms, having presented research papers at **IIM Ahmedabad**, **IIM Indore**, **IIM Kozhikode**, and **IIM Tiruchirappalli**.

As a **Ph.D. research guide**, he is currently supervising **two doctoral scholars**, fostering the next generation of researchers. His SCOPUS and ORCID profiles reflect a consistent commitment to advancing knowledge in management and related interdisciplinary fields.

Patliputra to Patna: Evolution of a Historic City into a Smart City

Rashmi Sharma and **Tanvi Ranjana**

Banasthali Vidyapith, India

Patna, formerly known as Patliputra. Situated on the banks of the Ganga River, due to its advantageous position, this city saw a golden age during the Mauryan and Gupta periods, a period of decline, and a subsequent revival as a cantonment region during British administration. Today, it is the capital of Bihar. From serving as the capital of powerful empires to embracing the digital age, Patna's history is proof of its adaptability, resilience, and progress. The city has suffered from unplanned urbanisation. To address this problem, Patna was chosen from among India's 100 cities as part of the government's National Smart City Mission. Redevelopment of urban areas, digital urbanisation, and sustainable and citizen-friendly development are all components of smart cities, which aim to raise people's standard of living. The India Smart City Mission aims to reform, retrofit and regenerate the old city to address the issue of unplanned urbanisation. This study will analyse how the city has changed from its illustrious golden age in ancient India to its current transformation into a smart city. We will also study the city's development programs and observe the current changes made to the city. This study examines the success rate of the smart city mission, its responses to unplanned urbanisation, and the aspirations of its citizens.

Biography

Dr. Rashmi Sharma is the Head & Dean of the Faculty of Earth Sciences at Banasthali Vidyapith, Rajasthan, India and an Associate Professor of Geography with over 22 years of experience in the field. She holds a B.Sc., M.Sc., Ph.D.and LLB from the University of Rajasthan. Dr. Sharma has published over 50 research papers and presented at numerous national and international conferences. She has chaired technical sessions, delivered invited lectures, and organized conferences and workshops. Her Specialization is Urban and Environmental Geography.

Pteridophytes in Phytoremediation and Environmental Sustainability

Nishika Jaishee

Department of Botany, The University of Burdwan, India

Pteridophytes, the most primitive vascular cryptogamic plants on Earth, occupy a unique position between cryptogams and phanerogams and are regarded as critical drivers of ecological succession. Their distinct physiology, high adaptability, and remarkable ability to colonize marginal and contaminated habitats underscore their evolutionary resilience to diverse biotic and abiotic stresses. Consequently, ferns and their allies are recognized for their potential in bioremediation, positioning them as a promising candidate for sustainable pollution mitigation strategies. Their remarkable tolerance to toxic metals and resilience to high metal stress make them ideal for both in situ and ex situ remediation. Various phytoremediation strategies such as phytoextraction, phytostabilization, and rhizofiltration have been reported to effectively reduce pollutant mobility and toxicity. A sustainable solution exists using processed pteridophyte biomass as a highly effective, low-cost, and abundant biosorbent for point-source pollution control.

Pteris vittata L. is well documented as an arsenic hyperaccumulator. RNAseq studies have revealed glyceraldehyde 3-phosphate dehydrogenase (PvGAPC1), organic cation transporter 4 (PvOCT4), and glutathione s-transferase (PvGSTF1) to be highly upregulated in arsenic rich environment and necessary for its tolerance. Phosphate transporters have also been reported to play a key role in arsenate (AsV) translocation in *Pteris vittata*. Metagenomic studies indicate fern microbiome to contribute in bioremediation, yet the mechanisms involved are still unclear. To avoid secondary contamination, genetically engineered plants that efficiently convert and sequester arsenite are promising, but their success depends on sustainable biomass management and safe arsenic recovery strategies. Ongoing research should prioritize addressing root causes by minimizing industrial and anthropogenic activities, with a further focus on the reduction and recycling of resources. Valorization of pteridophytes for bioremediation offers sustainable and cost-effective alternatives to conven-

tional methods. Harnessing the pteridophytes' bioremediation potential can significantly drive sustainable ecosystem restoration and lead to significant advancements in circular bioeconomy models.

Biography

Dr. Nishika Jaishee is an Assistant Professor at the Department of Botany, UGC Centre for Advanced Studies, University of Burdwan, West Bengal, India. She holds M.Sc., M.Phil., and Ph.D. degrees, with expertise in phytomedicine, phytochemistry, phytoremediation, and computer-aided drug design. Dr. Jaishee has authored numerous research papers in reputed journals including Journal of Cellular Biochemistry, Frontiers in Microbiology, and Journal of Biomolecular Structure and Dynamics. Her publications span phytochemical profiling, antioxidant and antimicrobial studies and computational drug discovery. She has contributed several book chapters on plant-microbe interactions, secondary metabolites, and metabolomics. She has a total teaching experience of 13 years . She has guided research projects on unravelling indigenous knowledge of medicinal plants. She is a recipient of the UGC Meritorious Basic Scientific Research Award and has qualified CSIR-UGC NET (Life Sciences) and WBSET. Dr. Jaishee is a life member of the Botanical Society of Bengal and The Indian Fern Society.

Red King Crab as a Source of Unique Enzymes: Prospects for Waste Processing

Evgeny Sogorin

Institute of Biological Instrumentation of Pushchino Scientific Center for Biological Research RAS, Russia

The annual catch of Red king crab (*Paralithodes camtschaticus*) in Russian waters exceeds 20, 000 tons, half of which is discarded as waste. The crab's digestive gland, the hepatopancreas, is a rich source of unique enzymes—including hyaluronidase, lipase, chitinase, and others—as well as antimicrobial peptides with enzymatic activity. For example, the recently discovered hyaluronidase from Red king crab is the first eukaryotic hyaluronate lyase identified in higher animals, exhibiting activity three orders of magnitude higher than its medical counterpart.

Processing the hepatopancreas can be approached in two distinct ways. The first involves a relatively simple method to extract a complex of all hepatopancreatic enzymes, which can then be used to break down other multicomponent waste. This enzymatic treatment decomposes biological macromolecules—such as proteins, carbohydrates, and lipids—into oligomeric and monomeric forms (e.g., amino acids, simple sugars, and free fatty acids). The resulting product could serve as a base for starter feed premixes.

The second approach focuses on isolating specific, commercially valuable enzymes from the hepatopancreas. However, this method faces challenges, as enzyme activity varies between batches due to seasonal and geographical differences in crab catches.

While Red king crab is also harvested commercially in the U.S., Norway, and Japan, the majority of its population inhabits Russian waters, making catches elsewhere negligible. Given Russia's nearly 50 years of research and development in this field, crab-fishing enterprises in U.S., Norway, and Japan could adopt deep hepatopancreas processing—especially since their governments actively support waste valorization to enhance added value.

Biography

Evgeny Sogorin has completed his PhD at the age of 30 years from Institute of Protein Research RAS. He is the PI of laboratory of applied enzymology of Pushchino Scientific Center for Biological Research. He has published over 20 papers in reputed journals.

