

**4<sup>TH</sup> GLOBAL SUMMIT ON  
ADVANCES IN  
EARTH SCIENCE  
AND CLIMATE CHANGE**

**SEPTEMBER**

**29-30  
2025**

**BERLIN, GERMANY**





# SCIENTIFIC PROGRAM

# DAY 01

MONDAY

SEPTEMBER 29, 2025

HALL 01

08:00-08:30

Registrations

08:30-08:40

Inaugural Ceremony

Moderator

**Paolo Porto**, *University Mediterranea of Reggio Calabria, Italy*

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

## Distinguished Speaker Talks

Session Chair

**Albert Fässler**, *Bern University of Applied Sciences, Switzerland*

Session Chair

**A. Miguel Piecho-Santos**, *Portuguese Institute for the Sea and the Atmosphere (IPMA), Portugal*

08:40-09:00

Title: Using Cs-137 Resampling Method as a Tool to Assess Soil Erosion

**Paolo Porto**, *University Mediterranea of Reggio Calabria, Italy*

09:00-09:20

Title: From Canoes to Industrial Fishing: The Fishing Vessels Ocean Observing Network (FVON)

**A. Miguel Piecho-Santos**, *Portuguese Institute for the Sea and the Atmosphere (IPMA), Portugal*

09:20-09:40

Title: Gasification, a Viable Solution to Decarbonize a Carbon-Loaded Energy System

**Qianlin Zhuang**, *EcoZenergy & Industrials LLC, USA*

09:40-10:00

Title: Higher Education Institutions' Roles in Climate Change Mitigation

**Jouni Kekäle**, *University of Eastern Finland, Finland*

10:00-10:20

Title: Mankind Problem Climate Change

**Albert Fässler**, *Bern University of Applied Sciences, Switzerland*



GROUP PHOTO 10:20-10:30

REFRESHMENT BREAK 10:30-10:50

10:50-11:10

Title: Optimized Renewable Energy Planning in China

**Fangfang Li**, *China Agricultural University, China*

11:10-11:30

Title: Estuarine Heatwaves under Climate Change

**Marisela Des Villanueva**, *Universidade de Vigo, Spain*

11:30-11:50

Title: STEM, Masculinity and the Periphery: Adolescent Science Capital in the Face of Global Challenges

**Revital Duek**, *Bar-Ilan University, Israel*

11:50-12:10

Title: Why Traditional Rural Landscapes are still Important to our Future

**Antonio Santoro**, *University of Florence, Italy*

12:10-12:30

Title: Possible Alternatives for the Mexican Electrical System to Achieve the Goals of the Transition toward Clean Energy

**Francisco Ortiz Arango**, *Universidad Panamericana, Mexico*

12:30-12:50

Title: Earthquakes: Lithosphere-Atmosphere Interactions and Biological Implications in the Northern Apennines (Italy)

**Valentino Straser**, *University of Makeni, Sierra Leone*

GROUP PHOTO 12:50-13:00

LUNCH BREAK 13:00-13:40

13:40-14:00

Title: The Construction Progress of New Energy Bases in China's Desert, Gobi, and Arid Areas

**Qia Wang**, *Institute of Quantitative and Technological Economics (IQTE), Chinese Academy of Social Sciences (CASS), China*

14:00-14:20

Title: Mooring of Ships in Very Restricted Port areas and Determination of Tugboat Pulling Force during Ship Mooring Operations

**Vytautas Paulauskas**, *Klaipeda University, Lithuania*

14:20-14:40

Title: A Comprehensive Study of Downscaling using Model Tree for Climate Change

**Shreenivas Londhe**, *Vishwakarma Institute of Technology, Pune, India*

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|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 14:40-15:00                   | <p>Title: A Matter of Energy Injustice? A Comparative Analysis of Biogas Development in Brazil and Italy</p> <p><b>Andrè Mateus Bertolino</b>, <i>Federal Institute of Education, Science and Technology of Paraná (IFPR)   Pontifical Catholic University of Paraná (PUCPR), Brazil</i></p>                                                                                                                                                                            |
| 15:00-15:20                   | <p>Title: Determining Surface Resistance to Overland Flow in Semi-Arid Field Conditions with Low Reynolds Numbers</p> <p><b>Jose Ramon Barros Cantalice</b>, <i>Rural Federal of Pernambuco University, Brazil</i></p>                                                                                                                                                                                                                                                  |
| 15:20-15:40                   | <p>Title: SIMUTEC: A Multi-Sector Simulation Platform for the Systemic Impact Analysis of Urban Policies to Support Local Authorities in the Ecological Transition of their Territories</p> <p><b>ZERGUINI Seghir</b>, <i>University of Bordeaux, France</i></p>                                                                                                                                                                                                        |
| 15:40-16:00                   | <p>Title: Adsorption Rate of Uranium and Thorium Isotopes in Soil and Plants Grown in a High Background Radiation Area</p> <p><b>Othman Abdulrahman Fallatah</b>, <i>King Abdulaziz University, Saudi Arabia</i></p>                                                                                                                                                                                                                                                    |
| REFRESHMENT BREAK 16:00-16:20 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 16:20-16:40                   | <p>Title: Fluorescent Chemosensors in the Detection of Ultra-Trace Quantity of Toxic <math>\text{Hg}^{2+}</math>, <math>\text{Pb}^{2+}</math>, <math>\text{Al}^{3+}</math>, <math>\text{F}^-</math>, <math>\text{AsO}_4^{3-}</math> &amp; <math>\text{AsO}_3^{3-}</math> in Water towards Monitoring Humam Health and Management</p> <p><b>Samir Kanti Datta</b>, <i>The Bhawanipur Education Society College (Affiliated to the University of Calcutta), India</i></p> |
| 16:40-17:00                   | <p>Title: The Ancient Water Supply System of Saldae: Digitalization and Characterization (case of romain tunnel El Habel of Bejaia in Algeria)</p> <p><b>Souad Laoues</b>, <i>Mouloud Mammeri University of Tizi Ouzou, Algeria</i></p>                                                                                                                                                                                                                                 |
| 17:00-17:20                   | <p>Title: Investigation of Radioactive Inventory and Microstructural Features along the Reactor Pressure Vessel of Greifswald Nuclear Power Plant-Future Insights in Decommissioning Process and Repository Conditions</p> <p><b>Ghada Yassin</b>, <i>Helmholtz Zentrum Dresden Rossendorf HZDR, Germany</i></p>                                                                                                                                                        |
| 17:20-17:40                   | <p>Title: Determinants of Sustainability-Driven Green Entrepreneurial Intentions among SMEs in the Electric Vehicle Component Industry</p> <p><b>Zhao Kongling (Sheila)</b>, <i>China International Council for the Promotion of Multinational Corporations, China   Bufori Motor Car Company (M) SDN. BHD, Malaysia</i></p>                                                                                                                                            |

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17:40-18:00

Title: Comparative Modelling of the Rainfall Runoff Pattern of the Solöz River using the WEAP Model within the Framework of Climate Change Scenarios

**Bihter SEZER GÜNEY**, *Bursa Uludağ University, Turkey*

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18:00-18:20

Title: Pyrometallurgical Reduction of Copper Slag with Biochar for Metal Recovery

**Desmond Attah-Kyei**, *Metso Metals Oy, Finland*

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**NETWORKING**

End of Day 1

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# SCIENTIFIC PROGRAM

# DAY 02

TUESDAY

SEPTEMBER 30, 2025

HALL 01

08:30-08:40

## Introduction

Moderator

**Giovanna Lucia Piangiamore**, *Istituto Nazionale di Geofisica e Vulcanologia, Italy*

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

## Distinguished Speaker Talks

Session Chair

**Halvor Kvande**, *Retired from Norsk Hydro, Norway*

Session Chair

**Valentino Straser**, *University of Makeni, Sierra Leone*

08:40-09:00

Title: Greenhouse Gas Emissions from Aluminium Production – The Way towards Net-Zero Emissions

**Halvor Kvande**, *Retired from Norsk Hydro, Norway*

09:00-09:20

Title: Natural Risk Reduction Educational Experiment at School: Through *Episodes of Situated Learning (ESL)* as Interactive Education

**Giovanna Lucia Piangiamore & Alessandra Maramai**, *Istituto Nazionale di Geofisica e Vulcanologia, Italy*

09:20-09:40

Title: Large-scale Atmospheric Circulation Modulates *Prosopis nigra* Growth in Subtropical Woodlands of Southeastern South America

**Silvana María José Sione**, *Universidad Nacional de Entre Ríos, CICyTTP CONICET, Argentina*

09:40-10:00

Title: Assessing the Impact of Climate Change on Future River Flows using Neural Networks: A Case Study of the Tagus River (Iberian Peninsula)

