Joint Event

2nd Global Summit on

Climate Change & Environmental Sustainability

&

International Conference on

Recycling and Waste Management

September 18-19, 2025 | Los Angeles, USA

Contact us:
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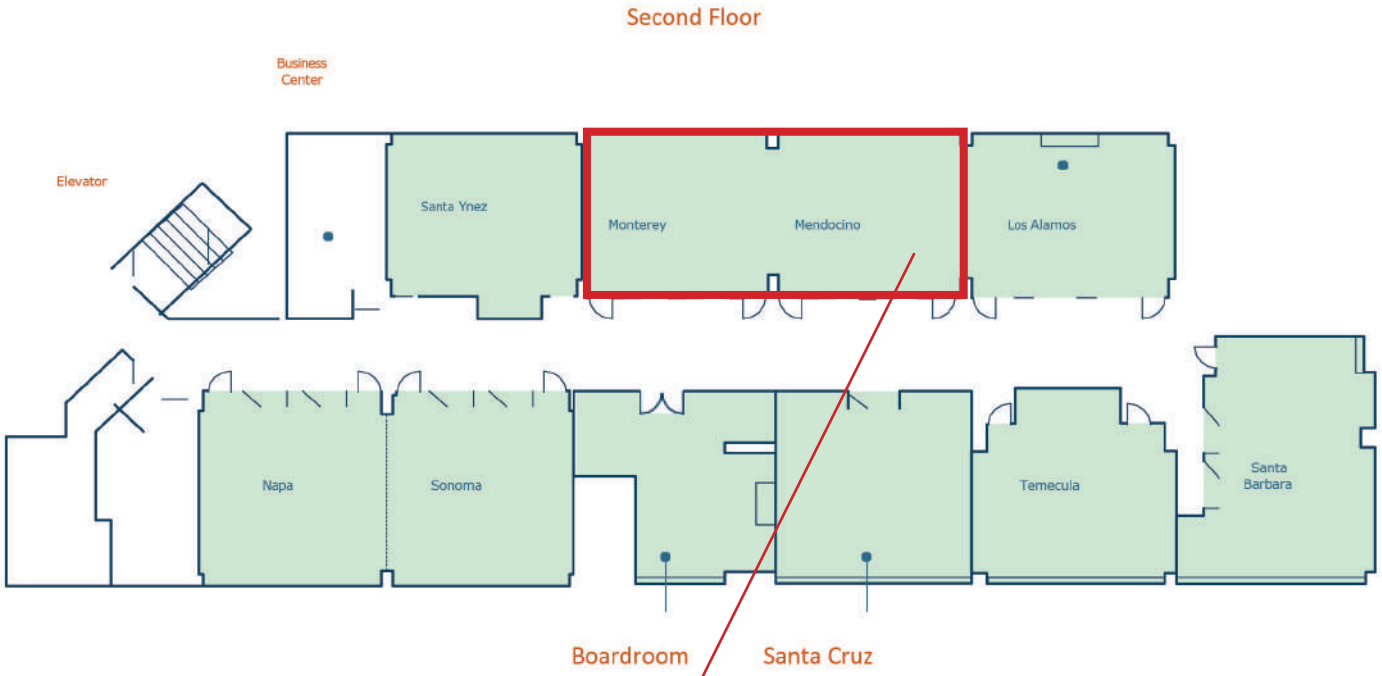
Floor Map



Conference Hall - Monterey & Mendocino

Wifi Details

Username: Sonesta Guest
Password: Stayrewarded

Speaker Representations

Conference Programme

Day 1

18th September

Session Chairs

Anjun Jerry Jin, Chongqing University, China
Hyuk Jeong, Hankuk University of Foreign Studies, South Korea

Conference Programme

Day-1 | September 18, 2025	
Conference Hall @ Monterey & Mendocino	
09:15 - 09:45	**Registrations**
09:45 - 10:00	**Introduction**
Keynote Presentations	
10:00 - 10:40	**Chris Salvino, Lunar Helium-3 Mining, USA**
Title: Helium-3 Fusion for a Sustainable/Green Future	
10:40 - 11:20	**Anjun Jerry Jin, Chongqing University, China**
Title: Status and Prospects of Decarbonization in China - Unraveling Energy to GHG Conversion Demystified and it's Optimizing Methods for Decarbonization	
Network & Refreshments (11:20 - 11:35) @ Temecula	
Oral Presentations	
Session Chair	**Anjun Jerry Jin,** Chongqing University, China
Session Chair	**Hyuk Jeong,** Hankuk University of Foreign Studies, South Korea
Sessions: Climate Change and Public Health | Climate Policy and Governance | Climate Justice and Equity | Natural Hazards and Disaster Management | Waste Management Policy and Regulation | Climate Adaptation Strategies | Waste Management Techniques and Best Practices | Advancements in Climate Science | Agrobiodiversity and Agroecology | Atmospheric Sciences and Meteorology | Biodiversity Conservation | Climate Adaptation Strategies | Climate Finance and Investments	
11:35 - 12:00	**Nkongho Ayuketang Arreyndip, Ca' Foscari University of Venice, Italy**
Title: The Russia-Ukraine Conflict: Most Vulnerable Regional Food Markets and Mitigation Strategies	
12:00 - 12:25	**Hyuk Jeong, Polar Research Center, Hankuk University of Foreign Studies, South Korea**
Title: An Analysis of the Sweden's Methane Emissions Reduction Policies in Landfill, the Policy Enhancement Factors, and the Implications for Korea	

12:25 - 12:50	**Jorge Orozco Gaytan, Academia Mexicana De Geriatría, Mexico**
Title: Perceptions of Climate Change and Health Risks among Urban Older Adults in Mexico City: A Pilot Study	
Group Photo (12:50 - 13:00)	
Lunch (13:00 - 14:00) @ Temecula	
14:00 - 14:25	**Michelina Di Trani, Università Di Padova E Università Di Bari, Italy**
Title: Circular Economy and Sustainable Finance: ESG Funds as a Tool of Policy and Transition	
14:25 - 14:50	**Algie Au, Puget Sound Energy, USA**
Title: Clean Energy Transition and Affordability: How Mapping Vulnerability, Customer Engagement, Community Capacity Building Drives Clean Energy Program Design and Development	
14:50 - 15:15	**Dillip Kumar Das, University of KwaZulu-Natal, South Africa**
Title: Climate Change Adaptation Strategies to Build Sustainable and Resilient Communities in the Global South – A Comparative Perspective on South Africa and India	
15:15 - 15:40	**Junboum Park & Yisup Byun, Seoul National University, South Korea**
Title: Mechanochemical Degradation of Long-Chain PFAS in Contaminated Soil	
15:40 - 16:05	**Barbara Dutka, Strata Mechanics Research Institute of the Polish Academy of Sciences, Poland**
Title: Assessment of the Suitability of Municipal Solid Waste Incineration Bottom Ash to Reduce CO_2 and to Achieve Recycling Targets	
Network & Refreshments (16:05 - 16:30) @ Temecula	
16:30 - 16:55	**Fredua Agyemang, North-West University, South Africa**
Title: Climate Change Mitigation and Disaster Risk Reduction for Sustainable Development in South African Cities: The Role of South African Legislation	
16:55 - 17:20	**John Kingsley Krugu, Eco-Bliss Climate Ltd, Ghana**
Title: Unlocking Ghana's Natural Capital through Nature-Based Solutions	
Day 1 Concludes	

Day 2

19th September

Session Chairs

Anjun Jerry Jin, Chongqing University, China
Michelina Di Trani, Università Di Padova E Università Di Bari, Italy

Day-2 | September 19, 2025	
Conference Hall @ Monterey & Mendocino	
Keynote Presentations	
10:00 - 10:40	**Funda Yoldas, Ege University, Turkey**
Title: Enhancing Crop Productivity Under Climate Change: The Role of Light, Shade, and Agrivoltaics	
10:40 - 11:20	**Akrum Tamimi, The University of Arizona, USA**
Title: The Shincci-USA Low Temperature and Low Energy Heat Pump Sludge Drying Systems: Treating Sludge, Manure and Residuals to Pathogens free and Odour free Materials, at Low Cost	
Network & Refreshments (11:20 - 11:40) @ Temecula	
Oral Presentations	
Session Chair	**Anjun Jerry Jin, Chongqing University, China**
Session Chair	**Michelina Di Trani, Università Di Padova E Università Di Bari, Italy**
Sessions: Marine Sciences, Marine Ecology and Aquatic Environment | Electronic Waste (E-Waste) Recycling and Management | Climate Finance and Investments | Carbon Reduction Initiatives | Agrobiodiversity and Agroecology | Climate Policy and Governance | Agricultural and Food Waste Recycling | CO2 Utilization in Recycling Processes | Waste Management Policy and Regulation | Decarbonization and Net Zero Strategies in Waste Management | Bio-Based Approaches and Resource Efficiency | Waste Management Techniques and Best Practices | Bio-Electrochemical Treatment Systems | Waste Water Treatment Innovations | Infectious Waste Management Solutions	
11:40 - 12:05	**Fazal Musaddiq Rehman, Cooper Caraway, Asher Simon, Raphael Ruiz, Amelia Domondon, Darrell Keith Shelton and Daniel Keith Shelton** MCSMS Robotics Club Youth Mentors/Atlantic Coast High School, USA MCSMS Robotics Club Youth Mentors/Stanton College Preparatory School, USA MCSMS Robotics Club Youth Mentors/Paxon School for Advanced Studies, USA
Title: From Waste to Watchdog: Monitoring Pond Health with 3D-Printed ROVs Made from Recycled Plastics	
12:05 - 12:30	**Jee Yeon Hong, Hanyang University, South Korea**
Title: Development of the Food Systems–related Greenhouse Gas Emissions Factor Database using the Korea National Health and Nutrition Examination Survey (2016-2018)	