Investigation of Geodynamic Factors Impacted on Radon Emission using a Radiometric System with AI

Azad Bayramov[1], Gurban Yetirmishli[1], Ibrahim Guliyev[2] and **Fatali Abdullayev[1]**

[1]Republican Seismic Survey Center of the Azerbaijan National Academy of Sciences, Azerbaijan
[2]Institute of Geology and Geophysics, Azerbaijan

The objective of this work is to present the results of the development of a radiometric system based on Artificial Intelligence to study the influence of geodynamic factors on the emission of radioactive radon gas from the ground into the atmosphere, and its impact on Earth's climate change. Radioactive radon poses a great threat to all living things. This paper presents the results of an analysis of the dependence of some geodynamic factors on the dynamics of radon concentration in the soil and in the near-surface region of the earth. To study the influence of geodynamic factors on radon emission, a radiometric system was developed for measuring and transmitting data by GSM radio communication. Experimentally substantiated data are characterized by features of the migration behavior of radon in the surface atmosphere and near-surface soil layers. The level of radon concentration in the pore air of dispersed near-surface soil is formed due to two terrestrial sources: intragenic and deep, with a significant contribution from the atmospheric source due to the entry of radon with liquid precipitation, washing it out of the atmosphere and delivering it to the earth's surface. A relationship was established between the amount of precipitation and the amount of atmospheric radon, and an assessment was made of the relative contribution of the atmospheric source and terrestrial sources of radon to its total content in the pore air of soils. It has been shown that the contribution of the atmospheric source of radon sporadically, depending on the amount of precipitation and the concentration of radon in it, can exceed the contribution of terrestrial sources. This work was supported by the Azerbaijan Science Foubdation – Grant № AEF-BQM-BRFTF-4-2024-5(53)-06/03/2-M-03.

Biography

SD of Physics and Mathematics, Professor A.A. Bayramov is a head researcher of the "Scientific investigation of complex research" department of the Republican Seismic Survey Center of the Azerbaijan National Academy of Sciences. He has more 600 scientific works. He is a specialist in the field of modeling physical processes and developing technical electronic systems. Recently, he has been researching geophysical processes occurring in the earth's crust, in particular the processes of release of radioactive gas radon and the development of technical systems for their registration.

Investigations of Paraffin Deposition Processes and Development of the Methods to Improve Rheological Parameters of Highly Waxy Oils

L.E. Boranbayeva[1], B.K. Kenzhaliyev[1], G.I. Boiko[2], N.P. Lyubchenko[1], R.G. Sarmurzina[1] and **Zh.A. Baltabekova[1]**

[1]Institute of Metallurgy and Ore Beneficiation, Kazakhstan
[2]Kazakh National Technical University after K.I. Satpayev, Kazakhstan

Processes of transportation of paraffinic oils through oil pipelines in the cold season is accompanied by deposition of paraffins on the inner surface of the pipeline.

The paper discusses the results of developing methods for optimizing the transportation of high-paraffin crude oil at temperatures below the pour point.

At the first stage, the composition, structure, nature of components of normal alkanes in oil and their influence on the aggregative stability were studied.

At the first stage, in order to optimize the conditions for oil transportation with minimal energy costs, the composition, structure, and nature of normal alkane components in oil, as well as their influence on aggregate stability, were studied. It has been shown that the main share of n-alkanes in the oil from fields Kumkol and Akshabulak falls within the paraffin group C15-C44. The results of cooling rate studies indicate that rapid cooling of crude oil leads to the formation of a large number of crystallization centers, which results in an increase in the pour point temperature and kinematic viscosity of the oil. The greater the temperature difference between the oil and the cold steel surface (≤40 °C), the smaller the amount of asphaltene-resin-paraffin deposits (ARPD) precipitating on the studied surface, despite the significant content of long-chain paraffins in their composition...

The possibility of improving the rheological properties of a mixture of West Kazakhstan crude oil (WKOM) using low-viscosity Aktobe oil as a diluent is considered. The increase of naphtheno-aromatic hydrocarbons content, increase of aggregative stability of oil dispersion and improvement of viscous properties of WKOM are revealed.

The combined effect of thermal treatment at temperatures of 60°C and 90°C and the addition of a pour point depressant (PTE) on the rheological properties of oil mixtures (WKOM) and Kumkol-Akshabulak crude oil (KAOM) has been studied. WKOM yield loss temperature values decrease from +18 °C to +3 °C and KAOM from +12°C to +0°C. Viscosity of oil mixtures decreases to 0.245 and 0.167 Pa·s, respectively.

This research has been/was/is funded by the Committee of Science of the Ministry of Science and Higher Education of the Republic of Kazakhstan (Grant No. BR24992868.

Biography

L.E. Boranbayeva is a Magister of technical sciences and PhD student of K.I. Satbayev Kazakh National Research Technical University, Almaty, (Kazakhstan Programme/Speciality – Chemical engineering) She is a Reseacher with a strong academic background. She has been actively contributing to the fields of engineering and applied sciences. Boranbayeva is also recognized for her collaborative work as a Researcher of R&D Center JSC "KazTransOil", where she investigated the changes in rheological parameters of oil transported along various oil pipeline routes, selection of optimal oil blends in terms of physical, chemical and rheological properties - in case of changes in pumping volumes and oil pipeline routes.

Her profile is available on ORCID (https:// orcid.org/0000-0002-3160-331X), showcasing her academic publications and research contributions. As a rising figure in Kazakhstan's academic landscape, she continues to pursue excellence in research, playing an important role in advancing scientific knowledge within her R&D Center JSC "KazTransOil".

Sustainable Strategies in Traditional Riyadh Housing

Nouf Alaqeel

Prince Sultan University, Saudi Arabia

This study explores the architectural features of traditional Najdi homes in Saudi Arabia, including internal courtyards, adobe mud structures, alfuraj, and shurâf, to emphasize their cultural and environmental significance. Central courtyards regulate indoor temperatures by enhancing airflow and trapping cool air, while adobe mud, sourced locally, provides insulation against extreme heat. Alfuraj, small openings in Najdi homes, facilitate ventilation and natural lighting, whereas shurâf, or wind towers, extend from walls to shade rooftops, enabling outdoor sleeping during summer. By analysing three case studies, the research compares construction techniques, highlighting the role of shurâf and alfuraj in maintaining thermal comfort. The findings demonstrate that Najdi building methods offer sustainability, energy efficiency, and social connectivity while preserving privacy and architectural authenticity. Despite requiring maintenance, these homes remain cost-effective and provide passive cooling benefits, making them relevant for contemporary urban projects in Riyadh. This study underscores the importance of safeguarding Saudi Arabia's architectural heritage to promote sustainable development in alignment with Vision 2030.

Case studies	Located in	Courtyard	Mud	Alfuraj	Shuraf
House 1	AD-DIRA	The courtyard is located in the center of the house.	The main material that has been used in elevations is mud.	In public elevations, the Alfuraj has been used with triangular shapes	The Shurafhas been used internally in the house.
House 2	MANFOHA	The courtyard is located in the center of the house.	The main material that has been used in elevations is mud.	In the public elevations, Alfuraj small rectangular widows have been used.	The Shuraf has been used internally in houses.

House 3	KHURAIS	The courtyard is located on the sides of the house.	The main material that has been used in elevations is concrete.	Alfuraj rectangular openings have been used in the internal elevations, with modern influence.	The Shuraf has been used internally in houses.