**Diego Fernández Nóvoa**, *Universidade de Vigo, Spain*

10:00-10:20

Title: Decoding Climate Complexity through a Knowledge Graph Approach to Empower Evidence-Based Policymaking

**Vanni Resta**, *Uninettuno International Telematic University, Italy*

GROUP PHOTO 10:20-10:30

REFRESHMENT BREAK 10:30-10:50

10:50-11:10

Title: The History of the Brazilian Sardine (*Sardinella brasiliensis*) between Two Fishery Collapses: An Ecosystem Modeling Approach to Study its Life Cycle

**Rafael Schroeder**, *Universidade do Vale do Itajaí (UNIVALI), Brazil*

11:10-11:30

Title: Digital Transformation: Patents as a Determinant Proxy for Industry 4.0

**Luciana Peixoto Santa Rita**, *Universidade Federal de Alagoas (UFAL), Brazil*

11:30-11:50

Title: The Effects of Increasing Ambient Temperature and Sea Surface Temperature due to Global Warming on Combined Cycle Power Plant

**Ali Osman Büyükköse**, *Enerjisa Enerji Uretim Inc., Turkey*

11:50-12:10

Title: From Kitchen and Farm Waste to Sustainable Textiles: Valorizing Onion Peels and Local Sheep Wool in Eco-Friendly Fabric Production

**Diana Tuulik**, *TTK University of Applied Sciences, Tallinn University of Technology, Estonia*

12:10-12:30

Title: Competitive Immobilisation of Heavy Metals using *Chrysopogon Zizanioides* from Multi- Metal Contaminated Soil

**Sobha Cyrus**, *Cochin University of Science and Technology, India*

12:30-12:50

Title: Analysis and Prediction of Land Cover Changes in Sinaloa's Coastal Zone, Gulf of California using Remote Sensing and GIS

**Felipe Omar Tapia Silva**, *Universidad Autónoma Metropolitana, México*

GROUP PHOTO 12:50-13:00

LUNCH BREAK 13:00-13:40

13:40-13:50  
(Poster)

Title: Radial Growth of *Prosopis affinis* and its Relationship with Soil Water Content in Subtropical Woodlands of Argentina

**Marcelo Germán Wilson**, *Instituto Nacional de Tecnología Agropecuaria EEA Paraná/CONICET, Argentina*

13:50-14:10

Title: Sustainable Concrete with Artificial Aggregates Coming from Waste Pelletization

**Valeria Corinaldesi**, *Università Politecnica delle Marche, Italy*



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|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 14:10-14:30                   | <p>Title: Enhancing Properties of Coconut Shell Aggregate Concrete using Pre-Treated Coconut Shell Aggregates</p> <p><b>Deepa Balakrishnan S</b>, <i>Cochin University of Science and Technology, India</i></p>                            |
| 14:30-14:50                   | <p>Title: Application of Geophysical Techniques to Identify the Causes of Instability in Roadways Built on Conductive Ground (Fez region, Morocco)</p> <p><b>Ahmed Benamara</b>, <i>University of Moulay Ismail, Morocco</i></p>           |
| 14:50-15:10                   | <p>Title: Numerical Modeling of Non-Equilibrium Model for Sediment Transport in Vegetated Channels by Roe Scheme</p> <p><b>Sanae JELTI</b>, <i>ESTN of Mohammed First University, Morocco</i></p>                                          |
| 15:10-15:30                   | <p>Title: Environmental Sustainability of Fast-Moving Consumer Goods Companies in Nigeria: The Role of Green Logistics Practices</p> <p><b>Jude Chekwume Nwaulune</b>, <i>Babcock University, Nigeria</i></p>                              |
| 15:30-15:50                   | <p>Title: Juggling between Economic Growth and Tourism Sustainability: A Tale of Ladakh's Journey</p> <p><b>Ishika Jaiswal</b>, <i>Indian Institute of Management Sambalpur, India</i></p>                                                 |
| 15:50-16:10                   | <p>Title: Spontaneous Formation of Evolutionary Game Strategies for Long-Term Carbon Emission Reduction Based on Low-Carbon Trading Mechanism</p> <p><b>Zhanggen Zhu</b>, <i>Guangzhou University, China</i></p>                           |
| REFRESHMENT BREAK 16:10-16:30 |                                                                                                                                                                                                                                            |
| 16:30-16:50                   | <p>Title: A Practical Abdominal Voice Wearable Device Improves Nutritional Status and Reduces Risk Factors for Intradialytic Hypotension</p> <p><b>Chen Han</b>, <i>National Taipei University of Technology, Taiwan</i></p>               |
| 16:50-17:10                   | <p>Title: Metropolitanization in India and Changing Ecology; Insights of Two Major Metros of India - Delhi &amp; Mumbai</p> <p><b>Smita Salunke</b>, <i>Akbar Peerbhoy College of Commerce &amp; Economics, India</i></p>                  |
| 17:10-17:30                   | <p>Title: Production of Organo-Mineral Fertilizer (OMF) using Organic Waste and Mineral Resources (Pozzolan and Limestone)</p> <p><b>Kpouyie Bintou</b>, <i>Global Intergrate Sustainable Services, Cameroon</i></p>                       |
| 17:30-17:50                   | <p>Title: Climate Change and Biogeochemical Cycles: Speciation of Trace Metal Elements and their Transfer to Alfalfa Plants (<i>Medicago sativa</i> L.)</p> <p><b>Lina Chebbi</b>, <i>Paris-East Créteil University (UPEC), France</i></p> |

## Introduction

### Distinguished Speaker Talks

**Session Chair** **Vytautas Paulauskas**, *Klaipeda University, Lithuania*

**Session Chair** **Francisco Ortiz Arango**, *Universidad Panamericana, Mexico*

10:50-11:10

Title: Modeling and Monitoring System for Circular Bio-Economy Implementation in Ukraine: Integration with EU Strategies, Agricultural Case Study

**Orest Koleshchuk**, *Lviv Polytechnic National University, Ukraine*

11:10-11:30

Title: Balancing Tourism Expansion and Ecosystem Sustainability: Experiences from Goa's Coastal Destinations (India)

**Nandkumar Sawant**, *Parvatibai Chowgule College (Autonomous), India*

11:30-11:50

Title: Enhancing the Efficiency of Lithium-Ion Batteries: The Role of Physical Properties in Anode Material Selection

**Sikiru Surajudeen Olalekan**, *Universiti Teknologi Mara, Malaysia*

11:50-12:10

Title: Human-Machine Partnership and Digital Communication: Practices of Distance Learning

**Ryhor Miniankou & Aliaksandr Puptsau**, *European Humanities University, Lithuania*

12:10-12:30

Title: Polysaccharide Nanoemulsions for Antifungal and Anthelmintic Applications

**Flavia Oliveira Monteiro da Silva Abreu**, *State University of Ceará, Brazil*

12:30-12:50

Title: Microplastic Presence and Pollution-Related Patterns in Native European Oyster, *Ostrea Edulis*, in the Solent Region

**Giovanna Sidaoui Haddad**, *University of Southampton, UK*

GROUP PHOTO 12:50-13:00

LUNCH BREAK 13:00-13:40

13:40-14:00

Title: Effect of Heatwaves on Milk Production

**Yunus ÖZTÜRK**, *Gebze Technical University, Turkey*

14:00-14:20

Title: The Antecedents of Customers' Green Purchase Intention: Bridging the Eco Gender Gap