Poster Presentations@12:30	
CCRWP - 01	**Katarzyna Godyń, Strata Mechanics Research Institute of the Polish Academy of Sciences, Poland**
Title: Modification of Bottom Ash from Municipal Waste Incineration for CO_2 Removal	
CCRWP - 02	**Lukasz Hupka, Gdansk University of Technology, Poland**
Title : Data-Driven Modeling and Validation of Residual useful Life Prediction for Second-Life EV Batteries	
CCRWP - 03	**Caroline Lee, Homestead High School, USA**
Title : Tracking the Benefits and Limitations of AI as a tool for Climate Literacy and Action	
Lunch (13:00 - 14:00) @ Temecula	
Oral Presentations	
14:00 -14:25	**Naana Ama Bruce, American University - Kogod School of Business, USA**
Title: Driving Sustainable Finance in Emerging Markets: Designing Green Products and Aligning ESG Strategy	
14:25 -14:50	**Sarman Oktovianus Gultom, University of Minnesota, USA**
Title: Floating Island Strategies and Applications for Salt-Polluted Water Phytoremediation	
Video Presentations	
CCRWVP - 01	**Christos Bakos, Anatolia College, Greece**
Title: Mediterranean Monk Seals Population Viability Analysis Considering Male to Male (M2M) Aggression using the VORTEX Simulation Model	
CCRWVP - 02	**Abba Yakubu Abdullah, Aquagric Ltd, Nigeria**
Title: The Impact of Climate Change on Some Selected Crops Under Different Agro-ecological Zones in Katsina State, Nigeria during the 2021 Croping Season	
CCRWVP - 03	**Arnold J. Bomans, Eranistics, Netherlands**
Title: Decision Change: A Plan for a Plan for the Planet	
CCRWVP - 04	**Cristina Sousa Coutinho Calheiros, CIIMAR - Interdisciplinary Centre of Marine and Environmental Research, Portugal**
Title: Integrated Approaches for Enhancing Wastewater Treatment and Reuse Efficiency	
Network & Refreshments (16:00 - 16:30) @ Temecula	
Day-2 Concludes by closing ceremony followed by Certifications and Vote of thank to the participants	

Day 1

Climate Change & Recycling 2025

Keynote Presentations

HELIUM-3 FUSION FOR A SUSTAINABLE/GREEN FUTURE

Chris Salvino
Lunar Helium-3 Mining, USA

Abstract:

We would love the opportunity to speak at your event in September to share how lunar helium-3 fusion can revolutionize sustainable energy. Unlike tritium-based fusion, which produces neutron radiation and long-term waste, helium-3 fusion is a nearly byproduct free energy source that eliminates greenhouse gas emissions. As fossil fuels continue to drive climate challenges, helium-3 offers a cleaner, safer, and more efficient path toward global energy independence. We are not seeking sponsorship but rather an opportunity to inform key stakeholders about the role of helium-3 fusion in advancing truly green energy solutions. If this aligns with your event's goals, we would welcome the chance to contribute to the conversation. Let us know if we can discuss further.

Biography:

Chris Salvino is a CEO and Chief Engineer of LH3M, Dr. Chris Salvino's diverse education and extensive work experience in aerospace engineering, planetary geology, space studies, fl ight science, mining engineering, and medicine position him to lead the team in developing a practical and commercially viable method for extracting lunar Helium-3 for fusion power on Earth. With master's degrees in aerospace engineering and Flight Test Engineering from the National Test Pilot School. Chris brings hands-on expertise in aerospace systems and challenging environments.

STATUS AND PROSPECTS OF DECARBONIZATION IN CHINA - UNRAVELING ENERGY TO GHG CONVERSION DEMYSTIFIED AND ITS OPTIMIZING METHODS FOR DECARBONIZATION

Anjun Jerry Jin
Chongqing University, China

Abstract:

This talk systematically examines renewable energy (RE) applications, develops a related theoretical framework, and proposes design optimization and power management methods to enhance energy quality and reduce carbon emissions. A comprehensive mathematical model, called the EEE system, is constructed which can provide optimized control of comprehensive utilization of renewable energies. The EEE system framework incorporates three key output functions energy performance, greenhouse gas (GHG) emissions, and economic cost which are determined by three input variables: local solar/wind power generation, energy storage capacity, and grid power integration. This model is engineered to facilitate the optimal leveraging of clean energy resources and to strategically advance carbon neutrality. The technological advancements in solar, wind, hydrogen, and energy storage, and smart energies, where China leads global deployment, are explored as critical enablers of energy transition. As the world's largest energy consumer and GHG emitter, China's carbon-trajectory is pivotal to global climate goals. This research explores carbon emission management, optimized through strategic algorithms while ensuring economic viability. The results reveal significant emission reductions with positive economic implications; further research is needed in order to refine load consumption to RE power variations and to achieve control mechanisms of carbon neutrality. The research results can enable policymakers and businesses to identify emission hotspots, monitor and control them with scientific precision that supports both domestic renewable scaling and global energy cost reductions. The case study has highlighted multiple advantages of a typical EEE system, showcasing its ability to meet energy load consumption, reduce carbon emissions, and deliver strong economic benefits. Specifically, the system achieves a remarkable 80% reduction in carbon emissions while simultaneously significantly cutting costs.

Biography:

A.J. Jin, is the director of the New Energy Work Department of the Achievement Transformation Working Committee of the Chinese Society of Land Economics. He currently serves as a full professor in Chongqing University, Chongqing, China. As a noteworthy scientist and inventor, Dr. Jin is honored by several countries and international associations as an academician at below: an academician of International EuroAsia Academy of Sciences and academician of Serbia National Academy of Sciences. Dr. Jin is widely acclaimed as the "Father of EEE Equations," a title that underscores his pioneering contributions to the field of renewable energies and carbon neutrality. Beyond this groundbreaking work, he holds the distinction of being the experimental discoverer of two-dimensional phase transitions. Notably, in 1996, part of his work appeared in Chinese Physics Letters, a respected platform for disseminating high-quality physics research. Building on this recognition, another influential study was featured in the journal of Science in 1997—one of the world's most prestigious and widely cited scientific journals—further solidifying the international impact of his research. The academic value of Academician Jin's work is further evidenced by the many citations by distinguished scholars, including recipients of the Nobel Prize in Physics.

Day 1

Climate Change & Recycling 2025

Oral Presentations

THE RUSSIA-UKRAINE CONFLICT: MOST VULNERABLE REGIONAL FOOD MARKETS AND MITIGATION STRATEGIES

Nkongho Ayuketang Arreyndip
Ca' Foscari University of Venice, Italy

Abstract:

The devastating economic impact of the war between Russia and Ukraine, which began in February 2022 and continues to this day, cannot be overemphasized. As Ukraine is a global producer of corn and wheat, there has been very little documentation of the global economic impact due to supply chain disruptions in these two major agricultural sectors. This paper examines the global impact of the war on the maize and wheat sectors during the first year of hostilities. Analysis of FAO data shows that Ukraine suffered a decline of 15.87% and 17.45% in the maize and wheat sectors, respectively, compared to the base year 2012-2021. Using the Acclimate economic network model, these shocks are applied to Ukraine's maize and wheat network nodes to examine their global impact. The production value and total losses are calculated and compared to the baseline, both regionally and across some key global economic blocs. The results show that the maize sectors in Germany, Ukraine, Poland, and Belgium were most affected by production value losses, while Ukraine, China, Venezuela, and Korea suffered the largest overall losses. In the wheat sector, Russia, Germany, Ukraine, and Canada suffered the largest production value losses, while Ukraine, Kazakhstan, Uzbekistan, and China suffered the largest overall losses. Overall, the maize sector was the hardest hit globally compared to the wheat sector, with the EU, US, China, South America, and Africa being the hardest hit in the maize sector, while the BRICKS and Oceania were the hardest hit in the wheat sector. In July 2022, the Black Sea Grain Agreement was signed between Russia, Ukraine, Turkey, and the United Nations. This initiative was to facilitate the export of grains and fertilizers to the global market as a means to address the global grain shortages and soaring food prices due to the war. Researchers found that the Black Sea Grain Initiative reduced prices of Wheat by 7.9%, offsetting approximately $21.48 billion of these costs. Hence, mitigation policies such as the continues implementation of the Black Sea Grain Initiative can help stabilize global food prices through the crises.

Biography

Nkongho Ayuketang Arreyndip is a Ph.D. holder in Physics from the Department of Physics, University of Buea, Cameroon. He also completed three (3) Postdoc Fellowships at PIK in Potsdam, Germany, funded by the Alexander von Humboldt Foundation, at TU Darmstadt, also funded by the Alexander von Humboldt Foundation, and a Marie Curie Postdoctoral Fellowship at Ca'Foscari University of Venice in Italy. As a climate dynamics and risk assessment scientist, my research interests and expertise in the field of climate change and its impacts range from studying the dynamics of the climate system to assessing its regional and global economic impacts. My interests also include atmospheric physics and chemistry, analysis of extreme climate events, climate change adaptation and mitigation strategies, and environmental AI.

AN ANALYSIS OF THE SWEDEN'S METHANE EMISSIONS REDUCTION POLICIES IN LANDFILL, THE POLICY ENHANCEMENT FACTORS, AND THE IMPLICATIONS FOR KOREA

Hyuk Jeong
Polar Research Center, Hankuk University of Foreign Studies, South Korea

Abstract:

Sweden, one of the European Arctic states, is now implementing the Swedish Environmental Code and the Landfill Ordinance that it has transposed from the EU landfill Directives with a view to reducing methane emissions from landfills. This article is purposed to analyze, and to discuss the policies in terms of reducing methane emissions, and to extract the policy enhancement factors, and to provide the policy implications for Korea. First, the Swedish government needs to define and stipulate environmentally hazardous activities and the harmfulness of landfilling to the other environmental realms as well other than soil realm in the Swedish Environmental Code. Second, concrete requirements for permit to operate landfill facility need to be laid out in the Landfill Ordinance. And lastly, exemption conditions and the extent of the exempted emissions need to be set in the Ordinance. This article stresses, inter alia, on the arrangement of concrete requirements for the permit, and present it as the most crucial policy enhancement factor for the case of Korea where the Wastes Control Act is applied only partly to the landfill facility, and doesn't have any contents regarding reduction in methane emissions from landfills. This article argues that the Korean Government needs to consider enacting the landfill only legislation prioritizing the stipulation of concrete requirements for the permit including an official methodology for calculating the amount of methane emissions from landfills.