Figure 1: Samples of Alfuraj in traditional houses in Riyadh (Source: Alnaim, 2021)

Biography

Nouf Alaqeel and Silvia Mazzetto are researchers and architectural enthusiasts specializing in traditional Najdi architecture and sustainable urban planning from Prince Sultan University. With a strong interest in preserving and adapting historical building techniques, they focus on the environmental and cultural significance of Saudi Arabia's heritage structures. Their work highlights passive cooling strategies and the social benefits of Najdi homes, emphasizing their relevance in modern urban development. Through comparative case studies, they explore how adobe mud construction, alfuraj openings, and shurâf wind towers enhance energy efficiency and sustainability. Passionate about integrating historical wisdom with contemporary design, they advocate for conserving Saudi Arabia's architectural legacy as a model for sustainable living. Their research aligns with Vision 2030, promoting the revival of traditional construction techniques to enhance urban resilience while maintaining cultural identity.

Hydrological Regimes under Future Land Use and Climate Change: A Study for Three Watersheds in Iran

Mostafa Naderi

Institute for Advanced Studies in Basic Sciences (IASBS), Iran

Here, impact of land-use and climate change on hydrological regime of three dam watersheds (Karaj, Latian and Mamlu) in Alborz and Tehran Provinces of Iran is assessed. Overall, results indicate that the study area will experience warming by 0.78, 2.1, and 2.4 °C under SSP1-1.9, SSP2-4.5, and SSP5-8.5, respectively, and precipitation anomalies by +129.3, −95.6, and −54.2 mm, respectively, compared to the baseline period 1991–2014. Extreme precipitation depth will increase at all stations under SSP1-1.9. However, precipitation change depends on the storm's return period, station, and scenario under warmer scenarios. River flow simulations using the SWAT reveal that river flow over three watersheds will increase, compared to the baseline period, under SSP1-1.9 but decrease under SSP2-4.5 and SSP5-8.5. Among combinations of land-use and climate change scenarios, land-use scenario High under SSP1-1.9 leads to greatest annual streamflow, while no change in land-use under SSP2-4.5 results in maximum reduction in streamflow over three watersheds. Extreme flows over Karaj and Latian watersheds show no sensitivity to different land-use scenarios due to negligible land-use development in future but they still are sensitive to climate change scenarios. Meanwhile, extreme flows over Mamlu watershed show significant sensitivity to both land-use and climate change scenarios due to significant land-use change in future.

Biography

Mostafa Naderi has his expertise in hydrogeology and climate change. He is a young researcher who has experienced and worked on pumping test analysis, sustainable management and planning of water resources, climate change analysis, and evaluation of impact of climate change on available water and water security. He has studied the impact of climate change on rivers, wetlands and aquifers in different parts of Iran since 2015. Research Interests: Hydrogeology, Climate change, Sustainable water resources management, watershed modeling, Pumping test analysis.

Impact of Climate Change on the Herpetofauna of Europe: Assessment and Forecasting using GIS Modelling and Artificial Intelligence

Oksana Nekrasova[1, 2, 3], Mihails Pupins[3], Yurii Buchchenko[4] and **Jean-Yves Georges[1]**

[1]Université de Strasbourg, CNRS, IPHC, France
[2]I.I. Schmalhausen Institute of Zoology of National Academy of Sciences of Ukraine, Ukraine
[3]Department of Ecology, Institute of Life Sciences and Technologies, Daugavpils University, Latvia
[4]Dev.Pro, USA

Climate change is a global threat to biodiversity, particularly for amphibians and reptiles through degradation and loss of their habitats and landscapes. Rising temperatures and decreasing moisture levels lead to habitat loss (including breeding water bodies), population fragmentation, while the spread of invasive species further increases pressure on ecosystems. Modern technologies, such as GIS modelling and artificial intelligence (AI), can significantly enhance monitoring, planning, and forecasting. AI algorithms can process large datasets, identify patterns in range shifts, and predict the spread of invasive species. IT platforms allow data integration from various sources, including satellite imagery and biological research, to develop comprehensive models. Our field studies and predictive Species Distribution Models (SDM) using AI-assisted GIS modelling suggest that in Europe, by 2050, the most significant risks will be faced by rare herpetofauna species (*Bombina variegata, Epidalea calamita, Coronella austriaca*) in southern and western Europe, with a probable north-eastern shift in the ranges of most species where there are less competition and invasive threats. However, migration is challenging for low dispersing endemic species with narrow ecological niches such as amphibians. A significant population decline and even extinction are projected for most amphibians in southern Europe. In contrast, reptiles, which have greater migration capabilities, are predicted to exhibit a northward expansion of thermophilic species (e.g., *Natrix tessellata* in Ukraine) along major river eco-corridors. These results are vital for creating adaptive strategies, such as establishing ecological corridors and networks of protected areas. This will not only facilitate predictive assessments but also enable the development of effective biodiversity conservation measures in Europe.

With support from EMYS-R https://emysr.cnrs.fr, Nr.lzp-2021/1-0247, and PAUSE.

Biography

PhD, Leading Researcher I.I.Schmalhausen Institute of Zoology, NAS of Ukraine; Hubert Curien Pluridisciplinary Institute: Strasbourg, FR; Daugavpils Universitāte: Daugavpils, LV. Lead expert of the Emys-R project (www.emysr.cnrs.fr) and 24 other projects. Author and co-author of over 330 scientific publications, including 7 monographs, and a participant in more than 80 international conferences held in Ukraine, Poland, Germany, France, Latvia, the USA, and other countries. A member of the Ukrainian Herpetological Society, INVASIVESNET, and SSAR. Serves as a reviewer for leading scientific journals indexed in Web of Science and Scopus and as an editor for a special issue of the journal "Diversity." Initiated the establishment of more than 30 nature conservation areas and 66 Emerald Network sites across Ukraine. An expert in zoology, ecology, biodiversity conservation, and invasive species management, with specialized skills in GIS modeling. Research interests focus on the effects of climate change on fauna, biodiversity conservation, invasive species, and the application of digital technologies in these fields.

https://izan.kiev.ua/eng/deps/depprot/nekrasova.htm

Impact of Water Temperature on Chemicals Migration from Bottom Sediments under Experimental Conditions

T.P. Zhezherya[1], V.A. Zhezherya[2], P.M. Linnik[2] and **V.P. Osipenko[2]**

[1]Ukrainian Hydrometeorological Institute of the State Emergency Service of Ukraine | National Academy of Sciences of Ukraine, Ukraine
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The rise in water temperature accelerates chemical reactions, increases the toxicity of heavy metals, organic xenobiotics and the sensitivity of hydrobionts to toxicants. Currently, the duration of icetime is getting shorter, while the summer water stratification, on the contrary, starts earlier and lasts longer.

The aim of our research is to investigate the impact of water temperature on the migration of chemicals from bottom sediments to water.

The experiment had lasted for 21 days until chemical equilibrium was reached. In the 1st experimental system (ES), the water temperature was 5 °C, in the 2nd ES – 15 °C, and in the 3rd and 4th ES – 25 °C. In the 4th ES, the water was additionally saturated with oxygen using an aerator with an air supply rate of 20–30 ml/min.

The maximum concentrations of nutrients, dissolved organic matter (DOM) and metals were observed mainly on the 14th day of the experiment in the water of the 3rd ES. The concentration of inorganic nitrogen compounds, inorganic phosphorus compounds and total phosphorus, dissolved silicon increased maximally by 1.8, 5.8, 1.9 and 2.5 times. The content of easily oxidisable organic matter and DOM elevated by about 1.6 times. At the same time, the Al, Mn and Cr concentration increased by 1.9, 3.2, and 2 times, respectively. Rising water temperature led to a decrease in the proportion of ammonium nitrogen and, conversely, an increase in the proportion of nitrite and nitrate ions in the water due to the intensification of nitrification. The artificial aeration led to a slight decline in the concentration of inorganic nitrogen compounds, inorganic phosphorus compounds and total phosphorus, DOM, as well as the content of dissolved Al, Mn and Cr.