**Ibrahim Mahmoud Darwish**, *Beirut Arab University, Lebanon*

14:20-14:40

Title: Is your Contribution Fair? How Countries Justify Equity in their NDCs

**Oliver Herrera González**, *University Research Institute for Sustainability Science and Technology, Universitat Politècnica de Catalunya, Spain*

|                               |                                                                                                                                                                                                                                                                       |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 14:40-15:00                   | <p>Title: Enhancing Growth and Essential Oil Quality of Peppermint (<i>Mentha piperita</i> L.) through Plant Growth-Promoting Rhizobacterial (PGPR) Applications</p> <p><b>Vagmi Singh</b>, <i>CSIR-Central Institute of Medicinal and Aromatic Plants, India</i></p> |
| 15:00-15:20                   | <p>Title: Improving Reference Evapotranspiration Predictions with Hybrid Modeling Approach</p> <p><b>Rimsha Habeeb</b>, <i>Quaid-I-Azam University, Pakistan</i></p>                                                                                                  |
| 15:20-15:40                   | <p>Title: A Quantitative and Qualitative Assessment of Microplastics Collected at Two Public Beaches along the East and South-East Coast of Mauritius</p> <p><b>Kishore Boodhoo</b>, <i>University of Mauritius, Mauritius</i></p>                                    |
| 15:40-16:00                   | <p>Title: Investigation of the Growth and Mortality of Bacteria and Synechococcus spp. in Unvegetated and Seagrass Habitats</p> <p><b>Patrichka Wei-Yi Chen</b>, <i>National Taiwan Ocean University, Taiwan</i></p>                                                  |
| REFRESHMENT BREAK 16:00-16:20 |                                                                                                                                                                                                                                                                       |
| 16:20-16:40                   | <p>Title: Menstruation in the Shadows of the Sea: The Untold Struggles of Coastal Women in Bangladesh</p> <p><b>Mohammed Julfikar Ali</b>, <i>Presidency University, Bangladesh</i></p>                                                                               |
| 16:40-17:00                   | <p>Title: Leveraging Deep Learning for Early and Non-Invasive Detection of Red Palm Weevils: A Novel Approach to Sustainable Agriculture</p> <p><b>Amal Hussein Abbas</b>, <i>Al-Mustansiriyah University, Iraq</i></p>                                               |
| 17:00-17:20                   | <p>Title: Influential Plant in Medicinal Science and Clove: Tiny Buds with Global Fame</p> <p><b>Royanama Rahimi</b>, <i>Mashhad University of Medical Sciences, Iran</i><br/> <b>Arzoo Asadi</b>, <i>Alice Salomon Hochschule, Germany</i></p>                       |
| 17:20-17:40                   | <p>Title: Environmental, Social and Governance (ESG) Practice: Does ESG Disclosure Matter for Firms Performance in Nigeria?</p> <p><b>Mustapha Ibrahim</b>, <i>University of Maiduguri, Nigeria</i></p>                                                               |
| 17:40-18:00                   | <p>Title: Optimizing Food Supply Chains in the Portuguese Air Force: Reducing Waste and Enhancing Sustainability through Lean Principles</p> <p><b>Ana Filipa Ferreira Ventura Caseiro</b>, <i>Portuguese Air Force Academy Research Centre, Portugal</i></p>         |
| 18:00-18:20                   | <p>Title: Women Fisher-Folk Barbados- A Gendered Lens</p> <p><b>Debra Joseph</b>, <i>The University of the West Indies, Barbados</i></p>                                                                                                                              |
| NETWORKING                    |                                                                                                                                                                                                                                                                       |

End of Day 2



ADV. ESCC 2025



**DAY 01**

4<sup>th</sup> GLOBAL SUMMIT ON  
**ADVANCES IN  
EARTH SCIENCE  
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**BERLIN, GERMANY**

**SEPTEMBER 29-30, 2025**

**SPEAKER TALKS**



# ADVANCES IN EARTH SCIENCE AND CLIMATE CHANGE

September 29-30, 2025 | Berlin, Germany



## Using Cs-137 Resampling Method as a Tool to Assess Soil Erosion

**Paolo Porto<sup>1,2</sup> and Emil Fulajtar<sup>3</sup>**

<sup>1</sup>Department of Agriculture, University Mediterranea of Reggio Calabria, Italy

<sup>2</sup>Faculty of Geographical Sciences, Kazimierz Wielki University, Poland

<sup>3</sup>Soil Science and Conservation Research Institute of National Agriculture and Food Centre, Slovakia

Soil erosion is the most important land degradation process and it may result not only in deterioration of soil properties but in extreme cases it can completely remove the whole soil layer. Therefore, reliable information to predict spatial distribution of soil erosion and its magnitude is required to better understand the process and to mitigate the environmental consequences.

Soil erosion assessment is usually based on measurements at plot or catchment scale but this strategy requires long time and it is labour demanding. This problem can be overcome by using the Cs-137 radionuclide as a tracer for erosion assessment. The origin of Cs-137 technique can be traced back to 1970s but it became to be used routinely since early 1990s when the convenient algorithms for converting the values of Cs-137 activities to soil erosion rates were introduced. Since then, a huge amount of data on soil erosion distribution was collected. It helps not only to identify the erosion hotspot areas where conservation measures should be targeted, but it is used also to assess the efficiency of implemented conservation measures, when Cs-137 distribution in areas with conventional and conservation land management is compared.

Recently a novel approach based on the Cs-137 resampling the sites sampled already earlier was introduced. This approach allows to study the medium-term erosion dynamics by comparing results obtained from different time windows. The authors of this presentation published the first methodological guidelines on Cs-137 resampling method. They assessed earlier studies using Cs-137 resampling, carried several own Cs-137 resampling case studies, validated this method versus conventional erosion plot measurements, and finally, developed a novel standardized 7-step procedure involving two alternative approaches of Cs-137

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resampling and data interpretation. This contribution will give an overview of the recently published book and will provide a comprehensive guidance for all newcomers using Cs-137 resampling method.

## Biography

Professor of Soil erosion and Torrent control at the University Mediterranea of Reggio Calabria (Italy) – Department of Agricultural Sciences (from Nov 1, 2000).

Professor of Physical Geography, Geology and Geomorphology at the Faculty of Geographical Sciences, Kazimierz Wielki University, Bydgoszcz (Poland) (from Oct 1, 2023).

Honorary Member at the University of Exeter (UK) from February 2014 to January 2017.

His research experience was gained during several fellowships spent at the Dept of Civil Engineering of the Colorado State University, USA (6 months), at the Dept of Engineering of the University of Palermo, Italy (2 years), at the National Research Council of Cosenza, Italy (4 years), at the Dept of Geography of the University of Exeter, UK (3 years).

His research activity (Scopus H-index=29) in soil erosion, radionuclides, hydrology, and torrent control is well documented in over 100 papers published in refereed journals.

Paolo Porto is President of the International Commission on Continental Erosion (IAHS/ICCE), and Vice-President of the IASWS (International Association of Sediment and Water Sciences).

Paolo Porto is closely involved with International Atomic Energy Agency initiatives to develop the use of environmental radionuclides in erosion and sedimentation investigations. He was a leading member of one IAEA Co-ordinated Research Projects in this area and he has been invited in assisting IAEA to initiate such applications in Mexico, Iran, Egypt, Bangladesh, Thailand, and Haiti in training scientists from these countries both in their home countries and at the University Mediterranea.

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## From Canoes to Industrial Fishing: The Fishing Vessels Ocean Observing Network (FVON)

**A. Miguel Piecho-Santos<sup>1,2</sup>, Christopher Cusack<sup>3</sup>, Rita Esteves<sup>1</sup>, Patrick Gorringer<sup>4</sup>, Naoki Hirose<sup>5</sup>, Julie Jakoboski<sup>6</sup>, Veronique Lago<sup>7</sup>, Shin Kida<sup>5</sup>, Dustin C. Leaning<sup>3</sup>, Michela Martinelli<sup>8</sup>, George Maynard<sup>9</sup>, Peter McComb<sup>10</sup>, Hassan Moustahfid<sup>11</sup>, Carles Castro Muniain<sup>12</sup>, Moninya Roughan<sup>7</sup>, João de Souza<sup>13,14</sup>, Aubrey Taylor<sup>3</sup> and Cooper Van Vranken<sup>12</sup>**

<sup>1</sup>Portuguese Institute for the Sea and the Atmosphere (IPMA), Portugal

<sup>2</sup>Centre of Marine Sciences University of Algarve (CCMAR), Portugal

<sup>3</sup>Environmental Defense Fund (EDF), USA

<sup>4</sup>Swedish Meteorological and Hydrological Institute (SMHI), Sweden

<sup>5</sup>Research Institute for Applied Mechanics Kyushu University, Japan

<sup>6</sup>MetService, New Zealand

<sup>7</sup>School of Biological, Earth and Environmental Sciences, U. of New South Wales, Australia

<sup>8</sup>Nat. Res. Council - Inst. of Mar. Biological Resources and Biotech. (CNR-IRBIM), Italy

<sup>9</sup>NOAA Northeast Fisheries Science Center, USA

<sup>10</sup>Oceanum Ltd., New Zealand

<sup>11</sup>NOAA, US Integrated Ocean Observing System (US IOOS), USA

<sup>12</sup>Ocean Data Network, Inc., USA

<sup>13</sup>Cooperative Inst. for Research in Environmental Sciences Univ. of Colorado Boulder, USA

<sup>14</sup>NOAA Physical Sciences Laboratory, Boulder, USA

The Fishing Vessel Ocean Observing Network (FVON; <https://fvon.org/>) was recently endorsed as an emerging Global Ocean Observing System (GOOS) network. The goal of FVON is to foster the proliferation of collaborative fishing vessel-based observations. By eliminating the two largest cost components of ocean observation (the platform and deployment of that platform) fishing vessel can be orders of magnitude more cost efficient than many established platforms. There is an increasing demand for enhanced surface and subsurface coastal observations to improve ocean forecast and decision-support tools for marine science and the seafood sector. New Zealand was the first country to establish a fully de-