Biography

Hyuk Jeong has his expertise in the EU's climate change and environmental policies and the EU Arctic states' climate change policies. His articles are believed to be instrumental to building fundamental foundation for peer researchers and researchers of next generation for their researches, not to mention the fact that they made contributions to some degree to helping South Korea's law makers laying out climate change relevant policies at the government level. In particular, the insights and problems solving perspectives that are reflected in the Articles show the possible approach to optimal solutions to given climate change issues not only in Europe but also in the Arctic region.

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PERCEPTIONS OF CLIMATE CHANGE AND HEALTH RISKS AMONG URBAN OLDER ADULTS IN MEXICO CITY: A PILOT STUDY

Jorge Orozco Gaytan
Academia Mexicana De Geriatría, Mexico

Abstract:

Background: Climate change poses significant risks to public health, particularly for vulnerable populations such as older adults. In Mexico, where extreme weather events are becoming more frequent, understanding how this demographic perceives climate-related health risks is crucial for designing effective adaptation strategies. Limited research exists on this topic.

Objective: this pilot study aims to assess the perceptions of climate related health risks among older adults from a multidisciplinary team, with data collected at the Centro Médico Nacional "La Raza" in Mexico City.

Methods: cross-sectional, descriptive, and observational survey design, data were collected from hospitalized and outpatient individuals using a validated instrument that measures perceived environmental and emotional impacts of climate change. Key findings reveal varying levels of awareness and emotional responses to environmental changes, such as heatwaves, droughts, and ecosystem degradation. Participants' sociodemographic characteristics and existing health conditions are also documented to explore their association with climate risk perceptions.

Results: Men were significantly more likely to report lower awareness of animal suffering ($p = 0.02$), while residents of the Valley of Mexico showed greater awareness of drought-related phenomena ($p = 0.02$). The presence of chronic diseases, particularly hypertension, was associated with increased emotional responses, such as a greater frequency of reported frustration and a heightened perception of the volume of climate-related news, particularly on floods ($p < 0.01$). Additionally, individuals with hypertension expressed a stronger sense of failure regarding human responsibility for environmental change ($p < 0.01$). While environmental awareness appears relatively high, particularly regarding observable phenomena like heat waves, emotional engagement with climate change remains limited in many participants. Chronic health conditions may heighten sensitivity to perceived climate risks, suggesting that perceived vulnerability could play a role in shaping both cognitive and affective responses.

Conclusion: This pilot study provides explanatory insights into how older adults in Mexico perceive environmental changes associated with climate change and its related health risks. Their level of sensory awareness particularly regarding heatwaves, drought, and ecosystem degradation suggest a strong experiential understanding of environmental stressors.

There is high frequency of perceived environmental changes (over 50% of the surveyed) indicating a strong sensory awareness of these shifts. Geographic location also mattered: residents of the Valley of Mexico displayed greater sensitivity to drought and environmental effects, likely reflecting the region's urban environmental stress and information exposure.The findings also have direct implications for the design of public health policies and climate communication strategies aimed at older adults.

CIRCULAR ECONOMY AND SUSTAINABLE FINANCE: ESG FUNDS AS A TOOL OF POLICY AND TRANSITION

Michelina Di Trani

Università Di Padova E Università Di Bari, Italy

Abstract:

Sustainable finance and the circular economy can support each other. The latter, as it is characterized by the ability to regenerate itself autonomously, presents a paradigm that allows us to overcome the traditional linear economic model, in which the steps "extract-produce-use and throw away" trigger a vicious circle that creates negative externalities and unfavorable consequences on our "common home". Sustainable finance, with its nature as financial intermediation process that allows the passage of financial resources from subjects in surplus (savers/investors) to subjects in deficit (i.e. businesses and States) characterized by correct management in the environmental, social and governance (ESG) field, allows us to pursue sustainable development. Among the sustainable finance tools, we can include ESG funds. In their essence as collective savings management tools, ESG (or SRI) funds carry out a financial asset management activity oriented according to criteria that combine the objective of pursuing profit with that of channeling private savings towards initiatives that have a positive impact on the community and the common good. The investment of savers' financial resources, from a purely technical act, becomes a tool for social, environmental and governance improvement and a lever for the diffusion of social values, well-being and virtuous behavior.

In choosing the securities and shares in which to invest, the fund uses negative selection criteria and positive selection criteria, applicable to the issuers of financial instruments (in particular shares and bonds), i.e. companies and States. The reasons for exclusion may be different depending on the type of fund, but in general it is possible to consider, among the economic sectors not worthy of investment for moral and social reasons, as the alcohol, tobacco, gambling, armaments, sectors, those in which there is systematic violation of human rights or in which the activity carried out reveals links with oppressive regimes by companies and States.

Biography

Michelina Di Trani is a PhD candidate in the joint Doctoral Program in Scientific, Technological and Social Methods Enabling Circular Economy at the University of Padova and the University of Bari. Her research focuses on the connections between circular economy and sustainable finance, with a particular emphasis on innovative financial strategies that support ecological transition. As part of her doctoral work, she explores emblematic case studies that highlight systemic approaches to sustainability across both industrial and cultural contexts. Michelina regularly participates in national and international conferences and is actively involved in teaching activities related to economics, law, and circular models. Her research aims to integrate academic rigor with practical impact, contributing to a transformative and holistic vision of sustainability.

CLEAN ENERGY TRANSITION AND AFFORDABILITY: HOW MAPPING VULNERABILITY, CUSTOMER ENGAGEMENT, COMMUNITY CAPACITY BUILDING DRIVES CLEAN ENERGY PROGRAM DESIGN AND DEVELOPMENT

Algie Au
Puget Sound Energy, USA

Abstract:

Background: Puget Sound Energy (PSE) recognizes that meaningful advancement in Energy Justice requires sophisticated data intelligence & authentic community connections. Our integrated data combines complex GIS, Customer Information Systems, Power BI dashboards to help PSE navigate and identify specific needs of our energy burdened vulnerable customers. This comprehensive dataset, developed in response to Clean Energy Transformation Act requirements, identifies vulnerable customers through socio-economic, environmental, climate risk, & health factors. This approach moves PSE beyond transactional interactions to build lasting, evolving relationships with our communities, creating partnerships that are both responsive and accountable to customer needs. PSE transforms these data into meaningful actions: ensuring community capacity building, using customers' preferred languages, and meeting people where they are. PSE and advisory group developed a rigorous methodology to identify customer vulnerability within our service areas, using factors such as the percentage of energy burdened customers, customers experiencing disconnection, arrearages, rental/housing burdens, receiving public assistance, health vulnerabilities, education, and income level. This classification of vulnerable population was further expanded into the development of PSE's Deepest Need customers, leveraging best-in-class energy burden data, we can identify customers experiencing severe energy burden and other compounding vulnerabilities. The challenge after the identification of vulnerable customers is how to utilize these data to best serve these populations. Using mapping tools, we depicted vulnerable population data visually. With a public facing story map (PSE's equity investment zones), this highlights where PSE is committed to deepening connections with our communities through outreach.

These data and tools allow PSE to see the visual distribution of vulnerable populations within the PSE service territory easily, one can identify a location and extract pertinent information including specific vulnerable customer classification, county name, service types, whether the location includes tribal land, and more. The intention is to provide a simple, yet effective way for planners, customer outreach, and program teams to find information regarding vulnerable customers and make decisions based on the information provided. For example, we can pair the analysis with a geographic view into participation trends for deepest need customers, where the PSE teams can evaluate, design, and develop specific strategies in better serving vulnerable customers. Particularly, exploring outreach opportunities, engagement plans, design clean energy education events, and engage tribal sovereignty.

Biography

Algie Au is a multidisciplinary strategist and educator with over 15 years of experience leading equity-centered initiatives across public, nonprofit,

and academic sectors. A bilingual advocate for environmental justice and social equity, Algie holds a Ph.D. in Education, Sustainability and has completed advanced training in climate leadership, adaptive systems practice, and nonprofit strategy. Her research explores the psychological and social factors influencing urban transportation choices, with implications for sustainable mobility design. With a background spanning transportation equity, immersive education, and institutional strategy, her work integrates human-centered design, systems thinking, and storytelling to amplify community voices and drive transformative outcomes. Currently serving as the Energy Equity Program Manager for Research and Education at Puget Sound Energy, Dr. Au designs and scales programs that advance climate justice, community resilience, and inclusive engagement across Washington State.

CLIMATE CHANGE ADAPTATION STRATEGIES TO BUILD SUSTAINABLE AND RESILIENT COMMUNITIES IN THE GLOBAL SOUTH – A COMPARATIVE PERSPECTIVE ON SOUTH AFRICA AND INDIA

Dillip Kumar Das
University of KwaZulu-Natal, South Africa

Abstract:

Background: In the wake of climate change and its widespread consequences, including natural disasters countries in the Global South, including South Africa and India, have made significant efforts to develop climate adaptation strategies and governance systems. Climate change governance and adaptation strategies in the Global South are inherently complex, involving diverse actors, policies, and institutional frameworks. While several steps have been initiated towards climate change governance and adaptation, focused attention is needed on developing sustainable and resilient communities, as emphasized by the United Nations Sustainable Development Goal 11 (UNSDG 11). Given their high vulnerability to climate impacts, South Africa and India face unique challenges shaped by their socio-economic contexts and environmental vulnerabilities. Both nations are at the forefront of developing climate change adaptation strategies and governance systems. This study, therefore, aims to conduct a comparative analysis of these strategies and their potential impacts on fostering sustainable and resilient communities. Specifically, it explores climate change adaptation strategies and governance in these two countries, focusing on their implications for sustainable development while identifying existing gaps. The study employs a mixed-method approach, including a critical literature review, content analysis of relevant policy and strategy documents, case studies, and expert interviews. Two case studies KwaZulu-Natal Province in South Africa and Odisha State in India were analyzed. Findings reveal distinct strategies in each country. South Africa's adaptation measures are largely ecosystem-based, focusing on conserving biodiversity, restoring wetlands, and promoting water efficiency through programs like Working for Water. The National Climate Change Response Policy (NCCRP) integrates adaptation into broader development goals, while local adaptation plans address challenges such as drought in the Western Cape and floods in KwaZulu-Natal. However, institutional challenges, including weak coordination, siloed governance, and financial constraints, hinder effective implementation. India's approach is sectoral, guided by the National Action Plan on Climate Change (NAPCC), which prioritizes missions on solar energy, water conservation, and sustainable agriculture. Traditional water management practices and rural development initiatives further support adaptation. However, gaps remain in integrating local contexts, addressing region-specific vulnerabilities, and ensuring effective policy execution, with localized adaptation strategies underexplored. Emerging transformational approaches emphasizing small-scale, continuous interventions hold promise but require greater emphasis. Advancing climate adaptation in both countries demands stronger community engagement, robust knowledge systems, and integrated policy frameworks to address gaps and build resilient, sustainable communities. Lessons learned from these two countries could contribute to the development of climate change adaptation strategies in other Global South nations.