According to the results of earlier experimental studies, a more significant increase in the content of dissolved Si, Al, Fe, and Mn was found, respectively, by 3.0, 10.3, 8.6, and 4.8 times when the pH value was reduced to 6.0 and the dissolved oxygen deficiency was formed compared to neutral pH value and aerobic conditions. The dissolved oxygen deficiency causes an increase in the supply of Fe and Mn from bottom sediments to water by 1.3 and 2.6 times and doesn't affect the Al migration.

Thus, increasing water temperature affects the supply chemicals from bottom sediments to water, which is intensified by the combined action of such factors as dissolved oxygen deficiency and a decrease in pH and redox potential.

Biography

Education:

Zhytomyr Ivan Franko State University. Faculty of Natural Sciences, diploma of a specialist in "Pedagogy and methods of secondary education. Chemistry and Biology." (2002–2007).

Institute of Hydrobiology of the National Academy of Sciences of Ukraine, postgraduate study in the field of 11.00.07 "Land hydrology, water resources, hydrochemistry" (2011–2014).

Candidate of Geographical Sciences in the field of 11.00.07 "Land hydrology, water resources, hydrochemistry" (2015).

Work experience:

She works as a senior researcher at the Ukrainian Hydrometeorological Institute of the State Emergency Service of Ukraine and the National Academy of Sciences of Ukraine.

Research experience:

Her research concerns the study of coexisting forms of nutrients in surface waters. Considerable attention is paid to studying the influence of various abiotic factors on the nutrients migration from bottom sediments to water. She also studies the impact of urbanized areas on the content and coexisting forms of nutrients in surface waters.

Proposed Study Design for Map-Based Approach to Flood Risk Assessment in Bwaise III in Kampala City, Uganda: An Indicator Approach

Yawe Samuel

Rakai District Local Government, Uganda

Bwaise III is a parish found in Kawempe division which is one of the five divisions that make up Kampala city. Kampala is Uganda's biggest city as well as the capital of the country with an estimated population of 1, 610, 500. Kampala is a city facing many challenges including high unemployment, urban density and limited financial resources, energy and food insecurity. In addition, climate-related weather changes threaten the social development of the country and the sustainable structure of the city. This paper presents a comprehensive proposed study design to focus on flood disasters at local level in one of Kampala city divisions of Kawempe which will be scaled down to a parish level of Bwaise III. The study includes a proposal to use GIS and other software to produce a number of maps that will aid in decision-making and planning. Flood zone maps, location maps and other inventory maps will be generated and watershed and the different water catchments will also be identified. The study aims to carry out a risk assessment to determine the extent of vulnerabilities and provide solutions for disaster recovery and management in this area under study based on an indicator approach.

Biography

Yawe Samuel is a Professional Physical Planner and a Climate Change Expert (climate change response). He works with Rakai District Local Government as a District Physical Planner. He holds a bachelors degree of Urban Planning from Makerere University and a Master's degree of Climate Change Response from Hallym University, Korea.

Zimbabwe's Economy: Four Decades in Perspective (1980-2020)

Kenneth Mahuni

University of Mauritius, Mauritius

The broad aim of this 12-chapter book was to trace the tumultuous economic journey of Zimbabwe, a Southern Africa country soon after attaining its hard-won independence. Just like any other newly independent African state, the expectations were very high post-independence. Specifically, the book's purpose was to explore the shot lived successes after inheriting a functional economy and the enduring challenges of the Zimbabwean economy to haunt the economy for the next four decades. Several case qualitative research design methodologies were employed including historical case studies, document analysis, ethnography and phenomenology to explore the narrative spanning from 1980 through 2020.

Through a critical historical examination of Zimbabwe's economic experience, five thematic areas were developed. In the respective themes, the study traced the country's crucial flaws and dilemmas in the policy making. Sectors such as agriculture, health, education, mining, tourism were seriously impacted by the flaws. The book goes on to show how this led to the birth of other challenges to haunt the economy including unemployment, episodes of inflation, currency crisis, international isolation, decline in productivity in agriculture as the mainstay of the economy.

From Zimbabwe's narrative, the book draws also similarities with other countries in showing how resource abundance which is not totally managed turns to be a curse. For example, the case of Venezuela and its unending challenges is captured in the narrative as it also affords important historical lessons. Peers such as Rwanda, Mauritius, South Africa also provide important learning points. Despite all the turmoil and turbulence, the book in Chapter 9 proffers critical lessons not only to Zimbabwe but other post independent African states as they strive to curve their own paths free. The cost of the unresolved challenges is a genesis of other challenges to the economy has to contend as detailed in Chapter 11.

Biography

Kenneth Mahuni is a multi-award-winning PhD student at the University of Mauritius and a Pan Africanism enthusiast. He is a co-author of two books, '***Africa's Incomplete Cycles of Development.' (2020) and Zimbabwe's Economy: Four Decades in Perspective* (2024)**. He has also authored several peer reviewed papers and economic policy briefs. He has presented at prestigious research and policy forums such as International Economic Association (IEA), COMESA, Academics Stand Against Poverty (ASAP) Global Financial Integrity Program as well as South Korea's Official Development Assistance (ODA) forum as well as reviewed for selected journals. He has a wealth of experience acquired from working in policy environments and academia as well as through years of travelling in many countries.

Developing Relationships for Hydrological Drought Characteristics by Copula Functions

Ibrahim Halil DEGER[1], Mehmet Ishak YUCE[2] and **Musa ESIT[3]**

[1]Hasan Kalyoncu University, Turkey
[2]Gaziantep University, Turkey
[3]Adiyaman University, Turkey

In all around the world, the global attention in water and its associated events such as floods and droughts is increasing since water is essential and irreplaceable. As a water threaten natural disaster, droughts are complex and have potential negative impacts on environment, economy and energy as well. In the literature, drought has been classified into 4 groups which are meteorological, agricultural, hydrological and socio-economic. Among these hydrological droughts refer to deficiencies in surface or subsurface water.

The aim of this research is to develop relationships for the hydrological drought characteristics of severity and duration, which have been identified as two significant characteristics of drought events in many studies. To do so, mean monthly streamflow records that have been taken from General Directorate of State Hydraulic Works (DSI) and streamflow drought index (SDI) have been used to predict drought events in 1-month time scale (SDI-1) for Yeşilirmak Basin, Turkiye. Drought severity and duration parameters have been determined by Yevjevic's Run Theory. The dependence between these characteristics have been investigated by Kendall's . The best marginal distributions of these parameters have been selected among Normal, Lognormal, Gamma, Weibull, Exponential and Logistics distributions based on goodness of fit tests. The best copula types that have been used for the modelling of conditional probabilities, univariate, bivariate and conditional return periods are defined among 10 types of copula functions considering on tail dependence and goodness of fit tests criteria. Results have shown that there has been a strong positive correlation between severity and duration series. Besides, copulas have successfully modelled drought severity-duration series for conditional probabilities and univariate, bivariate and conditional return periods indicating that these functions provide significant information particularly in the risk assessment of water basins.