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ployed operational national fishing vessel observation network integrated with a data-assimilative ocean forecasting system. The network comprises approximately 250 vessels delivering near-real-time observations at any given time. The system generates tailored products that directly benefit the fishing and aquaculture industries, among other users. Accessible and affordable methods of ocean observing for resource constrained coastal nations could prevent the acquisition of critical data for informed decision-making. An FVON collaboration with the MarCNoWA Project (<https://gmes.rmc.africa/>) conducted an experiment in Ghana to enhance coastal ocean observations by using fishing canoes as ocean observing platforms. Sensors have been installed on a range of artisanal and industrial vessels across other countries and regions, namely in The Bahamas, Tanzania, the Bering Sea, Japan, the Pacific Islands, the US Atlantic Coast, the Adriatic Sea, the Atlantic Ocean, and Australia. Examples of programs contributing to FVON are the Moana Project (<https://www.moanaproject.org/>), the eMOLT-Environmental Monitors on Lobster Traps and Large Trawlers Program (<https://www.emolt.org/>), the AdriFOOS-Adriatic Fishery and Oceanography Observing System Program (<https://www.irbim.cnr.it/en/inf-dettagli/adrifoos/>), the FishSOOP-Fishing Vessels Ships of Opportunity Ocean Observing Program (<https://www.unsw.edu.au/research/oceanography/fishsoop>), the SFiN-Smart Fisheries Network, and the Portuguese ferrybox programme. Cost-efficiency enables accessibility, and collaboration is inclusive, both of which are key steps towards democratizing ocean observation.

## Biography

Senior Principal Researcher at the Portuguese Institute for Ocean and Atmosphere and a member of the Center of Marine Science U. Algarve's OC2-Oceanography and Climate Change Group. Degree in Marine Biology, PhD in Physical Oceanography and DSc (Habilitation/"Agregação") in Marine Sciences. National Focal Point for the Argo Program, one of the national delegates of ICES SICOM, IPMA's representative to EuroGOOS, interim co-chair of the Steering Committee of the Fishing Vessel Ocean Observing Network (FVON), and the President of the Portuguese Oceanographic Society. His research interests are the physical-biological interactions in the ocean through an end-to-end approach, the development of ocean observing systems, the impact of global change in the ocean (especially in upwelling systems), fisheries oceanography, fish ecology and the applications of satellite remote sensing to marine fisheries and oceanography. Has more than 100 publications, more than 3180 citations and an h-index of 28 (Scopus).

Personal web page: <https://www.ccmар.ualg.pt/users/ampsantos>

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## Gasification, a Viable Solution to Decarbonize a Carbon-Loaded Energy System

**Qianlin Zhuang**

EcoZenergy & Industrials LLC, USA

The author would like to present a briefing about the historical development of the gasification technology, its crucial roles to the Industrial Revolution, and its interactions with chemistry and science. The author would also like to provide an update of the current status-quo of industrial deployment of the gasification technology, which would reflect the unique feature of the gasification technology as an effective tool in carbon capture and management in the utilization of fossil energy. Finally, the author will share some related lessons learned in the commercialization of gasification technology and its implications for biomass gasification in this increasingly carbon conscious world.

### Biography

The author, a Ph.D. Eng. and veteran having 30+ years of hands-on experience ranging from R&D, technology business development, commercial negotiation, team building, execution of technology licensing business, gasification technology of natural gas/heavy oil/coal/biomass feedstock, comprehensive utilization of low rank coal through pyrolysis etc. He had been in different commercial roles with Texaco, ChevronTexaco, GE, and KBR in the licensing business of proprietary gasification technologies.



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## Higher Education Institutions' Roles in Climate Change Mitigation

**Jouni Kekäle**

University of Eastern Finland, Finland

The presentation deals with Higher Education Institutions (HEI) role in climate change (CC) mitigation in relation to other key societal actors. The presentation draws from a book “Higher Education Policy for Tackling Climate Change – Drivers, Dynamics and Effects” (Palgrave MacMillan, 2025), edited by Jouni Kekäle and Rómulo Pinheiro, investigating the roles of HEIs in tackling CC through nine country cases, written by 20 researchers from around the world. Prior and subsequent works are also used in argumentation. Different national policies appear to reflect diverse expectations on HEIs role in CC mitigation. This is discussed through UK’s and the Netherlands’ contrasting policy approaches (Kekäle, Cristofolletti & Pinheiro, in the book). In the Netherlands HEIs are expected to have a more central ‘policy implementor’ role in CC mitigation, whereas in the UK this is done in a more indirect and less substantive manner, by scientific intermediary bodies aiding parliamentary steering towards those who cause the emissions. Most emissions come from utilization of fossil fuels in the energy sector: These have increased. Political steering of HEIs as publicly funded institutions is relatively easy, but HEIs don’t have the resources nor direct power to steer industry towards net zero. Companies appear to lack incentives for reducing their emissions (the oil and gas industries invested only 2.5% of their total capital into clean energies in 2022). Effective CC mitigation needs strong political steering, corporate efforts, demand by citizens and innovations from HEIs. HEIs sometimes claim to take a leading or even sole role in CC mitigation but such role might make policymakers, industries and citizenry to take a backseat in approaching the wicked issue. That would be counterproductive. There already are working solutions and innovations tend to take decades to penetrate society. Still, at present, for example, critical carbon removal processes and decarbonization technologies are neither sufficient nor scalable enough. It is argued that HEIs play an important supportive or developmental role in CC mitigation but effective cooperation between

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societal sectors is crucial.

## Biography

Jouni Kekäle is a Professor and Chief Senior Specialist and at the University of Eastern Finland. He has previously worked for 23 years as Human Resources Director in multidisciplinary universities of Joensuu and Eastern Finland, where institutional strategy aims at tackling global problems. His main research interests have included academic leadership, human resources management, quality, responsibility, disciplinary and organizational cultures in Higher Education as well as assessment systems and the changing operational environment for the higher education sector. Recent work has concentrated on HEIs role in CC mitigation.

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## Mankind Problem Climate Change

### Albert Fässler

Bern University of Applied Sciences, Switzerland  
Dr. sc. math. ETH, Prof. em. for Applied Mathematics Switzerland

Climate Change increases the mean global temperature of the earth's surface (MGT).

According to the National Oceanic and Atmospheric Administration (NOOA)'s 2023 Report, the MGT has increased at an average rate of 0.06°C per decade in the time span 1850 – 1981, but since 1982, the rate of warming with 0.20°C per decade is more than three times as high.

With the increase of the CO<sub>2</sub>-equivalencies in ppm (parts per million) in the atmosphere, mainly caused by fossil fuels combustion, the MGT will increase in the future, until there will be hopefully reached a balance, leading to a stationary MGT.

Several scenarios for the increase of greenhouse gases in the atmosphere are calculated using the simple but well established **Zero-dimensional Energy Balance Model**: The courses of the temperature increase of the earth's surface in the future with the stationary higher values (limit values) of 1.5°C, 2.0°C and 3.0° C compared to the pre-industrial time will be calculated.

However, an absolutely decisive criteria has to be fulfilled for the mentioned limit temperatures: **The carbon budget**. It will be shown, that this is a real challenge for mankind! The limited time left for using up the budget until net pollution in the atmosphere has to be realized.

Climate Change is a highly interdisciplinary complex problem.

### Increasing causes:

- World population demanding energy, water and food

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- mobility
- cutting down forest
- methane emissions threw permafrost and agriculture

## Effects and dangers:

- glaciers and sea level rise
- extreme weather
- biodiversity
- tipping points

## Ethical considerations:

- Wealth and poverty
- High standard of living versus population growth

## Biography

Albert Fässler

Dr.sc.math.ETH, Prof. em. for Applied Mathematics

- Bachelor in Mechanical engineering in 1967.
- Study of mathematics at ETH Zürich with Ph.D. in *Applied Group Theory* in 1973.
- During seven years (1973-1980) Scientific Collaborator at ETH Zürich and Lecturer for *Methods of Mathematical Physics I +II* and *Linear Algebra*.

Book Group *Theoretical Methods and Their Applications*, Birkhäuser Boston, 1992, Reprint 2012, Co-author Eduard Stiefel.

4 contributions in *The Concise Handbook of Algebra*, by Aleksander V. Mikhalev, Moscow State University and Günter F. Pilz, Johannes Kepler University-Linz Austria, Kluwer Publishers, 2002.