These data and tools allow PSE to see the visual distribution of vulnerable populations within the PSE service

territory easily, one can identify a location and extract pertinent information including specific vulnerable customer classification, county name, service types, whether the location includes tribal land, and more. The intention is to provide a simple, yet effective way for planners, customer outreach, and program teams to find information regarding vulnera

Biography

Dillip Kumar Das is a Civil Engineer and Planner specializing in Urban and Transportation Engineering and Planning, with expertise in Applied System Analysis. He holds a PhD in Urban and Rural Planning and has a background in Civil Engineering and City Planning. He has over two decades of experience in teaching. His research interests span various areas, including smart, sustainable cities, infrastructure, transportation planning, Climate Change Adaptation, Multi-Criteria Decision-Making, and Engineering Education. He has been recognized as an Established Researcher by the National Research Foundation (NRF), South Africa and empaneled as a researcher under Category A (highest) by the South African National Road Agency Limited (SANRAL). He is a professionally registered engineer. Professor Dr. Das has contributed significantly to academia, with a portfolio comprising more than 200 research publications, including peer-reviewed journal articles, books, book chapters, and conference proceedings.

MECHANOCHEMICAL DEGRADATION OF LONG-CHAIN PFAS IN CONTAMINATED SOIL

Junboum Park and Yisup Byun
Seoul National University, South Korea

Abstract:

Background: Per- and polyfluoroalkyl substances (PFAS) are persistent environmental pollutants with strong carbon-fluorine (C–F) bonds that resist conventional remediation. Mechanochemical degradation (MCD) using planetary ball milling (PBM) has emerged as an effective approach for PFAS treatment in soil by inducing chemical transformations through high-energy collisions.

Objective: To examine PFAS degradation kinetics and transformation pathways of PFAS by MCD. Also, to evaluate tourmaline's role as a co-milling reagent in radical generation.

Methods: In this study, PFAS degradation and intermediate formation are monitored with LC–MS/MS, while IC confirms defluorination by measuring released fluoride ions. Concurrently, FT-IR, XPS, and NMR capture changes in functional groups and fluorine speciation, and XRD identifies new mineral phases. we employ DPPH-based UV spectroscopy to quantify radical generation by co-milling reagent (tourmaline) during MCD of PFAS-contaminated soil. SEM-EDS, XRF, TGA, and TOC further characterize morphological transformations, elemental distributions, and overall mass balance. By integrating these techniques, we establish clear correlations between radical generation and mechanochemical PFAS breakdown, ultimately guiding efficient remediation strategies that convert PFAS to stable inorganic fluoride species.

Results: MCD technique with tourmaline achieved over 82% PFOS degradation within 4 hours in contaminated soil.

Conclusion: Tourmaline enhances radical formation, accelerating PFAS mineralization. These findings highlight MCD as a scalable, non-thermal strategy for PFAS remediation in contaminated soil.

Biography

Junboum Park, obtaining B.S. and M.S. Degrees from Seoul National University in the Department of Civil Engineering, Dr. Park obtained a doctorate degree (Ph.D.) in the Geo-Environmental Engineering from University of Houston, Texas in 1994, and had continued taking Post-Doctoral position in West Virginia University. Since 1996, he joined the faculty of the Department of Civil and Environmental Engineering, Seoul National University, S. Korea, in the field of Geotechnical and Geo-environmental Engineering. The scope of his research interests extends Permeable Reactive Barriers (PRBs), leakage detection systems, and sorption material development. He has published more than 240 peer reviewed journal papers including 80 SCI papers and has been actively joining governmental committees and consulting engineering companies for technical issues of a number of challenging projects. He is also organizing international conferences of GEE(Geoenvironmental Engineering since 2001 with Kyoto Univ, Concordia Univ., and Caen University of France) and GER(Geoenvironmental Engineering and Recycling) since 2012 with Waseda Univ., Hokkaido Univ., Taiyuan Univ and Tech (China) and Chulalongkorn Univ of Thailand) every year.

Yisup Byun, is a master's student at Seoul National University, specializing in Geoenvironmental engineering. His research focuses on the degradation of persistent organic pollutants, particularly per- and polyfluoroalkyl substances (PFAS). With expertise in Mechanochemical techniques, he aims to develop innovative approaches for PFAS degradation and mineralization. His broader research interests include environmental geochemistry, contaminant fate and transport, and sustainable remediation technologies.

ASSESSMENT OF THE SUITABILITY OF MUNICIPAL SOLID WASTE INCINERATION BOTTOM ASH TO REDUCE CO2 AND TO ACHIEVE RECYCLING TARGETS

Barbara Dutka
Strata Mechanics Research Institute of the Polish Academy of Sciences, Poland

Abstract:

Background: Actions aimed at reducing CO_2 emissions into the atmosphere require considerable effort in order to meet the requirements of climate policy. Literature sources indicate the potential for using MSWI-bottom ash for CO_2 capture and/or storage through adsorption or carbonation processes. A crucial step in carrying out these processes may prove to be the selection of an appropriate treatment method for the bottom ash. It is to be expected that the processing of the material after leaving the furnace grate affects the differences in chemical composition and surface properties. It is necessary to assess the benefits of using uncooled and cooled (in Poland, typically treated by wet method using water) bottom ash for CO_2 reduction.

Objective: The properties of MSWI-bottom ashes collected after leaving the furnace grate were compared: in raw form before water cooling (NC-BA) and after contact with cooling water (C-BA). Based on chemical composition analyses and sorption measurement data, the suitability of both materials for CO_2 removal was evaluated.

Methods: The technical and sorption parameters of bottom ash samples with respect to H_2O, N_2, and CO_2 were determined. A low-pressure volumetric and gravimetric adsorption methods were applied. The chemical composition was obtained using X-ray fluorescence (XRF) analysis. Test measurements of carbonation of bottom ash samples were performed.

Results: It was demonstrated that the tested bottom ashes, depending on the type of treatment, differed in sorption capacity and kinetics of water uptake. Water absorption by the C-BA sample was stronger than that of the NC-BA sample. Textural parameters obtained from N_2 adsorption at 77 K may be modified through treatment with a hydroxide solution. It was shown that the sorption of polar sorbates such as H_2O and CO_2 on the C-BA sample results from the fact that previously deposited molecules modify the surface, thereby offering additional sorption sites. Sorption of polar molecules in the NC-BA sample proceeds to a limiting value. Therefore, the surface of this sample contains a defined number of active sites with high affinity for H_2O and CO_2 at low concentrations.

Conclusion: Bottom ash has recycling potential in the area of CO_2 removal. Unlike hazardous fly ash, a broader range of possibilities is available while still meeting strict environmental requirements. CO_2 capture can be carried out using adsorption methods, following appropriate treatment of the bottom ash and selection of suit-

able process conditions. CO_2 sequestration by carbonation on a raw sample, not cooled by water, is one of the possibilities of the management of post-process waste produced in incineration plants in a continuous manner.

Biography

Barbara Dutka is a graduate of the Faculty of Energy and Fuels at the AGH University of Krakow. Since 2006, she has been an assistant professor at the Strata Mechanics Research Institute of the Polish Academy of Sciences. In 2017, she obtained a Ph.D. in technical sciences in the field of mining and engineering geology. She specializes in sorption processes and analysis of the porous structure of materials. She is committed to working in the field of waste management, in particular in the search for potential use of incineration bottom ash from thermal conversion of municipal waste or coal combustion. She has experience in laboratory analyses, adsorption methods, filtration tests and density measurements. Her current interests include the modification of incineration bottom ash for CO_2 capture. She is the author of 49 scientific publications. Currently he is the coordinator of the Polish-Romanian research project for 2023-2025: Macro and micro strength tests on composite–cement stones.

2nd Global Summit on
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CLIMATE CHANGE MITIGATION AND DISASTER RISK REDUCTION FOR SUSTAINABLE DEVELOPMENT IN SOUTH AFRICAN CITIES: THE ROLE OF SOUTH AFRICAN LEGISLATION

Fredua Agyemang
North-West University, South Africa

Abstract:

Background: South African cities are increasingly vulnerable to climate change and disaster risks, posing significant threats to sustainable development and urban resilience. Legislation serves as a critical tool in addressing these challenges by establishing actionable frameworks. The Climate Change Act of 2023 and the Disaster Management Act of 2002 are cornerstone policies in South Africa's efforts to tackle climate and disaster-related issues. These laws align closely with global objectives, particularly Sustainable Development Goals (SDGs) 11 (Sustainable Cities and Communities) and 13 (Climate Action).

Objective: This study aims to evaluate how South African legislation supports climate change mitigation and disaster risk reduction in urban areas while assessing the alignment of these legislative frameworks with the Sustainable Development Goals (SDGs).