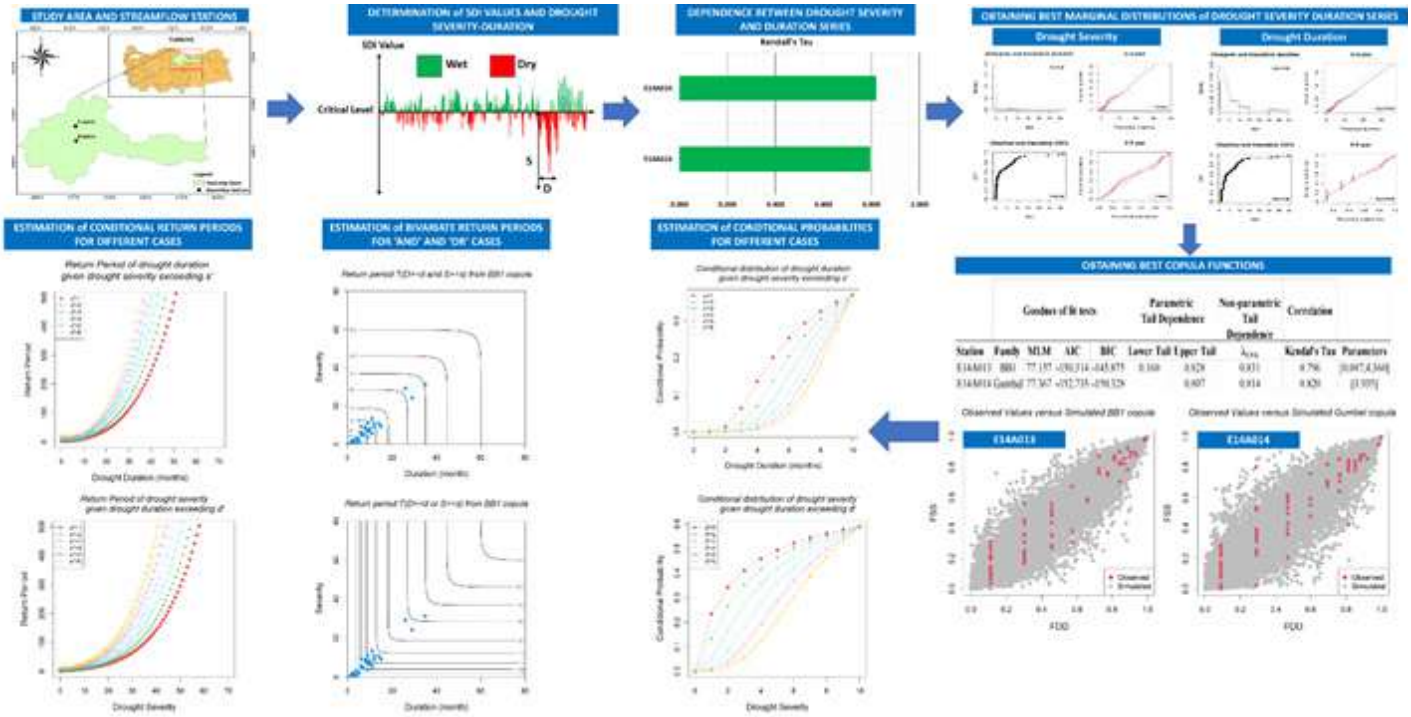

Figure 1. Graphical Abstract

Biography

Dr. Ibrahim Halil DEGER is an Assistant Professor and currently serves as the Head of the Department of Civil Engineering and Vice Dean of Faculty of Engineering at Hasan Kalyoncu University, Gaziantep, Turkiye. He obtained his B.Sc. degree in Civil Engineering in 2017, followed by an M.Sc. degree in 2019 with a thesis titled "*Generating Rainfall Intensity-Duration-Frequency Curves of the Southeastern and Eastern Mediterranean Regions of Turkey*." He earned his Ph.D. in 2023 with a dissertation entitled "*Univariate and Bivariate Hydrological Drought Severity and Duration Frequency Analysis of the Yeşilırmak, Kızılırmak, and Euphrates Basins of Türkiye Using Copula Functions*." During his postgraduate studies, Dr. DEGER served as a Research Assistant at Hasan Kalyoncu University. His research interests include hydrology, climate, water resources management and risk prediction of extreme hydrometeorological events. Currently, Dr. DEGER conducts research, delivers lectures, and supervises students in related fields.

Integration of Earthen Materials in the Lebanese Construction Industry

Yathreb Sabsaby

Faculty of Architecture Design & Built Environment, Beirut Arab University, Lebanon

Using earth as a building material offers a variety of potential opportunities and alternative solutions, not only to environmentally conscious planners and designers but also to architects and volunteers. It will also help these individuals integrate into the field of rethinking sustainable practices with their quality of life and even open doors for skilled laborers in the mainstream of the Lebanese construction industry. Therefore, this paper investigates the potential for integrating adobe-stabilized earth blocks into the Lebanese construction industry as earthen materials. The study aims to: 1) assess the technical feasibility and sustainability of earthen construction in the Lebanese context, considering seismic activity and climatic conditions; 2) analyze the economic viability of earthen construction compared to conventional building methods; 3) identify the main barriers to the wider adoption of earthen construction in Lebanon; and 4) propose strategies for overcoming these barriers and promoting the sustainable development of the earthen construction sector. The research methodology includes a literature review, field surveys, laboratory testing of local soils, building performance simulations, and economic cost-benefit analyses. Preliminary results indicate that earthen construction offers significant potential in Lebanon, with benefits such as low embodied carbon, high thermal mass, and improved indoor air quality. However, challenges remain, including the need for skilled labor, establishing quality control standards, and integrating earthen construction into existing building codes. The paper concludes with recommendations for policy interventions, capacity-building programs, and research initiatives to facilitate the wider adoption of earthen construction in Lebanon and contribute to a more sustainable and resilient built environment.

Biography

Yathreb Adnan Sabsabi is an assistant professor at Beirut Arab University, Faculty of Architecture, Design and Built Environment. Their research interests focus on energy-efficient residential buildings, sustainable construction materials, and Building performance simulation. They have more than 14 years of experience in consulting and designing in the Lebanese Real Estate development sector. They have authored and co-authored numerous publications in peer-reviewed journals and conferences.

Trade-offs between Lean, Green, and Agile Practices and their Impact on Environmental and Operational Performance

Akram. EL KORCHI and **Fadwa. Bouhannana**

IBN ZOHR University, Morocco

Faced with a rapidly evolving market, characterized by increasingly shorter product life cycles and heightened differentiation requirements, this article explores the challenges companies and their suppliers encounter in supply chain management. It highlights three essential approaches: Lean, Green, and Agile.

The main challenge lies in striking a balance between these approaches to achieve both operational and environmental performance simultaneously. To this end, the article proposes the development of a decision-support tool for managers. This tool enables the selection of the most suitable Lean, Green, and Agile (LGA) practices to enhance a company's overall performance.

The methodology adopted is based on a systematic literature review (drawing from 2011 to 2022 data from Google Scholar, Science Direct, and Scopus) to identify the interrelations between LGA practices and performance indicators. These findings are then validated through a case study in the agri-food sector. A correlation matrix is established, and impact indices are calculated by multiplying the effect of a given practice on a metric by the degree of importance the company assigns to that metric. The practices are then categorized into A, B, or C, based on their overall contribution.