1980-2008: Prof. for Applied Mathematics at Bern University of Applied Sciences, Head of department for several years.

3 Sabbaticals: Institute for Mathematics and its Applications IMA at Univ. of Minnesota Minneapolis / State University of Colorado in Ft. Collins / Fudan University in Shanghai.

After retirement in 2008 until 2024: Courses and talks in China (Tsinghua University in Beijing, Fudan University in Shanghai), Taiwan (National Chiao Tung University in Hsinchu), India (Anna University and Abdur Rahman University in Chennai), Switzerland (ETH in Zürich).

Author of the textbook *Fast Track to Differential Equations*, 2nd Ed., Springer 2021, 216 pages (ordinary differential equations, many applications, 103 exercises with solutions).

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## Optimized Renewable Energy Planning in China

**Fangfang Li<sup>1</sup> and Jun Qiu<sup>2</sup>**

<sup>1</sup>College of Water Resources & Civil Engineering, China Agricultural University, China

<sup>2</sup>College of Water Sciences, Beijing Normal University, China

China has officially proposed to achieve the target of carbon peak by 2030 and carbon neutrality by 2060, imposing substantial pressure on the transformation of the energy structure. In this study, we propose a multi-objective optimization model for the non-fossil energy structure, encompassing three primary optimization objectives: maximizing power generation, minimizing economic costs, and reducing CO<sub>2</sub> emissions. The optimization involves determining the proportion of seven key non-fossil energy sources—hydropower, onshore wind, offshore wind, photovoltaic power (PV), bioenergy, geothermal, and nuclear power—while adhering to constraints related to power demand, nuclear safety, and other factors. The analysis explores the installed capacity, power generation, power generation costs, and CO<sub>2</sub> emission reductions of non-fossil energy under distinct scenarios in 2025, 2030, and 2060. The findings reveal that by 2030, the optimal share of power generation should be sequenced as onshore wind, hydropower, nuclear power, offshore wind, PV, bioenergy, and geothermal. Subsequently, by 2060, the optimal distribution of electricity generation is expected to be onshore wind, nuclear power, hydropower, PV, bioenergy, offshore wind, and geothermal.

### Biography

Fangfang Li is a distinguished scholar in the field of Water Resources Research and Renewable Energy at a leading university in China, China Agricultural University. As the first or corresponding author, Professor Li has published over fifty high-level academic papers in the past decade in top-tier journals in the fields of energy, environment, and water resources, including "Water Resources Research," "Energy," "Applied Energy," "Journal of Hydrology," "Environmental Modeling & Software," and "Journal of Water Resources Planning & Management." Professor Li has led several national-level projects and commissioned projects from organizations such as the China Three Gorges Corporation, Hydroelectric and Water Resources Planning and Design Institute of China, and Upper Yellow River Hydropower Development Company. Professor Li has been selected



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as an Outstanding Young Scholar by the Ministry of Education, a young talent under the Beijing Association for Science and Technology, a Kunlun Scholar in Qinghai Province, a Sanjiang Scholar at Qinghai University-Tsinghua University, an Oasis Scholar at Shihezi University, and a "Wu Dayou Scholar" at Taiwan's MediaTek Technology. Professor Li also serves as the Deputy Secretary-General of the Youth Committee of the Chinese Society for Dams and as a director of the Beijing Agricultural Engineering Society.

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## Estuarine Heatwaves under Climate Change

**M. Des, A. Castro-Olivares, M. deCastro, and M. Gómez-Gesteira**

Centro de Investigación Mariña, Universidade de Vigo, Environmental Physics Laboratory, Spain

Estuarine ecosystems are increasingly exposed to the impacts of climate-driven extreme events, such as marine and atmospheric heatwaves, which threaten both biodiversity and socio-economically important resources. This study combines observational data, numerical modeling, and climate projections to analyze the dynamics and potential impacts of heatwaves in the Ría de Arousa, a highly productive estuary located in the NW Iberian Peninsula.

Using long-term data (2008–2023) 38 estuarine marine heatwave (EMHW) events were identified. Those events were primarily associated with oceanic thermal anomalies and strongly correlated with large-scale climate variability, particularly the Atlantic Multidecadal Oscillation. In contrast, local atmospheric heatwaves (AHWs) and upwelling conditions showed limited influence, indicating limited atmospheric control on past EMHW occurrences. However, the potential intensification of AHWs under future climate scenarios underscores their growing relevance and the need to evaluate their prospective impacts.

To address this, we used downscaled regional climate projections (SSP2-4.5 and SSP5-8.5) with the WRF and Delft3D-FLOW models to characterize future AHW and bottom water temperature responses during the most extreme projected events. Results indicate a significant increase in both frequency and intensity of AHWs. A thermal exposure model was then applied to evaluate the species-specific vulnerability of the most important shellfish gathered in the area. *Venerupis corrugata* and *Cerastoderma edule* are likely to experience critical thermal stress, while *Ruditapes decussatus* appears comparatively resilient.

To support adaptive management, a high-resolution modeling framework is being developed to produce early warning systems and risk maps for the shellfishery sector. By integrating hydrodynamic models with climate projections, this work provides a robust

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foundation for anticipating future extreme events and enhancing the resilience and sustainability of estuarine ecosystems in the face of climate change.

## Biography

Marisela Des Villanueva is a marine and climate scientist specialized in the study of climate change impacts on coastal and estuarine systems, with a particular focus on species and ecosystems of socio-economic importance. Her academic background includes a degree in Environmental Sciences, a Master's in Oceanography, and a PhD in Marine Science, Technology, and Management from the University of Vigo (Spain).

Her research integrates physical oceanography and numerical modeling to understand processes such as river plume dynamics, estuarine circulation, and marine debris transport along the Iberian Atlantic coast. She has led and participated in multidisciplinary projects assessing the vulnerability of aquaculture resources to environmental change and supporting the development of sustainable coastal management strategies. Collaborative work with institutions across Europe has strengthened the applied and international dimension of her research, contributing to a deeper understanding of climate-related challenges in marine environments.

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## STEM, Masculinity and the Periphery: Adolescent Science Capital in the Face of Global Challenges

**Revital Duek<sup>1</sup>, Ronit Kark<sup>1</sup> and Svetlana Chachashvili-Bolotin<sup>2</sup>**

<sup>1</sup>Bar-Ilan University, Israel

<sup>2</sup>Ruppin Academic Center, Israel

Climate change and sustainability are among the most pressing global challenges of our time, demanding innovative solutions grounded in scientific knowledge and technological advancement. Yet, participation in STEM—crucial for addressing these challenges—remains stratified by gender and geography. This presentation draws on the concept of science capital to explore how adolescent boys' perceptions of masculinity, shaped by their socio-geographic environment (center vs. periphery), influence their engagement with STEM. Based on qualitative interviews with 27 STEM-oriented high school students in Israel, the study reveals that peripheral boys often adhere to traditional notions of masculinity (e.g., physical strength, provider roles), viewing STEM as a pathway to economic security but often favouring combat military roles over technological ones. In contrast, boys from the center adopt more fluid, socially integrated masculinities, embracing STEM as both intellectually and strategically beneficial. Across both groups, masculinity emerges as a mediating factor in the accumulation and utilization of science capital.

By highlighting the intersection of gender identity, social environment, and STEM participation, this research sheds light on the structural and cultural barriers that inhibit inclusive engagement with science—barriers that, if left unaddressed, limit the diversity of perspectives crucial for tackling environmental crises. The talk will offer policy and pedagogical recommendations for creating STEM education environments that foster broader access to science capital, particularly among underrepresented youth. In doing so, it underscores the urgent need to cultivate equitable STEM pipelines to ensure a future workforce capable of addressing climate and sustainability challenges.

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## Biography

Dr. Revital Duek – An Engineer for Equality.

Dr. Revital Duek is a researcher and lecturer in Gender Studies with a PhD from Bar-Ilan University. She holds a BSc in Industrial Engineering from the Technion, an MBA in Marketing, and an MA in Gender Studies. Her research focuses on how policy and education frameworks shape access to STEM for underrepresented groups, using the lens of science capital. With 20+ years of experience in the high-tech sector, she led EdTech curriculum development and integration in Israeli schools. She founded and directed the Ri3 Center for Applied Research in Future Skills and STEM Education, and served as Executive Director of Atid Plus and Co-CEO of Tsofen. Dr. Duek is a member of Israel's National Council for the Advancement of Women in Science and Technology and an alumna of the IVLP and Mandel Leadership Institute, advancing equity in STEM through cross-sector collaboration.