Methods: A qualitative legislative analysis was conducted, focusing on the Climate Change Act, of 2023 and the Disaster Management Act, of 2002. Key provisions were mapped against specific SDG targets, including Targets 11.B (implementing disaster risk reduction strategies), 13.1 (enhancing resilience to climate hazards), and 17.16 (fostering partnerships for sustainable development). Secondary data from policy documents, academic literature, and case laws were also analyzed to contextualize the findings.

Results: The findings reveal that both Acts provide a robust framework for climate adaptation, emissions reduction, and disaster preparedness, as demonstrated in various case laws. Key provisions, such as integrating climate adaptation into municipal planning and fostering collaboration among stakeholders, align with critical SDG targets. However, gaps in coordination and resource allocation hinder effective implementation.

Conclusion: The study highlights the potential of harmonized legislative frameworks to drive sustainable urban development in South Africa. To optimize outcomes, stronger intergovernmental coordination, stakeholder partnerships, and capacity-building initiatives are essential. Aligning legislative implementation with the SDGs can enhance urban resilience and promote a sustainable future for South African cities.

Biography

Fredua Agyemang is a postdoctoral research fellow with the South African Research Chair Initiative (SARChI) in Cities, Law, and Environmental Sustainability (CLES) at North-West University and a researcher for AJIS Landed Properties. His work focuses on sustainable cities and mining. He holds a PhD in Urban and Regional Planning (North-West University), a Master's in Town and Regional Planning (University of KwaZulu-Natal), two Master of Laws (LLM) degrees—Public Law (University of Pretoria) and Environmental Law (University of the Western Cape)—a Postgraduate Certificate in Education (University of South Africa), and a BSc in Land Economy (Kwame Nkrumah University of Science and Technology).Dr Agyemang has published peer-reviewed articles, presented at local and international conferences, and serves as Assistant Editor for the Potchefstroom Electronic Law Journal. He co-lectures Local Government and Environmental Law (LLMO 885) at North-West University, supervises students, and reviews articles for leading journals in his field.

UNLOCKING GHANA'S NATURAL CAPITAL THROUGH NATURE-BASED SOLUTIONS

John Kingsley Krugu
Eco-Bliss Climate, Ghana

Abstract:

Background: Ghana's ecosystems forests, wetlands, soils, and biodiversity represent immense natural capital. Yet this capital is under pressure from deforestation, unsustainable land use, and climate variability. The result is declining ecosystem services, fragile livelihoods, and increased vulnerability to climate shocks. Addressing these challenges requires innovative approaches that simultaneously promote ecological restoration and socio-economic development.

Objective: To examine how Ghana can unlock its natural capital through Nature-Based Solutions (NbS) to drive climate resilience, restore ecosystems, and strengthen livelihoods.

Methods: The analysis draws on case studies from northern Ghana where NbS interventions such as agroforestry, soil carbon enhancement, and climate-smart agriculture are being applied. These initiatives were assessed within national and continental frameworks, including Ghana's Nationally Determined Contributions (NDCs), the African Union's Agenda 2063, and the United Nations' Sustainable Development Goals (SDGs). The approach emphasizes integration of ecological restoration with poverty reduction, community participation, and policy alignment.

Results: Early evidence shows NbS interventions have improved soil fertility, enhanced crop yields, strengthened community resilience, and generated biodiversity co-benefits. Community-led conservation efforts demonstrate the potential to foster trust and ownership at local levels. However, gaps remain in financing, policy coherence, and private-sector engagement. Without robust carbon market mechanisms and institutionalized partnerships between government, traditional authorities, and civil society, the transformative potential of NbS will remain limited.

Conclusion: Unlocking Ghana's natural capital through NbS is both an environmental necessity and a development opportunity. With strategic investments, supportive policy frameworks, and inclusive partnerships, Ghana can position itself as a regional leader in NbS deployment securing climate resilience, protecting ecosystems, and advancing sustainable livelihoods.

Biography

As the immediate past Chief Executive Officer of Ghana's Environmental Protection Authority, John Kingsley Krugu has expertise in public health, climate policy, sustainable land management, and the evaluation of nature-based solutions. As Executive Director of Eco-Bliss Climate Ltd and a long-standing partner of the Youth Harvest Foundation Ghana, he has led multiple initiatives at the intersection of climate action, agriculture, and community resilience. His work emphasizes participatory approaches, linking evidence-based solutions to the needs of vulnerable communities. Krugu has contributed to national and regional dialogues on carbon markets, ecosystem restoration, and youth engagement in sustainability. He is particularly committed to integrating scientific knowledge with traditional practices to unlock Ghana's natural capital. His research and leadership have positioned him as an advocate for holistic, inclusive, and scalable climate solutions.

Day 2

Climate Change & Recycling 2025

Keynote Presentations

ENHANCING CROP PRODUCTIVITY UNDER CLIMATE CHANGE: THE ROLE OF LIGHT, SHADE, AND AGRIVOLTAICS

Funda Yoldas
Ege University, Turkey

Abstract:

Climate change, marked by rising temperatures and increasing solar radiation, presents critical challenges for global agriculture, particularly in arid and semi-arid regions. These environmental stresses can reduce crop yield, impair plant physiological functions, and compromise fruit quality. Among adaptive strategies, shading has emerged as a promising technique to mitigate heat and light stress by altering the crop microenvironment. This study investigates the effects of light conditions, shading strategies, and agrivoltaic systems on crop performance, especially under Mediterranean climatic conditions characterized by high radiation intensity and low relative humidity.

Findings indicate that moderate shading (approximately 50%) improves photosynthetic efficiency, increases leaf chlorophyll content, enhances stomatal regulation, and leads to higher fruit yield and nutritional quality, especially in terms of vitamin C, soluble solids, and firmness. When combined with organic fertilizers, these benefits become more pronounced, suggesting synergistic interactions between light management and soil nutrition (My work supported, during a *TUBITAK Postdoctoral Fellowship at CSU, Chico State, CA, USA, emphasizes the role of light management in reducing heat stress, improving plant physiology, and enhancing fruit nutritional value, particularly in high-sun Mediterranean climates). Furthermore, agrivoltaic systems, which combine crop cultivation with solar energy production, offer a dual-function solution addressing both food and energy security. They also contribute to improved land-use efficiency and climate resilience.

Although existing research confirms the positive impacts of shading on crop development, there remains a gap in understanding the optimal integration of agrivoltaic technologies across different crops and environments. Future studies should investigate long-term effects, economic feasibility, and crop-specific responses under varying shading intensities and photovoltaic configurations.

Overall, this study highlights the multifaceted role of light management in climate-smart agriculture. By integrating shading techniques and agrivoltaic systems with sustainable agronomic practices, it is possible to enhance productivity, reduce environmental stress, and promote resilience in agricultural systems facing the uncertainties of climate change.

Reference - Supported by The Scientific and Technological Research Council of Türkiye (TÜBİTAK), TÜBİTAK- BİDEB 2219-International Postdoctoral Research Fellowship Program, Project No: 1059B192300065.

Biography:

Funda Yoldas is a faculty member and researcher in the Organic Agriculture Program at Ödemiş Vocational School, Ege University. Her academic background and research focus are on sustainable agricultural practices and vegetable cultivation, particularly in the context of organic agriculture, environmental stress factors, and climate-smart crop management. She has developed significant expertise in evaluating light conditions, shading strategies, and agricultural solar energy systems to optimize crop yield and quality in changing climate conditions. Throughout her career, she has combined academic research with both teaching and hands-on experience in land-based agricultural practices. Her work, including her work during a TUBITAK Postdoc at CSU, Chico State, CA, USA, emphasizes the role of light management in reducing heat stress, improving plant physiology, and enhancing fruit nutritional value, particularly in high-sun Mediterranean climates. She is also interested in the integration of renewable energy systems, such as agricultural solar energy systems, to promote multifunctional and resilient agricultural models. Funda Yoldaş is committed to contributing to sustainable food systems by aligning traditional practices with innovative technologies. Her ongoing work aims to strengthen environmentally responsible agriculture while supporting local farmers through knowledge transfer, applied research, and active participation in community-based agricultural development.

THE SHINCCI-USA LOW TEMPERATURE AND LOW ENERGY HEAT PUMP SLUDGE DRYING SYSTEMS

Akrum H Tamimi
The University of Arizona, USA

Abstract:

The Shincci-USA low temperature mesh belt type dehumidification system is a transformative technology for treating organic and inorganic residuals including wastewater (sewage) wet sludge cake to Class A level. The dehumidification system dries digested, undigested, primary, secondary or a blend of sludge cake with percent total solids ranging from 16% to 35% or higher, depending on sludge type, to 90% total solids or higher utilizing Shincci Patented and Manufactured heat pump dehumidification technologies. The final product meets pathogen and vector attraction reduction requirements for beneficial reuse and for reducing sludge weight. The Shincci-USA low temperature dehumidification technologies keep caloric and nutrient contents intact and do not change residuals' chemical characteristics. Energy requirements are low; drying one ton of wet sludge cake from 20% to 90% total solids requires between 160 kWh and 250 kWh, depending on sludge characteristics, compared to at least 700 kWh requirements for other drying technologies. The low energy requirements are achieved through the utilization of the Shincci patented and manufactured heat pumps, hot air recycling, multi-heat recovery systems within the treatment closed system, and through thin noodle shaping of the wet sludge cake that results in an increased evaporative surface area. Utilizing the Shincci-USA dehumidification technologies reduce the weight of sludge residuals by a factor of 4.5 when dehumidifying from 20% to 90% total solids, which results in significant reductions of final product weight, hence hauling cost. For example, utilizing the Shincci-USA dehumidification technologies in a wastewater treatment plant that produces 125,000 tons of 20% wet sludge cake would reduce the weight to 27,778 tons of pathogen and odor free Class A biosolids that meets vector attraction reduction when dried to 90% total solids. This results in significant savings on hauling costs, emissions from trucking, traffic congestion, destruction of roads and bridges due to repeated loading and unloading heavy trucks in addition to producing final dried material that can be beneficially used in agricultural production, creating topsoil, fuel for energy generation and other beneficial uses.