The results show that while each approach has its advantages and limitations, their strategic combination generates positive synergies. For instance, some Lean practices enhance operational efficiency but may increase environmental impact, whereas Green practices promote sustainability without necessarily optimizing productivity. A case study of a Moroccan canned food company illustrates the application of this methodology to meet European market requirements. By prioritizing high-impact practices (Class A), the company achieves an optimal balance between competitiveness and sustainability.

Biography

Akram EL KORCHI is a Full Professor at the National School of Applied Sciences in Agadir, Morocco. He has authored several research papers in the field of sustainable supply chain management. His current research focuses on the trade-offs between Lean, Green, and Agile practices, aiming to balance operational efficiency and environmental performance. In addition to his academic work, he is actively engaged in driving climate action initiatives in Morocco and internationally.

Phosphate Glass Electrolytes for Solid-State Lithium-Ion Batteries: A bibliometric Analysis

Hicham Es-soufi[1], Imane Jouarane[2], Soukaina Laghdass[2], Taoufiq Guedira[2] and **Lahcen Bih[3]**

[1]National Higher School of Chemistry (NHSC), Ibn Tofaïl University, Morocco
[2]Laboratory of Organic Chemistry, Catalysis, and Environment, Faculty of Sciences, Ibn Tofaïl University, Morocco
[3]Laboratory of Sciences and Professions of the Engineer, Materials and Processes Department ENSAM-Meknes Marjane II, Moulay Ismail University, Morocco

Solid-state lithium-ion battery (SSLIB) development has been fueled by the growing need for high-performance energy storage solutions. Phosphate glass electrolytes have become a potential material among the many electrolyte possibilities because of their favorable characteristics, which include excellent ionic conductivity, thermal stability, and structural plasticity. A thorough bibliometric analysis of the major figures, publications, and research trends in the field of phosphate glass electrolytes for SSLIBs is presented in this work. We examine publishing patterns, citation networks, and keyword co-occurrence using bibliometric approaches to show how scientific interest in this area has changed over time. The basic characteristics of phosphate glasses, how they are made, and how they improve lithium-ion mobility are all covered in the review.

Biography

Dr. Hicham Es-soufi is a Professor at the National Higher School of Chemistry (NHSC), Ibn Tofail University, Kenitra, Morocco. He has also served as the Director of Studies, Director of Research and Development, and Professor at the Higher School of Engineering, ESGCNT, Meknès, Morocco. Dr. Es-soufi is a member of the editorial board for three international scientific journals and has peer-reviewed for over 60 international scientific journals. He participates in more than 12 international conferences as a committee member. His primary research focus lies in the research and development of new materials, with a particular emphasis on studying the physical-chemistry of materials for applications in electrochemical energy storage, electrostatic energy storage, wastewater treatment, corrosion, and gamma radiation shielding. To date, Dr. Es-soufi has authored more than 50 publications in international scientific journals.

Assessing Landslide Risks and Vulnerabilities in Ghana: A Geospatial Modeling Approach

Julia Quaicoe

Department of Geography and Regional Planning, University of Cape Coast, Ghana

Landslides pose a significant global threat, involving the gravity-driven movement of earth materials. While triggered by various disturbances, their occurrence is strongly influenced by environmental factors such as geology, precipitation, land cover changes, and population dynamics. This presentation explores the application of geostatistical and geospatial models to evaluate the individual contributions of these environmental factors to landslide risks and vulnerabilities in Ghana. Utilizing the weighted overlay method, our analysis revealed a seemingly counterintuitive finding: areas identified as high landslide risk zones experienced the lowest levels of precipitation, despite precipitation being assigned the highest weight (35%). This suggests that the inherent geological setting of these locations significantly amplifies their susceptibility to landslides, even with minimal rainfall. Furthermore, the study highlighted a high level of vulnerability driven by increasing population density and associated improper land-use planning practices. Our findings underscore that while the precise prediction of landslide events remains challenging, the integration of available datasets through geostatistical and geospatial modeling technologies offers a valuable approach to ascertain the individual contribution of key environmental factors to the overall levels of landslide risk and vulnerability. This understanding is crucial for developing targeted and effective risk reduction strategies in Ghana.

Biography

Dr. Julia Quaicoe is a distinguished scholar and lecturer at the University of Cape Coast, with a Ph.D. in Physical Geography. Her expertise includes Geospatial Techniques, Vulnerability Assessment, and Geomorphology. Her research focuses on the intersection of physical landscapes and human activity, with a particular emphasis on geomorphology, hydrology, and environmental management. She is the author of a chapter on "Landslide Risk and Vulnerability: Real Issues, Thoughts and Perspectives," which highlights her expertise in assessing complex environmental hazards. Dr. Quaicoe has contributed to several projects and capacity-building initiatives, delivering online lectures on topics such as open data and riparian zone restoration. She is committed to knowledge sharing and education, having taught and led exercises for international students at a summer school on "Restoring the Aquatic Terrestrial Nexus in the Tropics." Her work demonstrates a strong focus on applied science and its role in sustainable development.

Lifecycle Engineering of Laser Beam Manufacturing Systems for EV Fuel Cells: Driving Cost Savings and Operational Efficiency in Production

Joseph Teye Ignatius Buertey

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Fuel cell technology is increasingly recognised as a viable pathway for zero-emission electric vehicles (EVs), yet its widespread adoption depends on cost-effective, high- quality, and scalable manufacturing processes. Laser Beam Manufacturing (LBM) has emerged as a key enabler in fuel cell production, delivering precision, repeatability, and reduced material waste in critical joining and microfabrication steps. This study provides a comprehensive analysis of the profound correlation between Lifecycle Engineering (LCE) principles and advanced Laser Beam Manufacturing Systems in EVs' fuel cell technology. The study highlights how this integration drives significant cost savings and enhances operational efficiencies across the entire production lifecycle of Electric Vehicle (EV) fuel cells and their critical components. LCE's holistic “cradle-to- cradle” approach, which encompasses technical, environmental, and economic impacts from raw material acquisition to disposal, combines seamlessly with the precision, speed, and automation capabilities inherent in laser technology. This research applies the LCE framework to optimise LBM systems for fuel cell manufacturing, with a targeted focus on cost reduction and operational efficiency. Through integrated digital modelling, process energy analysis, and total cost of ownership evaluation, the study assesses LBM performance across design, operation, and end-of-life stages. Findings show that optimised laser processing parameters and adaptive control systems reduce cycle times by up to 20%, while predictive maintenance strategies lower unplanned downtime, cutting operational costs by 10– 14%. End-of-life material recovery strategies further enhance resource efficiency and supply chain resilience. The proposed LCE-LBM approach provides manufacturers with a decision-support model to deliver high-performance fuel cells at lower costs, accelerating the competitiveness of EV fuel cell technology.

Biography

Prof Joseph Teye Ignatius Buertey has two PhDs and several professional certifications. He has lectured for the past twenty years at several universities. He is currently the Dean of the Faculty of Engineering Science and Computing. He manages several grant projects at Pentecost University, including LaSoMa, Lase4netZero, and NEDMEV, among others. He is a member of the Licensing and Registration Technical Committee of the Engineering Council of Ghana, a Fellow of the Engineering Institute of Technology, a Fellow of the Ghana Institution of Surveyors and a certified PMP. He is the Chairman of the Research Committee for the Ghana Institution of Surveyors and serves on several committees at Pentecost University. He has published over 50 peer- reviewed papers in reputable journals and conferences and has served as an editorial board member and reviewer for several journals.