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## Why Traditional Rural Landscapes are still Important to our Future

**Antonio Santoro**

UNESCO Chair “Agricultural Heritage Landscapes”, Department of Agriculture Food Environment and Forestry (DAGRI), University of Florence, Italy

Traditional rural landscapes are agro-silvo-pastoral systems that preserve characteristics (land uses, landscape structure, practices) going back to a remote past and that have not been essentially modified by mechanization and agricultural industrialization. Despite socio-economic changes that affected rural areas in the last century, these systems still characterize many rural areas around the world. The importance of these traditional systems is testified by the fact that the cultural landscapes category (which includes traditional rural landscapes) was already recognized in 1992 by UNESCO within the World Heritage List. Another crucial initiative was the establishment in 2002 of the Globally Important Agricultural Heritage Systems (GIAHS) Programme by the Food and Agriculture Organization (FAO). This FAO Programme aims at identifying and safeguarding “remarkable land use systems and landscapes” resulting from the adaptation of rural communities to the surrounding environments through the application of traditional and sustainable techniques. Traditional rural landscapes still represent a resource capable of providing a wide range of Ecosystem Services to local communities. In the context of climate change, they represent examples of sustainable adaptation and resilient strategies and practices. In addition, they can contribute to the economy of rural areas due to their attractiveness toward rural tourists and for the sustainable production of high-quality typical foods. On the other hand, this heritage is under pressure of two opposite dynamics: abandonment of marginal areas, agricultural intensification in the areas suitable for agro-industry. Traditional rural landscapes conservation and valorization should be one of the priorities in national and international agendas, due to the opportunities related to rural areas sustainable development. These systems, however, should not be preserved as rural museums, but making them the multi-functional basis of rural society and economy applying dynamic conservation principles, to effectively contribute to the wellbeing of rural communities and of the environment.



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## Biography

Antonio Santoro, PhD, is Deputy Director of the UNESCO Chair Agricultural Heritage Landscapes, coordinator of the IUFRO (International Union of Forest Research Organizations) Research Group 9.03.03 Historical Ecology and Deputy of the IUFRO Research Group 9.03.06 Biocultural diversity. He worked as Research Fellow at the Department of Agriculture Food Environment and Forestry (DAGRI) of the University of Florence (Italy), where he coordinated the international project MedAgriFood Resilience (2021 SUSFOOD2 FOSC joint call) on the resilience and valorization of traditional agroforestry systems, that received the FAO GIAHS Secretariat official support. As a freelancer he carried out consultancy for the European Commission as a Horizon Europe expert evaluator, for the UNESCO WHL proposal of the Valdobbiadene Hills, for the Management Plan of the UNESCO site Portovenere and Cinque Terre, and for other public agencies. He has published more than 30 scientific articles and presented his research activities in various international conferences.

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## Possible Alternatives for the Mexican Electrical System to Achieve the Goals of the Transition toward Clean Energy

**Francisco Ortiz Arango**

Universidad Panamericana, Mexico

This work analyzes twenty-four possible scenarios for electricity generation in the Mexican electricity system, considering the transition to clean energy. The scenarios were created considering combinations of three growth rates of the electricity system, which the Mexican authority has planned. An additional high-growth scenario is considered, assuming outstanding economic growth due to nearshoring. Three possible investment policies are also included in the model, calculated as the three-year average of the maximum and minimum investment made by the federal government from 2019 to 2023. It also shows that with the current minimum investment policy, the Mexican electricity system will not be able to meet electricity needs in the expected high-growth scenario due to the nearshoring process. Moreover, the share of clean energy in electricity production varies widely depending on the scenarios and policies: from a minimum of 17.5% (with a policy of minimum investment and cost minimization, with an annual production increase of 2.6%) to 86% (with a policy of maximum investment and CO<sub>2</sub> minimization, with a production increase of 5.4%), both in 2050.

With the results obtained, it is concluded that the goal of clean energy participation of 50% for the year 2050 is achievable only by minimizing CO<sub>2</sub> generation with rates higher than 2.6%, a value higher than that maintained by the government from 2019 to 2023. It remains to be seen what direction the new government's energy policy will take from 2025 onwards.

### Biography

- B.Sc. in Physics and Mathematics, and Master of Science from the IPN. Master of Operations Research from UNAM. Ph.D. in Financial Sciences from ITESM. Postdoctoral degree in Financial Economics from the IPN.
- Member of the National System of Researchers.

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- **At the Universidad Panamericana:**

- Currently, he is a professor-researcher at the Faculty of Economic and Business Sciences.
- Founding Director of the Center for Energy Regulation and Development Economics, Academic Director of the Master's and Ph.D. programs in Energy Economics and Regulation, Director of Industrial Engineering B.Eng. Program, Founding Director of Engineering in Innovation and Design B.Eng. Program, Director of the Pan-American Center for Research and Innovation of the UP-IPADE System, Research Dean.
- Areas of research interest: Mathematical Modeling in Economics and Finance, Energy Economics, Asset Valuation, and Risk Management.
- Author of more than 50 peer-reviewed research articles and book chapters, editor of 6 research books. Director of over 40 Bachelor's, Master's, and PhD theses. Lecturer and speaker at various national and international conferences.

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## Earthquakes: Lithosphere- Atmosphere Interactions and Biological Implications in the Northern Apennines (Italy)

**Valentino Straser**

University of Makeni, Sierra Leone

This study aims to verify potential physical and biological implications in lithosphere-atmosphere interactions triggered by strong earthquakes or seismic swarms. The purpose of the study is to contribute to a greater understanding of earthquake phenomena and their influence on the environment and in living organisms. The studies were carried out on Italian earthquakes and, in particular, in the Po Valley and northern Apennines. The method used is the detection and comparison of data with an instrumentation that is currently experimental for the detection of microgravity and electromagnetic frequencies in the ELF and VLF bands through the Radio Direction Finding network with survey stations located both in Italy and abroad as part of the Radio Emission Project. The high-precision gravimeter, designed by physicist Mario Campion, has been in use since 2011 and located in Rovigo, Italy. Biological data, referring to pigeons, are provided by the Italian pigeon association. The earthquakes considered in the present study embrace the events that have occurred in the last 12 years and, in particular: the Emilia-Romagna (Italy) earthquake swarm of 2023, which preceded the flood stages in Romagna, the Emilia earthquakes of May 20 and 29, earthquakes of magnitude greater than M6, followed by atmospheric precipitation and a particularly snowy winter. During the most intense phases of the earthquake crisis in Central Italy, there was a reverse migration of pigeons, which are known to orient themselves with magnetic fields. A common matrix for the atmospheric and biological phenomena is believed to depend on electromagnetic emissions in the ELF band below 5Hz, and VLF, while the change in microgravity in the phases preceding and following the seismic events is likely caused by chemical and physical interactions in the Earth's crust.

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## Biography

Valentino Straser (1958), holds a degree in Geological Sciences from the University of Parma (Italy) and has published more than 170 studies in scientific journals and presented his research at major international scientific conferences as a speaker. He has been Adjunct Professor at the University of Makeni in Sierra Leone since February 2023 and was a member of the International Earthquake and Volcano Prediction Center (Orlando, Florida) from 2012 to 2020. He has received various international awards such as Lifetime Achievement Award in the International Scientist Awards on Engineering, Science and Medicine in 2021 and Award best paper on track "Earthquake Seismology and Geodesy" at MedGU Annual Meeting 2022 (Marrakech, Morocco), shared with Daniele Cataldi and Gabriele Cataldi. In addition, to the research activity he performs as a peer referee for several international scientific journals.

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## The Construction Progress of New Energy Bases in China's Desert, Gobi, and Arid Areas

**Qia Wang**

Institute of Quantitative and Technological Economics (IQTE), Chinese Academy of Social Sciences (CASS), China

China is one of the countries with the most severe desertification in the world, with an arid land area of 2.57 million square kilometers, accounting for 26.81% of the national land area. Among them, the desertified land is 1.68 million square kilometers, accounting for 17.58% of the total land area. Since 2021, China has accelerated the planning and construction of large-scale wind and photovoltaic base projects in desert, Gobi, and arid regions. By the end of 2024, 95% of the first batch of base projects have already been put into operation, with an installed capacity of 90.79 million kilowatts. It indicates that China has successfully explored a new development path of "green energy production + desertification prevention and control". We will introduce the planning and layout scheme, construction progress, economic analysis, environmental benefits, and electricity-hydrogen synergistic systems of these new energy bases.

### Biography

Qia Wang is an Associate Professor in the Department of Energy Security and New Energy at the Institute of Quantitative and Technological Economics (IQTE), Chinese Academy of Social Sciences (CASS). She received her Ph.D. degree from the Academy of Mathematics and Systems Science, Chinese Academy of Sciences (CAS) in 2013. She was a cost analyst for new energy projects in China Longyuan Power Group which is world's largest wind power operator. Her research areas include renewable energy, energy policy, energy economics, and energy system modelling.