Day 2

Climate Change & Recycling 2025

Oral Presentations

FROM WASTE TO WATCHDOG: MONITORING POND HEALTH WITH 3D-PRINTED ROVS MADE FROM RECYCLED PLASTICS

Fazal Musaddiq Rehman, Cooper Caraway, Asher Simon, Raphael Ruiz, Amelia Domondon, Darrell Keith Shelton and Daniel Keith Shelton

MCSMS Robotics Club Youth Mentors/Atlantic Coast High School, USA
MCSMS Robotics Club Youth Mentors/Stanton College Preparatory School, USA
MCSMS Robotics Club Youth Mentors/Paxon School for Advanced Studies, USA

Abstract:

Background: Retention ponds are commonly used to manage stormwater runoff in residential communities, yet their environmental safety and ecological health vary widely depending on surrounding land use. Golf course communities, in particular, frequently apply large quantities of herbicides and pesticides, which may leach into nearby water bodies and impact both biodiversity and human health. Despite this concern, few cost-effective tools exist for direct monitoring of these aquatic systems.

Objective: To investigate biodiversity and assess water quality in retention ponds from three community types; golf course, nature preserve, and standard residential, using an underwater ROV built from recycled PET plastic filament produced with our PETamentor system.

Methods: We collected PET bottles from local beach cleanups and converted them into 3D-printable filament using the PETamentor. This filament was used to fabricate a compact ROV equipped with a waterproof camera and a gripper arm operated by a wireless controller. The ROV was deployed in retention ponds across Jacksonville, Florida, targeting ponds in golf course developments, protected preserves, and non-golf residential neighborhoods. We recorded aquatic biodiversity (fish, invertebrates, vegetation) and noted water characteristics such as clarity, algal presence, and sediment quality.

Results: The recycled filament successfully supported the production of durable, functional ROV components. Preliminary ROV surveys revealed reduced biodiversity and increased algal blooms in golf course ponds compared to others. The potential presence of chemical runoff is consistent with visual indicators, though further testing (e.g., for heavy metals or DNA damage in aquatic species) is needed.

Conclusion: Our project demonstrates that low-cost, upcycled ROVs can serve as effective tools for community-level environmental monitoring. The observed trends highlight the possible ecological and public health risks of pesticide runoff, supporting the need for expanded research into genotoxic exposures in landscaped environments.

Biographies

Fazal M. Rehman is a rising 10th grader at Atlantic Coast High School with a deep interest in environmental science, robotics, and photography. As the corresponding author for his group's project, Fazal combines his passion for technology and creative problem-solving to explore sustainable solutions that address climate change and preserve natural ecosystems. Whether building robotics systems or capturing the beauty of the environment through his lens, he is committed to promoting awareness and driving innovation for a more sustainable future.

Cooper Caraway is a rising 9th grader who graduated from Mayport Coastal Sciences Middle School in Atlantic Beach, Florida. Throughout middle school, he was an "A" Honor Roll student and is set to attend Atlantic Coast High School in Jacksonville, Florida as part of their Advanced Placement Capstone program. He was an active member of the Mayport Middle Robotics Club during 6th, 7th, and 8th grade, and this Team won multiple International Seaperch overall Championships. Outside of school, he enjoys soccer, fishing, Legos, scuba diving and snorkeling.

Asher Simon is a Freshman at Atlantic Coast High School in Jacksonville, FL. He is an AP Capstone Student that plans to pursue a degree in Biomedical Engineering followed by Medical School. Asher has a deep passion for biological sciences, particularly cellular biology, and neuroscience. He is a member of the National Junior Honors Society and attained a perfect score on the state testing for Biology. Asher is a member of math club and is a 3 Time International Robotics Champ and World Record Holder (Seaperch). His hobbies include cooking, sculpting, and playing with his golden retriever, Silver.

Raphael Ruiz is an incoming sophomore at Stanton College Preparatory School. He is deeply fascinated by technology and innovation and has always been captivated by the potential of engineering to solve real-world problems. His interest for computer programming began early, and he developed a strong passion in creating efficient solutions to complex problems. Thus, he is drawn to the fields of robotics and automation, where he is a part of the Mayport Robotics Team that won several awards in International Competitions. His experience working with robotics has not only sharpened his technical skills but also deepened his appreciation for the role of technology in addressing global issues like climate change. He is particularly interested in the connection between technology and environmental protection, and excited to continue exploring how engineering can help create a more sustainable future and is committed to using his skills to make a positive impact on the world.

Amelia Domondon is an incoming ninth grader at Stanton College preparatory school. During her time at Mayport coastal science middle school, she was an active member of the award – winning robotics team stingrays that one international competition competitions three years in a row. Through this experience, Amelia develops strong skills and communication, problem-solving, teamwork, and performing under pressure. Outside of academics, Amelia enjoys spending time outdoors – especially at the beach or pool – with her younger brother and friends. She also has a creative spirit who loves drawing and is an avid reader with a passion for exploring new books and ideas.

Darrell Keith Shelton is a Sophomore AP/Honor Student at Paxon School of Advanced Studies. He is fascinated by marine biology, engineering, and designing robots. He was a member and a youth mentor for the Mayport Coastal Sciences Middle School Robotics Club, an award-winning robotics team that garnered multiple awards in International Competitions, where he developed his talent and cultivated his expertise in robotics. Darrell Keith is deeply passionate about volunteering. His desire to give back to his local community by actively participating in beach and waterways clean-ups led him to innovate and repurpose plastic waste that significantly contributes to climate change at various stages of its life cycle.

He plays various instruments during his free time, but his favorite is his piano and guitar. He also enjoys outdoor activities, like camping, swimming, and kayaking.

Daniel Keith Shelton is a Freshman IB Student at Paxon School of Advanced Studies who is passionate about bioscience and robotics, particularly underwater ROVs. He was a National Junior Honor Society student all throughout middle school. Since 2023, he has been a member of an outstanding robotics team that has won the Overall International Championship at Seaperch for three consecutive years. During his time with Mayport Coastal Sciences Middle School Robotics Club, Daniel Keith became more enthusiastic about helping mitigate climate change by prioritizing the need to preserve and restore our natural ecosystems, especially in Northeast Florida, while applying his knowledge of engineering to solve tangible problems and address actual challenges our environment faces on our planet. While he loves the outdoors, he enjoys building Legos, coding and playing his video games.

DEVELOPMENT OF THE FOOD SYSTEMS–RELATED GREENHOUSE GAS EMISSIONS FACTOR DATABASE USING THE KOREA NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY (2016-2018).

Jee Yeon Hong
Hanyang University, South Korea

Abstract:

Background: The increase in the frequency and scale of climate-related disasters is closely linked to greenhouse gas emissions (GHGEs) from food systems. Due to a lack of a comprehensive emission database that covers entire food systems, data on per-capita dietary GHGEs are limited.

Objective: We created the Food Systems–related GHGE Factor Database (FS-GHGEF-D) to cover an entire food system and estimate per-capita GHGEs for Korea.

Methods: We include GHGE factors for 3,894 food items derived from 24-hour-recall data of the seventh Korea National Health and Nutrition Examination Survey (2016-2018). We extracted these factors from 920 articles, excluding studies that focused only on specific GHG types or single system boundaries, and used a Monte Carlo Markov chain simulation to assess uncertainty of estimates.

Results: The FS-GHGEF-D covered 96.6% of food items. A total of 265 food items, primarily alcoholic and non-alcoholic beverages, were characterized by high degrees of uncertainty. However, removing these foods did not significantly alter the average GHGE factor across all food groups or affect coverage significantly, with the exception of the beverage category (both alcoholic and non-alcoholic). The average daily diet–related GHGEs per capita in Korea, as calculated using FS-GHGEF-D, was 5.08 $kgCO_2eq$. Among food groups, meats contributed the most to the total variation in dietary GHGEs in the Korea population (75.7%). Men generally emitted more GHGEs than did women, with men in their 30s being the highest emitters.

Discussion: This study highlights the utility of a full-system GHGE database that addresses prior limitations in global estimates. Korean dietary patterns exceed climate-compatible thresholds, with substantial variation by demographic groups. These findings support the need for equity-focused strategies and integration of environmental considerations into national dietary guidelines for sustainable and climate-resilient food systems.

Biography

Jee Yeon Hong is a medical researcher specializing in preventive medicine and nutritional epidemiology with expertise in food systems, chronic disease, and environmental health. She earned her Ph.D. in Preventive Medicine from Hanyang University's College of Medicine in February 2024, after completing her M.S. (2021) and B.S. (2019) in Food and Nutrition at the same institution. In 2024, she also completed the Advanced Leadership Research Program (ALRP) in ESG Compliance at Seoul National University, broadening her perspective on sustainability and compliance. Since 2019, she has actively pursued research at Hanyang University, focusing on the intersection of nutrition, epidemiology, and climate change. Her major contributions include establishing the Korean Green Taxonomy of Foods, based on greenhouse gas (GHG) emissions across food systems, and developing sustainable diet standards for the Korean population. She has also led studies linking diet-related GHG emissions to cardiometabolic diseases, created a comprehensive GHG food database, and conducted systematic reviews and meta-analyses on the health impacts of dietary emissions, contributing evidence at the nexus of climate change and public health. She has demonstrated leadership as principal investigator of multiple projects supported by the National Research Foundation of Korea, including a five-year project (2024–2029) on sustainable diet standards and an earlier project (2022–2024) on GHG emissions and cardiometabolic health. She was also a trainee of the Ministry of Environment's Young Scientist Course in 2021, receiving advanced training in epidemiological and environmental health research.