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Population Changes and Primary Healthcare Delivery in Ebonyi State, Nigeria

Agatha Arochukwu[1], Felix Ike[2], Adelowo Adefisayo Adewoyin[3] and **Adebayo Oluwole Eludoyin[4]**

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Background: This study investigated the impact of population dynamics on primary healthcare (PHC) delivery in Ebonyi State, Nigeria, with a focus on gender disparities, spatial distribution, and healthcare accessibility. The study employed Geographic Information System (GIS) based spatial analysis to assess travel time and distance to PHC's.

Methodology: A GIS-based Network Analyst tool and Tobler's hiking function were applied to analyse accessibility to PHC under driving and walking scenarios. Primary data were collected from 170 PHC's using the National Primary Health Care Development Agency's checklist. Spatial data, including road networks and demographic statistics were obtained from the Ebonyi State Primary Health Care Development Agency and the National Population Commission.

Results: The population distribution across Ebonyi's 13 Local Government Areas (LGAs) varied significantly. The most populated LGAs were Izzi, Onicha, Ikwo, and Ohaukwu; each with approximately 300, 000 people, while Ivo LGA contributed only 4.6%. Gender distribution was relatively balanced (51% female, 49% male). Although 81.1% of the population can access a PHC within a 60-min drive (≤ 30 km), 37.9% of villages required over 60-min of walking, indicating underserved areas. The minimum standard checklist for 170 Primary Health Centres (PHCs) reveals that 90% of these centres are inadequately equipped with essential health facilities and personnel. As of 2022, only one PHC in Ebonyi State served a population exceeding 10, 000, highlighting significant deficiencies in service coverage.

Conclusion: The study highlights spatial and demographic disparities in PHC accessibility, resource distribution, and service readiness across Ebonyi State, Nigeria. While most residents were within a 60-min drive of a PHC, rural areas faced significant access challenges due to poor infrastructure. The shortage of medical personnel and inadequate equipment further exacerbates healthcare inefficiencies. Addressing these gaps requires targeted resource allocation, PHC expansion, and infrastructural development to achieve Universal Health Coverage (UHC) and ensure equitable healthcare access across the state.

Biography

Agatha Arochukwu (Nigeria)

National Population Commission Nigeria.

Agatha Arochukwu is a Principal Geographic Resource Analyst with over a decade experience in filed data collection. Completed a Master and Doctorate in Geography and Planning with a specialization in Environmental Management from Abia State University Uturu, Nigeria. Research interest is cantered on Demographic changes and health care planning and delivery.

Artificial Floating Islands Planted with Polypogon monspeliensis for Phytoremediating Rooftop Rainwater in the Semi-Arid Urban Area of Tunis (Tunisia)

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The artificial floating island (AFI) technology is becoming a promising sustainable remediating alternative for water and wastewater pollution. It is to build a buoyant carrier in water, planted with either aquatic (macrophytes) or adapted terrestrial plants characterized by water depuration capacity. In this study, the issues of how to use AFIs planted with the species Polypogon monspeliensis to decontaminate harvested rainwater from urban rooftops, and the possibility of using the treated rainwater were addressed. Experimental AFIs were set up outdoors the pilot wastewater treatment plant of El Menzah in the urban area of Tunis (Tunisia) characterized by a semi-arid climate. Polypogon monspeliensis seedlings were fixed on the floating islands either with or without filter media. The rainwater from the rooftops of the laboratory building was harvested in a plastic 100 Liter container for further treatment. The phytoremediation experiment and performance monitoring were conducted during six months between October 2022 and March 2023, preceded by an acclimatization period of two months. Physicochemical and bacteriological parameters of treated rainwater were analyzed using standard methods. Results showed a significant reduction of pH, electrical conductivity, COD, TSS, ammonium ions, nitrate, phosphates, chlorides, iron, fecal coliforms, and streptococci. Pollutants' removal rates increased simultaneously with the plants' growth during the monitoring period, while the in situ registered pH and electrical conductivity values were reduced. It was also found that filter addition to the floating islands can improve their decontamination performance. Moreover, the study revealed the compliance of treated rainwater quality with the required levels by the Tunisian standards for irrigation purposes. Then, the Polypogon monspeliensis–planted

artificial floating islands proved highly efficient remediation of rooftop rainwater that could be used for the irrigation of urban green spaces and subsequently could be an alternative for water scarcity in semi-arid urban areas.

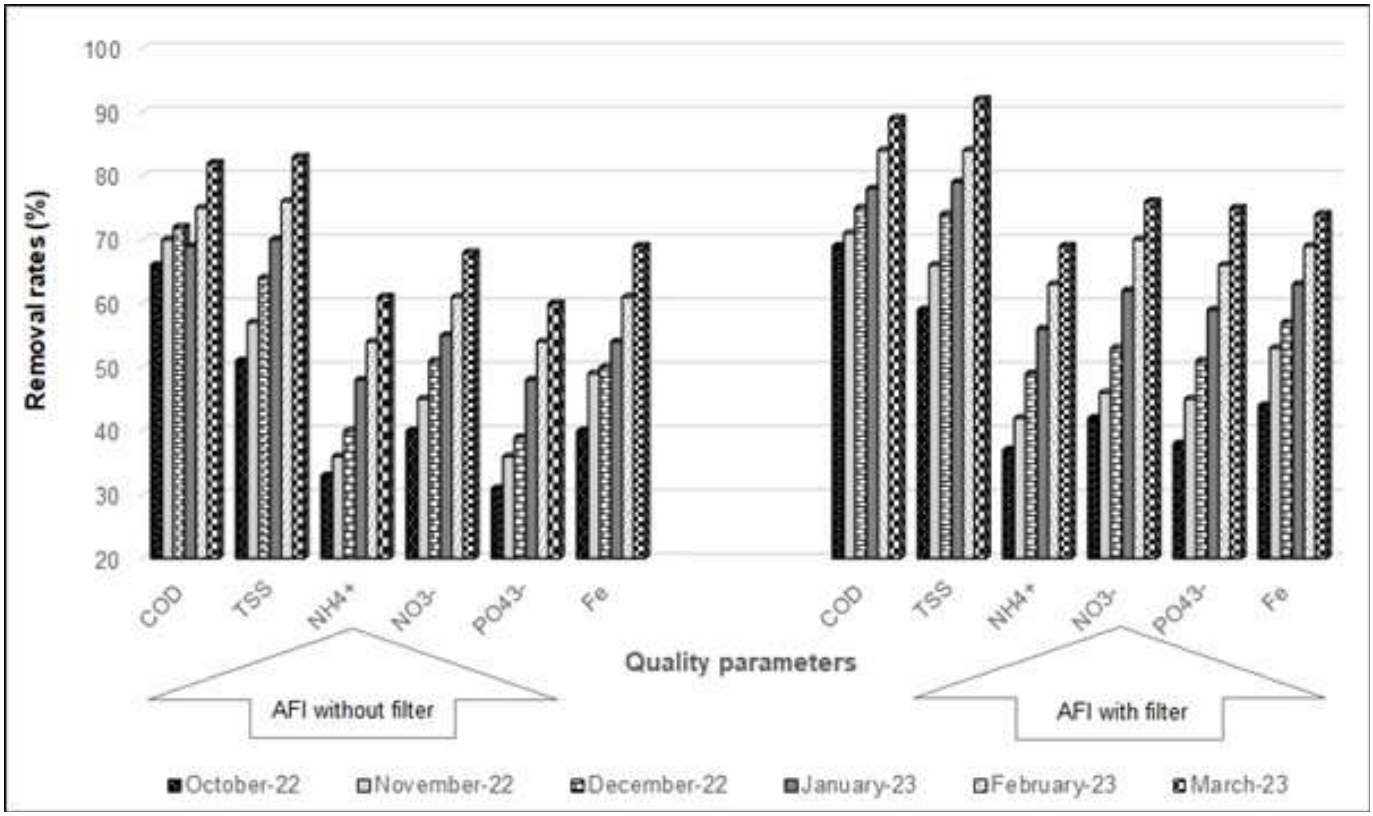

Figure1. Variation of pollutants' removal from the rooftop rainwater by artificial floating islands (AFIs) during the monitoring period (October 2022 - March 2023)