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## Mooring of Ships in Very Restricted Port Areas and Determination of Tugboat Pulling Force during Ship Mooring Operations

**Vytautas Paulauskas** and **Donatas Paulauskas**

Klaipeda University, Lithuania

Some ports have very narrow spaces between quays and/or other navigational obstacles. Narrow spaces or channels in the port water area, where quays are built and ships are moored; make it difficult for ships to moor at such quays. During ship loading operations, ships sometimes have to be moved from one quay to another, and in some cases port users (shipping companies or other companies) have to pay for port tug services. In such cases, it is very important to guarantee shipping safety during mooring operations and to optimally use tugboats and at the same time reduce the cost of tugboats services. Good knowledge of the maneuverability characteristics of ships and their application in ship mooring operations and maximum use of tugboats capabilities allows optimizing the use of very limited port spaces. A developed ship mooring methodology is presented, designed to moor ships by maximizing the capabilities of tugboats when mooring ships in extremely limited conditions, which helps to calculate the necessary tugboats traction power and their number, assessing the specific parameters of tugboats and the ships, as well as environmental conditions, taking into account the parameters of the mooring ships, berth locations, hydro meteorological and hydrological conditions and clearance (the gap between the ship's hull and the bottom of the water area), in order to guarantee shipping safety and not order an excess of tugboats according to their number and power. The developed methodology was tested in real conditions (with real ships and tugboats) and using a calibrated simulator and it was found that it can be successfully applied in any port or other complex shipping area, adapting it to specific conditions.

### Biography

Education: In 1974 graduated Academy of Marine Engineering - Master Marine. After graduating, he worked on mate and captain positions on general cargo ships, tankers and bulk carriers. In 1979 defended his PhD in the field of ship manoeuvring. In 1993 defended his habitation doctorate in the field of transport technologies.

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1990 - 1993 - Director of the Waterborne Transport Department of the Ministry of Transport and Communications of Lithuania. 1993 - to the present - professor, head of the Department of Shipping, in Klaipeda University, professor.

During the years 1976-2024, he published over 300 scientific publications, including 37 monographs and books for students, carried out more than 70 scientific projects in the fields of logistics, intermodal transport, shipping, shipping safety, port development and management, environmental protection, transport technologies, has conducted more than 30 international seminars on Port Management, Transport Technologies, Logistics, Shipping and Shipping Safety as a lecturer and coordinator.

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## A Comprehensive Study of Downscaling using Model Tree for Climate Change

**Shreenivas Londhe, Pradnya Dixit, Preeti Kulkarni, Marilyn Dcruz and  
Sucheta Dumbre**

Vishwakarma Institute of Technology, India

Climate change refers to long-term shifts in temperatures and weather patterns. Climate change profoundly impacts rainfall patterns, and PM<sub>2.5</sub> pollution, along with many other Hydro-meteorological parameters, intensifying risks of floods, droughts, and degraded air quality. To understand and predict these changes, scientists use tools called Global Circulation Models (GCMs). CMIP5 (Coupled Model Intercomparison Project Phase 5) and CMIP6 (Phase 6) are international frameworks that standardize climate model experiments to assess past, present, and future climate change. GCM outputs are often downscaled using dynamical (e.g., regional climate models) or statistical methods, refining projections to higher resolutions for practical applications like adaptation planning. Together, CMIP5/6 and GCMs underpin climate research and policy decisions aimed at mitigating these interconnected risks. The present work focuses on the climate change study done on 3 diverse topics: Effect of climate change on rainfall pattern in Pune city, on precipitation specifically in Koyana reservoir catchment in the state of Maharashtra and PM 2.5 concentrations in metro cities namely Pune, Mumbai, Delhi and Kolkata in India.

In the first study causative parameters of rainfall at four grid points around the city Pune were used as inputs (20 in number) to map observed rainfall at Pune for the past thirty years. The soft computing technique of Model Tree with M5P algorithm was employed for this exercise the CMIP5 framework with five GCMs. In the second study, the precipitation for Koyana reservoir Catchment was modelled using 15 GCMs (with CMIP6 framework and past 30 years of GCM data). In the third study of modelling effect of climate change on PM<sub>2.5</sub>, CMIP6 framework was used with 4 GCMs for Mumbai, Pune, Delhi and Kolkata (India) with M5 algorithm. Further, to increase the applicability of this study, these trained

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models were successfully used to forecast precipitation as well as PM 2.5 for the next 30 years at the respective locations.

## Biography

Professor in Civil Engineering with research interest in applications of soft computing techniques in Civil and Water Resources Engineering. Authored more than 60 peer reviewed international journal papers. Worked as adviser to several students towards their graduate and doctoral studies. Reviewer of many international referred journals. 34 years of experience in teaching and research.

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## A Matter of Energy Injustice? A Comparative Analysis of Biogas Development in Brazil and Italy

**André Mateus Bertolino<sup>1</sup>, Patrizio Giganti<sup>2</sup>, Danielle Denes dos Santos<sup>3</sup> and  
Pasquale Marcello Falcone<sup>2</sup>**

<sup>1</sup>Federal Institute of Education, Science and Technology of Paraná (IFPR) | Pontifical Catholic University of Paraná (PUCPR), Brazil

<sup>2</sup>Department of Business and Economics, University of Naples Parthenope, Italy

<sup>3</sup>Positivo University, Brazil

Energy transitions have significant implications for justice, as certain regions may experience losses or improvements as a result of decarbonization efforts. The biogas development in Brazil and Italy has been characterized by incidents of injustice in different dimensions and contexts. This article addresses this issue by applying a multi-scalar and multi-horizon structure model developed by Kanger and Sovacool (Kanger and Sovacool, 2022 [1]) to connect these incidents to energy transition dynamics, regarding biogas development, in both countries. Organized into dimensions and clusters, and at different spatial and temporal scales, the obtained data – derived by scientific literature review and analysis of news published by the media – were analyzed from an inventory that gathered 230 incidents of injustice for Brazil and 114 for Italy. Among the results obtained, some differences stand out. In Italy, biogas policies have mainly benefited large plants in the northern region of the country, leading to regional disparities, while in Brazil, the dependence on rainfall has prevented effective incentives for renewable sources, in addition to leading to increased energy costs and social problems. The research also reveals that the regional scale is more relevant for Italy, reflecting the country's political structure. Unlike the Italian reality, in Brazil, the regional spatial scale is neglected, with a greater presence of national scope initiatives. The movement to systematize the contextual factors of biogas injustices in Brazil and Italy can provide insights for policymakers and researchers interested in the dynamics of

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energy transition and the challenges associated with promoting renewable energies while addressing social and environmental issues.

## Biography

PhD in Administration from Universidade Positivo - PPGA-UP (2020), sandwich PhD from the Doctoral Program in Economics, Management and Accounting at the Università degli Studi di Napoli Parthenope - Italy (2022). CEO of CIRCOLARE - ESG - partner and founder of Ítalo School. Professor at PUCPR - Londrina Campus. Reviewer of international articles for - Corporate Social Responsibility and Environmental Management. Master in Administration and Accounting from - UNOCHAPECÓ. Worked at Banco Real/Santander and Banco do Brasil. Studying an MBA from USP in ESG and Compliance. Studied an MBA in Business Strategy at FGV. Specialist in Human Resources Management and Practices PUC-PR (2009). Graduated in Business Administration from PUC-PR. Federal Public Servant in the position of Administrator of the Federal – IFPR. Business Consultant - FIA Business School - USP. Professor at USP/PECEGE. His research focuses on the areas of Energy Transition, Energy Justice, Renewable Energies, Public Policies, Production Chains and Innovation.



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## Determining Surface Resistance to Overland Flow in Semi-Arid Field Conditions with Low Reynolds Numbers

**J. R. B. Cantalice<sup>1,2</sup>, V. P. Singh<sup>1</sup>, Taiza K. A. Souza<sup>2</sup>, E. O. S. Nunes<sup>2</sup>, Genival Barros Junior<sup>2</sup>, V. P. Silva Junior<sup>2</sup>, Wagner L. S. Souza<sup>3</sup> and Jeongwoo Han<sup>1</sup>**

<sup>1</sup>Department of Biological and Agricultural Engineering & Zachry Department of Civil & Environmental Engineering, Texas A&M University, USA

<sup>2</sup>Environmental Engineering Graduate Program, Rural Federal of Pernambuco University, (UFRPE), Brazil

<sup>3</sup>Brazilian Federal Education Institute, Campus Barreiro, Pernambuco State, Brazil

Shallow water flow on semiarid hillslopes with shrubs or cultivated with crops often occurs as laminar flow without concentration. Typically, the flow has a low Reynolds number, usually below 100, and the surface hydraulic resistance generated from the interaction between the soil surface and vegetation that obstructs the flow is governed by the Froude number. This study conducted field experiments on Brazilian shrub and semiarid crop fields and applied the Crompton framework to model hydraulic resistance. The overland flow observed on semiarid hillslopes under crops or natural vegetation always presented Reynolds numbers between 32 and 54, and the flow was laminar and subcritical. By employing the kinematic wave approximation, the Crompton framework was found to model overland flow resistance over semiarid hillslopes with acceptable accuracy.