DRIVING SUSTAINABLE FINANCE IN EMERGING MARKETS: DESIGNING GREEN PRODUCTS AND ALIGNING ESG STRATEGY

Naana Ama Bruce
American University, USA

Abstract:

Sustainable finance has become a cornerstone of global efforts to address climate change and promote long-term resilience, yet many financial institutions in emerging markets face structural and strategic barriers to adoption. This presentation explores practical pathways to integrate environmental, social, and governance (ESG) principles into banking operations through a case study with MMG Bank in Panama. As part of a consulting project, I co-led the development of a five-year ESG strategic roadmap, focusing on both disclosure alignment and product innovation. The project began with a comprehensive gap analysis against leading frameworks such as the Global Reporting Initiative (GRI), Sustainability Accounting Standards Board (SASB), Principles for Responsible Investment (PRI), and the IFRS S1/S2 standards. Based on these insights, we designed a suite of green and ESG-linked financial products aimed at expanding MMG's sustainable offerings while addressing investor demand for responsible investment vehicles. A key outcome was a 40% expansion of the bank's sustainable product portfolio, alongside enhanced ESG governance structures through a materiality assessment that engaged key stakeholders. These initiatives not only positioned MMG Bank to attract ESG-focused investors but also demonstrated how sustainable finance can bridge climate goals with financial performance in emerging markets. This presentation will highlight lessons learned from the project, including the importance of governance, stakeholder engagement, and product innovation in building institutional ESG capacity. It will also provide actionable recommendations for financial institutions across emerging economies seeking to align with global sustainability standards while advancing inclusive and climate-smart growth. By showcasing how finance can be a driver of sustainability, this case study underscores the transformative role of the financial sector in accelerating climate action and supporting the Sustainable Development Goals (SDGs).

Biography

Naana Bruce is a Sustainability Management graduate student at American University's Kogod School of Business, where she focuses on sustainable finance, ESG strategy, and climate leadership. She began her career in banking with the National Investment Bank in Ghana, where she led the financing of environmentally sustainable innovations and contributed to the bank's transition toward paperless operations. She recently served as a Sustainability Consultant for MMG Bank and Morgan & Morgan Law Firm in Panama, where she co-developed a five-year ESG roadmap, led a materiality assessment, and designed green finance products that expanded the bank's sustainable offerings. With professional experience in finance and sustainability across the U.S. and Ghana, she is passionate about driving inclusive, governance-focused solutions for climate action.

FLOATING ISLAND STRATEGIES AND APPLICATIONS FOR SALT-POLLUTED WATER PHYTOREMEDIATION

Sarman Oktovianus Gultom
University of Minnesota, USA

Abstract:

Sodium chloride (NaCl) is the main component of conventional road deicers since it is affordable and easy to handle and store. In its application, most of the salt dissolves in melting snow and ice, subsequently infiltrating streams, lakes, wetlands, and groundwater. This negatively impacts the ecosystem, especially aquatic creatures. Salt phytoremediation has been employed to reduce the concentration of salt in water by translocating sodium and chloride to plant biomass. This experiment employed the floating island technique to facilitate plant growth on the surface of salt-polluted water. Six plant species, namely common sunflower (*Helianthus annuus*), sugar beet (*Beta vulgaris*), tall fescue (*Festuca arundinacea*), weeping alkali grass (*Puccinellia distans*), clustered field sedge (*Carex praegracilis*), and American slough grass (*Beckmannia syziguchne* (Steud.) Fern.), were selected through an inventory and matrix decision-making process. Subsequently, a greenhouse experiment was conducted in which these plants were cultivated in hydroponic systems to evaluate their phytoremediation potential and performance concerning salinity. Plants were exposed to diverse growth circumstances, encompassing NaCl concentrations, nutrient levels, and harvest intervals. The greenhouse experiment concludes that salt content influences plant biomass development. The sugar beet and sunflower demonstrated the highest salt uptake percentage, approximately 40%, based on the concentration of salt in the biomass and biomass production at 10 mM NaCl. Most plants can assimilate larger amounts of chloride into their biomass than sodium. The sugar beet and sunflower were subsequently implemented in the floating island system under actual environmental circumstances. This study seeks to identify an effective method for remediating salt-polluted water bodies by cultivating potential plants on the floating island.

Biography

Sarman Gultom is an environmental researcher specializing in salt phytoremediation and sustainable land/water management. He has presented his work at academic conferences, highlighting the role of plants and microbes in mitigating soil salinity. His research interests include plant–microbe interactions, soil/water remediation, and environmental sustainability. With experience in experimental design and applied research, he is committed to developing practical solutions for improving soil/water health and supporting environmental sustainability.

Day 2

Climate Change & Recycling 2025

Poster Presentations

MODIFICATION OF BOTTOM ASH FROM MUNICIPAL WASTE INCINERATION FOR CO2 REMOVAL

Katarzyna Godyń

Strata Mechanics Research Institute of the Polish Academy of Sciences, Poland

Abstract:

Background: European Union countries have been consistently fighting excessive emissions of greenhouse gases into the atmosphere for years. In different regions of the world, the requirements for reducing CO_2 emissions may be different, but they have a common goal - mitigating climate change. It is possible to modify bottom ashes in order to utilize the solid residue from incineration of municipal waste for CO_2 removal. The dominant type of ash produced by incinerator plants is bottom ash. Research so far focuses primarily on fly ash, which can be modified quite effectively. However, bottom ash, which constitutes approximately 89% of the total product after incineration. Modification of bottom ash is aimed at increasing the specific surface area and obtaining a higher CO_2 adsorption capacity. The benefit of such activities is twofold: firstly, the waste produced continuously is managed, and secondly, a dangerous element of the environment, i.e. CO_2, is neutralized.

Objective: Testing the textual properties of unmodified and modified for 24 hours at low (60°C) and medium (125°C) temperatures bottom ash and then determining the sorption properties towards CO_2.

Methods: Modification was performed with a 3 molar NaOH solution. Obtained materials was characterized with X-ray diffraction technique, optical and SEM/EDS microscopic methods, low pressure nitrogen adsorption and gravimetric sorption method.

Results: Raw, unmodified bottom ash is characterized by a specific surface area of up to several m2/g and poor sorption properties towards CO_2. Modification with a 3 molar NaOH solution resulted in at least three-fold increase in the specific surface area of bottom ash, mainly by developing the area of micropores in the samples. Moreover, the modification increased the sorption capacity of bottom ash towards CO_2 and the kinetics of CO_2 sorption process.

Conclusion: As a result of the alkaline modification of bottom ash, new mineral phases were formed, visible in SEM/EDS and XRD analyses. Research has shown that bottom ash from the combustion of municipal waste is effectively modified into a material with a developed texture and the ability to capture CO_2. Work on the modification of MSWI bottom ash is very promising and may become a useful product for neutralizing CO_2 and other greenhouse gases. At the same time, the modification of bottom ash can effectively contribute to reducing the amount of the solid waste produced by incineration plants, which is an excellent way to fit into the zero waste and circular economy strategies.

Biography

Katarzyna Godyń is a graduate of the Faculty of Geology, Geophysics and Environmental Protection of University of Science and Technology in Krakow (2000-master's degree). In the years 2000-2008, she was a student of doctoral studies and in 2008, she obtained the title of Doctor of Earth Sciences. Since 2008, she has been employed at the Strata Mechanics Institute of the Polish Academy of Sciences as an assistant professor. She specializes in the studies of sedimentary rocks and in the analysis of anthropogenic materials produced in thermal waste treatment plants. She has

knowledge and extensive experience in laboratory analyses including optical and scanning microscopy. She also has practical skills in the stereology of materials. She is the author of 45 scientific publications well as monographs. She was a contractor in six research projects. She also managed a grant from the State Committee for Scientific Research and she was the coordinator of an international research project. She was also assistant supervisor and academic supervisor of PhD students.

DATA-DRIVEN MODELING AND VALIDATION OF RESIDUAL USEFUL LIFE PREDICTION FOR SECOND-LIFE EV BATTERIES

Lukasz Hupka
Gdansk University of Technology, Poland

Abstract:

The growing demand for battery materials, coupled with ongoing challenges in securing dependable and sufficient supply chains, and the urgent need to reduce greenhouse gas emissions, are driving European and U.S. efforts toward the full recirculation of lithium-ion batteries with minimal waste.

As part of the Horizon Europe-funded AUTOMAT project, we present the development of a digital modeling framework for predicting the Residual Useful Life (RUL) of end-of-life electric vehicle (EV) batteries destined for second-life applications. This work supports the EU's Green Deal and Circular Economy Action Plan by advancing digital tools for battery reuse, and directly contributes to the implementation of the EU Battery Passport framework.

We developed predictive models leveraging insights into degradation propagation and battery aging behavior. These models integrate state-of-health (SoH) metrics, performance derating trends, and application-specific usage profiles to deliver scenario-adapted residual useful life (RUL) estimations. AI-driven analysis of second-life operational data further enhances the adaptability and accuracy of these predictions, enabling real-time assessment and dynamic updates.

The modeling framework was validated through a comprehensive protocol using a dedicated sample population of aged battery modules subjected to accelerated aging cycles replicating second-life duty conditions. Periodic diagnostics and SoH evaluations were carried out throughout the test campaigns. The predictive accuracy of the digital tools was benchmarked against experimental outcomes to confirm their robustness and reliability under varying operational and degradation scenarios.

Results show strong alignment between predicted and actual battery lifetimes, supporting the use of advanced RUL prediction tools in circular battery economy strategies. This work marks a key advancement toward intelligent battery repurposing and contributes to the EU's broader sustainability objectives in e-mobility and energy storage.

Biography

Lukasz J. Hupka earned B.S. degree in Environmental Protection and Management from the Gdansk University of Technology in 2002, M.S. and PhD in Metallurgical Engineering from the University of Utah in 2006 and 2008 respectively. Since 2008 he worked at IBM T. J. Watson Research Center, Micron Technology Inc., and Gdansk Tech in scientific and technical leadership roles. His recent research focuses on the development of lithium-ion battery recycling technologies, sourcing raw materials sustainably, and advancing the circular economy. He is co-author of 21 patents & patent applications, 3 book chapters, 15 scientific articles, and over 40 conference presentations.