Table 1. Comparison of the treated rooftop rainwater quality with Tunisian standards for irrigation purposes

Parameters	AFI without filter	AFI with filter	Tunisian standards
pH	7,8	7, 5	6,5 ≤ pH ≤ 8,5
EC (µS/cm)	138	121	7000
COD (mg O2/L)	42	30	90
TSS (mg/L)	22	15	30
NH4+ (mg/L)	45	50	-
NO3- (mg/L)	31	23	-
PO43- (mg/L)	8,1	6,2	-

Chlorides (mg/L)	295	271	2000
Fe (mg/L)	1,1	0,8	5
Fecal coliforms (MPN/100 mL)	46	24	-
Streptococci (MPN/100 mL)	21	15	-

Biography

Dr. Soulwene KOUKI is an Assistant Professor and Researcher at the Water Researches and Technologies Center (Technopark of Borj Cedria), in Tunisia. She has worked in different research fields of environmental studies since 2003, mainly on the use of Constructed Wetland Systems in Water and Wastewater Phytoremediation. Dr. KOUKI areas of expertise also include: Bioremediation, Biofiltration, Environmental Microbiology, and Solid Waste Management.

Features of use of the Seismic Isolation Systems in the Conditions of Permafrost Melting

Alexander A. Bubis[1] and **Tatiana A. Belash**[2]

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Currently, seismic isolation technologies are becoming increasingly widespread in earthquake engineering. The technology, known since ancient times, has been developed in the modern world. The effectiveness of various seismic protection technologies used has been repeatedly confirmed after strong earthquakes in many countries of the world, including Russia. That is why scientific engineering does not stop working to improve the seismic protection of buildings and structures. Today seismic isolation systems are variety of devices. It is beneficial to apply different approaches to seismic isolation for different structural solutions of buildings and structures, different climates and different seismic hazards. The systems developed and used in Russia currently have economic and social efficiency, making it possible to achieve, in comparison with traditional structures, an increase in the seismic reliability of structures, a reduction in the cost of anti-seismic measures, a reduction in damage from earthquakes, and more accurate assessments of investment and insurance risks. The paper presents the huge experience of devices and their combinations using not quite traditional approaches to seismic isolation of buildings and structures, seismic supports made of concrete, seismic protection based on geometrically nonlinear systems, combinations of various devices.

The Global climatic changes and active development of the Arctic zone, Siberia and the Far East in Russia in the last decade has prompted the authors to return to the problem of construction of structures in areas that may be affected by a number of natural phenomena during construction and operation. In the paper the authors analyze options for the construction of earthquake-resistant buildings on permafrost soils, the situation most common in the territories of the so-called permafrost. The analysis of constructive solu-

tions applied more than 40 years ago in the construction of residential blocks of buildings in Severobaikalsk, well-proven during the past earthquakes. In the conclusions based on the results of the study, recommendations are given for the construction of earthquake-resistant buildings for the conditions of the Arctic zone.

Biography

A.A. Bubis is the Head of the Structures Earthquake Resistance Research Center (SERRC). Since 2016, he is the Vice President of the Russian Association for Earthquake Engineering and Protection from Natural and Man-made Impacts (RAEE). A.A. Bubis - Territorial Coordinator (Russia, Eastern Europe, except EU countries) of ASSISi (Anti-Seismic Systems International Society), member of the ISO TC98/SC/WG13 working group on earthquake-isolated structures. Research interests: earthquake engineering, seismic isolation, safety of structures and structures. With the participation of A.A. Bubis, many unique buildings and structures were erected in the Russian Federation, historical buildings were reconstructed and strengthened. He was a responsible executor from the Russian Association for Earthquake Engineering and Protection from Natural and Man-made Impacts (RASS) in the performance of research work on Olympic facilities. A.A. Bubis is a regular participant and speaker at specialized international scientific conferences and meetings, organizer of the Russian National Conference on Earthquake Engineering.

Innovative Design Solutions for Sustainable Development of Urban Agriculture by Ecofeminism Perspective

Jing Ruan

Nanhai Academy of art at Haikou University of Economics, China

Having set global warming in irreversible motion, we are facing the possibility of ecological catastrophe. Urban agriculture plays an important role in the sustainable development and transformation of cities in the future. First of all, improving urban ecology, regulating climate change, enhancing the resilience of the food system, and ensure food security; Secondly, shortening the food supply chain, reducing energy consumption, improving circular economic benefits, and supplementing urban agriculture with fresh fruits and access to vegetables; Thirdly, engaging more citizens increases social connections and networks between them, bridges gaps, reduces existing tensions, and promoting social integration between otherwise segregated groups. It is beneficial to physical and mental health and enhances community cohesion; Fourthly, urban agriculture provides inclusive green public spaces for women, children, and the elderly, helps improve air quality and waste recycling management, and promotes collaborative innovation in the community; At the same time, it also provides young people more employment opportunities and brings more possibilities for the sustainable development of urban agriculture. Timothy Morton argues that all forms of life are connected in a vast, entangling mesh. This interconnectedness penetrates all dimensions of life. Donna Haraway advocates “making kin”. If there is to be multispecies ecojustice, we have to reinvent how we think. From the perspective of ecofeminism, this article advocates the ethics of care and rethinks the coexistence between humans, nature and other species based on the concepts of relevance, transformation, love, inclusive, compassion and kindness.

Through the collaborative innovation cooperation model between the university and the agricultural community, explored the harmonious symbiosis of people, land, animals and plants through the practice of urban agriculture sustainable design projects in Tuscany. A series of design solutions were developed with the aim of enhancing the territory, achieving eco-friendly and poetic dwelling.

Biography

Dr. Jing Ruan is an associate professor of Nanhai Academy of art at Haikou University of Economics. She worked in laboratory of design for sustainability of DIDA in University of Florence for 6 years as a researcher. She is the author of "Design for Sustainability Drives Inclusive Innovation of Urban Agricultural Communities: Taking Projects in China and Italy as Examples". She focuses on interdisciplinary fields such as natural ethics, climate change, ecological innovation, and sustainable agricultural development. Her research integrates interdisciplinary methods, based on the context of Eastern and Western ecological philosophy, explores agricultural economic and cultural innovation and rural revitalization from the dimension of design education, and takes eco-feminism as the perspective, including biodiversity, cultural diversity, economic diversity, and knowledge diversity. Through design methods and tools, she seeks creative and sustainable solutions, and establishes a systematic theoretical method to drive sustainable design creativity.

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