TRACKING THE BENEFITS AND LIMITATIONS OF AI AS A TOOL FOR CLIMATE LITERACY AND ACTION

Caroline Lee
Homestead High School, USA

Abstract:

Climate change is a field where new data continues to emerge, often causing uncertainty among the general public. To illustrate, recent polls have found that significant proportions of Americans are confused about the plethora of climate change-related information in the media (48%) or feel suspicious of the groups pushing for action on the issue (51%). There is a clear gap between current scientific consensus and wider public understanding, which hinders the global coordination necessary to progress in the fight against climate change. Currently, the use of large language model (LLM) artificial intelligence (AI) chatbots is increasing dramatically. This widespread use brings the risk of climate misinformation being spread, as AI responses have inherent limitations, due to their fundamental structure and strong dependence on their input training data. Especially when answering questions about rapidly evolving fields, such as primary medical care, or fields where available training data is sparse, such as nutrition, LLM AI chatbots may produce inaccurate or variable responses, demonstrating a need to monitor their accuracy. This call for correct information can be extended to the field of climate change, as AI has the potential to provide detailed, accurate explanations of climate-related topics, but might be hampered by similar limitations. To begin tracking AI accuracy, this study assessed the reliability of the current top 10 LLM AI chatbots when asked to verify common climate change myths. The AI responses were recorded and evaluated by two study authors, following the procedures of a previous study. Each response was classified as "accurate," "inaccurate," or "accurate with missing information" to determine the overall accuracy levels of selected LLM AI chatbots as of August 2025. By repeating this experiment over time as AI becomes more prevalent, climate educators can track the gap between AI knowledge and the public's opinions of climate change and determine if the AI is helping to educate and motivate the public or, instead, incorporating climate misinformation into its responses.

Day 2

Climate Change & Recycling 2025

Video Presentations

MEDITERRANEAN MONK SEALS POPULATION VIABILITY ANALYSIS CONSIDERING MALE TO MALE (M2M) AGGRESSION USING THE VORTEX SIMULATION MODEL

Christos Bakos
Anatolia College, Greece

Abstract:

Background: The Mediterranean monk seal Monachus monachus is one of the most threatened marine mammals, with only 600–700 individuals restricted to three populations off the coast of Western Sahara and Madeira (North Atlantic) and between Greece and Turkey (eastern Mediterranean). The species was classified as Endangered by the International Union for Conservation of Nature (IUCN) on the Red List of Threatened Species and is the most threatened marine mammal in Europe.

Objective: In this study we demonstrate the applicability of PVA using VORTEX (Version 10.5.6.0) in exploring a range of scenarios to examine the potential long term and short term impact of male population reduction caused by male aggression in the critically endangered mediteranean monk seal Monachus monachus in the Eastern Meditteranean Sea and examined the impact of immediate removal of aggressive males from the population when such aggression occurs.

Methodology: A baseline population-based model of MMS population in Greece was constructed using the software VORTEX (Version 10.5.6.0). Each scenario was simulated 1000 times, over 100 years, with a one-year time step, to explore long-term population trends and allow for multi-generation effects to be observed. Population extinction was defined as occuring when only one sex remained.

Results: From the results obtained, it is concluded that the mortality of adult males resulting from adult male aggression has serious consequences. It is found that the short term high adult male removal rate will lead initially to a sharp decrease of the MMS population but after immediate aggressive male removal, the MMS population will reach again the initial number. The above results showed that immediate action should be taken for M2M ratio greater than 7%.

Biography:

Christos Bakos is a student at Anatolia College in Thessaloniki, Greece. He is an active member of the Greek non-governmental environmental organization MOm/The Hellenic Society for the Study and Protection of the Monk Seal. In these roles, he is involved in initiatives related to climate change mitigation and environmental sustainability as well as research on wildlife mobility prediction models and stochastic models that simulate the complex dynamics of wildlife population growth.

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THE IMPACT OF CLIMATE CHANGE ON SOME SELECTED CROPS UNDER DIFFERENT AGRO-ECOLOGICAL ZONES IN KATSINA STATE, NIGERIA DURING THE 2021 CROPPING SEASON

Abba Yakubu Abdullah
Aquagric Ltd, Nigeria

Abstract:

The purpose of this work paper is to assess the impact of climate change on crop production in Katsina Sate, Nigeria. The Study Design was Cross-sectional survey design in all the 34, Local Government Areas (LGAs) of the State. This was conducted was conducted between October 2021 and March 2022. The methodology consists of data gathered via questionnaires administered to farmers', employing Village and Block Extension Agents as enumerators. A multi-stage sampling technique was employed. The first stage involved classifying the state into three ecological zones. The second stage comprises random selection of three villages from each 34 LGAs to give (102 villages). The third stage was accomplished, based on the lists of farmers (26,589) frame, obtained from Katsina State Agricultural and Rural Development Authority (KTARDA), twelve thousand (12,000) farmers were selected proportionately for the study, using systematic random sampling technique. The results indicated that male and youthful age dominate production respectively (78%). Large proportion (95%) fall within formal to post primary education and also, more than two-third (69%) had no extension contact and highest (35%) obtained income from #300,001- #450,000. The findings on impact of climate change on crop production showed that (648,300 hectares) cultivated land and 633,950 tons (63,400 bags) of crops were lost. The analysis further unveiled that among the three ecological zones of the state, Sahel Savannah had the most devastating effect of losses, at both cultivated land (292,200 hectares) and crop yield (267,100 tons). More so, the result portrayed that amongst the assorted crops produced in the area, millet, groundnut, cowpea, and sorghum were the major crops affected by climate change scourge.

Climate change is therefore real and its manifestations are becoming alarming progressively; hence urgent steps need to be taken to avert the menace. It is recommended that farmers be educated on climate change aspects, i.e. climate smart strategies in respect to crop production and research station should develop more seeds adaptable to a given circumstance. Government should ensure accurate estimation of climate to facilitate other stake holders' early preparation.

DECISION CHANGE: A PLAN FOR A PLAN FOR THE PLANET

Arnold J. Bomans
Eranistics, Netherlands

Abstract:

There are many plans to combat the polycrisis. Some of them address individual problems (such as climate change) or the local manifestations of global problems, for instance, removal of plastic. Other plans take a systemic approach, that is, they address common causes (for example, fossil fuel combustion) or apply globally, such as geo-engineering. However, decision-making on global systemic plans has been inefficient or absent. Therefore, a new procedure to decide on systemic plans is needed. In this talk, Bomans does not advocate any specific such procedure but a plan to design it, plan called decision change – namely, the procedure would be designed by decision-making experts and by lay people who also oversee the design project. An independent organization would have to convene these people, collect system-change plans to decide on, and guarantee that other people use the designed procedure to decide on (or design) systemic changes. The resulting measures may meet opposition but they may also be conceived as legitimate because they have been decided on via a well-designed procedure. More information is in the March 2024 issue of the journal Sustainability

Biography:

Arnold Bomans holds a master's in mathematical decision theory from Delft University of Technology. He worked as a computer programmer and systems designer, amongst others to implement and maintain a moneyless economy at Euro transplant, which consists of algorithms to allocate organs of donors to recipients for transplantation. At present, he is developing a general (and very diff erent) moneyless economy based on mechanism design. He also conceived decision change, the program for designing a procedure to decide on global system change.

INTEGRATED APPROACHES FOR ENHANCING WASTEWATER TREATMENT AND REUSE EFFICIENCY

Cristina Sousa Coutinho Calheiros

CIIMAR - Interdisciplinary Centre of Marine and Environmental Research, Portugal

Abstract:

Wastewater management is a fulcra issue concerning sustainable development, particularly in regions where water scarcity and environmental pressures are intensifying. In this context, nature-based solutions (NbS) are emerging as a pivotal strategy to support decentralized wastewater treatment while delivering a broad range of ecosystem services. By harnessing natural processes, NbS contribute to improved water quality, enhanced water availability, and the reduction of water-related risks. The European Commission defines NbS as interventions "inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social, and economic benefits, and help build resilience." These approaches integrate more and more diverse natural features and processes into cities, landscapes, and seascapes through locally adapted, resource-efficient, and systemic interventions.

This keynote will present insights from a constructed wetland (CW) located in a rural tourism facility, which has served as a living laboratory for the application and long-term evaluation of NbS in decentralized wastewater treatment. Beyond demonstrating the ecological and economic value of CWs, this case highlights how such systems can be upgraded and reimagined through technological innovation.

The presentation will also introduce the CIRQUA project Integrated Approaches at Local Scale for Enhancing Water Reuse Efficiency and Sustainable Soil Fertilization from Wastewater's Recovered Nutrients. CIRQUA builds on the foundation of existing CWs while incorporating a new generation of technological tools. These include nanostructured filters and photocatalytic modules to improve pollutant removal, smart sensors and automated controls for optimized operation, and precision irrigation systems to maximize the beneficial reuse of treated water. Moreover, the project explores the integration of advanced artificial intelligence (AI) platforms to support predictive management, enhance efficiency, and ensure resilience under variable environmental conditions. By bridging traditional NbS with cutting-edge technological advancements, CIRQUA demonstrates how integrated approaches can unlock the full potential of wastewater as a resource. This keynote will reflect on lessons learned, future opportunities, and the role of multi-disciplinary collaboration in advancing sustainable water reuse and contributing to global water security.

Acknowledgments: This study integrates the project, entitled "Integrated Approaches at Local Scale for Enhancing Water Reuse Efficiency and Sustainable Soil Fertilization from Wastewater's Recovered Nutrients", acronym "CIRQUA", Grant agreement No 2321 Call 2023 Section 1 Management of Water IA, is part of the PRIMA programme supported by the European Union.

Biography:

Cristina Calheiros is Environmental Engineer with a PhD in Biotechnology. Currently is Research Scientist at CIIMAR - Interdisciplinary Centre of Marine and Environmental Research of the University of Porto, Portugal, former Coordinator of the Centre for Monitoring and Environmental

Interpretation (CMIA), Vila do Conde, Portugal, Adjunct Professor at University of Saint Joseph, SAR Macao, China and invited professor at University of Porto. She is European Climate Pact Ambassador, board member of the Portuguese Association for Water Resources – north region (APRH) and Vice-president of the Portuguese National Association of Green Roof (ANCV). Her work focuses on the development of nature-based solutions towards sustainability of territories and as tools for climate change adaptation and mitigation, and phytotechnologies and phytoremediation for solid and water management towards a circular economy.

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