### Biography

Professor Cantalice has worked on hydrology watersheds and sediment transport processes linked to soil use, agricultural pollution, and water quality. Professor Cantalice also approaches the gross erosion processes as inter-rill, rill, and gully erosion, connected with the landscape by lateral sediment and hydrologic connectivity. The hydraulic processes related to sediment transport have been studied, including laminar sheet flow with and without vegetation and river flow hydraulics under vegetative patches. This is also his research area.

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## **SIMUTEC: A Multi-Sector Simulation Platform for the Systemic Impact Analysis of Urban Policies to Support Local Authorities in the Ecological Transition of their Territories**

**Seghir Zerguini<sup>1</sup>, Simon Gorecki<sup>2</sup> and Nathalie Gaussier<sup>1</sup>**

<sup>1</sup>Bordeaux School of Economics (BSE) - University of Bordeaux, France

<sup>2</sup>IMS - University of Bordeaux, France

SIMUTEC is a modeling and simulation platform designed to assess the cross-sectoral impacts of public policies (transportation, housing, urban planning, etc.) on the climate/air/energy triptych at the scale of urban territories. This platform adopts a forward-looking approach to decision support, aiming to analyze and discuss possible "trajectories" for territories in terms of sustainability and territorial inequality criteria, based on the selection of a public policy and its systemic intersectoral effects.

The SIMUTEC platform, operating at the scale of an urban agglomeration, consists of three modules:

- MUST-B, a LUTI (Land Use and Transport Interaction) multi-agent model, simulates the location choices of households and firms in interaction with transportation networks and conditions. It is based on a systemic approach and an auction mechanism, allowing the modeling, over a given time horizon, of competition between agents in the real estate market (Existing stocks residential and professional real estate) and in the land market (buildable land reserves). This auction procedure is grounded in the maximization of utility provided by a given location to an agent: housing for a household and a professional premises for a firm. Utility depends on several characteristics related to space and the occupied premises, such as accessibility to jobs, housing area, energy efficiency of the building, the reputation of the area, or even its real estate prices.
- M-CLIMATE, coupled with MUST-B, determines the amount of energy consumed, air pollutants, and greenhouse gases (GHG) emitted by the various sectors characterizing urban metabolism, such as daily mobility, housing/buildings, urban services/networks, and economic/commercial activities.

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- M-3D, a 3D graphical interface, enables spatial visualization of the results produced by MUST-B (urban forms, household/job locations, mobility flows, congestion, real estate prices, etc.) and by M-CLIMATE (energy consumption, pollutant emissions, GHGs, territorial/social inequalities, land artificialization, etc.).

## Biography

Seghir ZERGUINI, Associate Professor in Economics at the University of Bordeaux, affiliated with the BSE (Bordeaux School of Economics) laboratory. His research focuses on transport economics and spatial economics, with particular attention to the challenges of energy consumption coupled with the environmental issues of territories. His work emphasizes systemic analysis (multi-agent modelling/simulation) and adopts multi-sectoral (transportation, land use, real estate, etc.) and multidisciplinary approaches (urban planning, spatial development, economics, geography, etc.).

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## Adsorption Rate of Uranium and Thorium Isotopes in Soil and Plants Grown in a High Background Radiation Area

**Othman Abdulrahman Fallatah<sup>1,2</sup>, Maher M. T. Qutob<sup>1,2</sup>, Murad Abdulfarraj<sup>3</sup>,  
and Sultan Almalki<sup>4</sup>**

<sup>1</sup>Faculty of Engineering, Nuclear Engineering Department, King Abdulaziz University, Saudi Arabia

<sup>2</sup>Faculty of Engineering, Radiation Protection and Training Centre, King Abdulaziz University  
Saudi Arabia

<sup>3</sup>Department of Petroleum Geology and Sedimentology, Faculty of Earth Sciences, King Abdulaziz  
University, Saudi Arabia

<sup>4</sup>Saudi Geological Survey, Saudi Arabia

Radionuclide concentrations in soil and rocks have been reported in several regions within the KSA. Radioactive radio nuclides in soils and rocks are highly influenced by geochemical and geological factors. This study aims to investigate a high background area of Natural radioactivity in Heqal village in Saudi Arabia (KSA). Fourteen samples were collected from Heqal village (9 soil samples; 5 rock samples). Rock and soil samples were analyzed using gamma spectrometry for <sup>238</sup>U, <sup>232</sup>Th, <sup>226</sup>Ra, and <sup>40</sup>K. This data provided the basis for calculating gamma dose rates (AGDRs), annual effective dose rates (AEDRs), radium equivalent (Raeq), external and internal hazard indexes (Hex and Hin), gamma index (I<sub>γ</sub>), alpha index (I<sub>α</sub>), and excess lifetime cancer index (ELCR). Our findings will help decision makers and public health officials with essential information for developing strategies to reduce radiation exposure and prevent future cases of cancer.

### Biography

Dr. Othman Fallatah is an Associate Professor of Environmental Radioactivity at King Abdul Aziz University, department of Nuclear Engineering Department. He is an expert in radiation protection in environment, and applied integrated (water quality, remote sensing, hydrogeology, modeling, GIS). Dr. Othman has published over 30 papers in top peer-reviewed journals and conferences that last one was in NATURE. He has received over \$200k in grants in support of his research, and he is a president of Radiation Protections and Training Center at King Abdulaziz University and a president of NRRU (Nuclear and Radiation Regulation Unit).

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## Fluorescent Chemosensors in the Detection of Ultra- Trace Quantity of Toxic $\text{Hg}^{2+}$ , $\text{Pb}^{2+}$ , $\text{Al}^{3+}$ , $\text{F}^-$ , $\text{AsO}_4^{3-}$ & $\text{AsO}_3^{3-}$ in Water towards Monitoring Humam Health and Management

**Samir Kanti Datta<sup>1</sup>, Saugata Konar<sup>1</sup>, Shibashis Halder<sup>2</sup> and Ungwanen John Ahile<sup>3</sup>**

<sup>1</sup>Department of Chemistry, The Bhawanipur Education Society College (Affiliated to the University of Calcutta), India

<sup>2</sup>Department of Chemistry, T.N.B. College, India

<sup>3</sup>Department of Chemistry, Benue State University, Nigeria

Chemosensors have extensive applications in chemical and biological sciences. Fluorescent chemosensors are the most powerful techniques for fast detection of ultra-trace quantity of inorganic ions with high sensitivity. Water is contaminated with various pollutant ions e.g.,  $\text{Cd}^{2+}$ ,  $\text{Cu}^{2+}$ ,  $\text{Hg}^{2+}$ ,  $\text{Pb}^{2+}$ ,  $\text{Mn}^{2+}$ ,  $\text{Zn}^{2+}$ ,  $\text{Al}^{3+}$ ,  $\text{AsO}_4^{3-}$ ,  $\text{AsO}_3^{3-}$  and  $\text{F}^-$  due to increase industrialisation, usage of fertilizers in agriculture, through food -beverages, water purification instruments and e-wastes. Thus, contaminated drinking water is a potential risk to human health as it transmits various bacterial waterborne disease, so detection of contaminants is essential.

Objective of our work is to detect these trace quantity toxic ions from water bodies, environmental and biological samples thereby protecting and monitoring Humam health.

Regarding methodology we have highlighted here recently developed single, dual and multi-analyte fluorescent chemosensors ligands for the detection through selective binding of trace quantity of critically toxic ions e.g.,  $\text{Hg}^{2+}$ ,  $\text{Pb}^{2+}$ ,  $\text{Al}^{3+}$ ,  $\text{F}^-$ ,  $\text{AsO}_3^{3-}$  and  $\text{AsO}_4^{3-}$  in water and food samples. Binding of ions through different Sensing mechanism: Intramolecular Charge transfer (ICT), Foster Resonance energy transfer (FRET), Photo induced electron transfer (PET) etc. have also discussed. We have used easily synthesizable chemosensor ligands i) derivatives of rhodamine dyes and phenanthroline ii) Schiff base with rhodamine B thiohydrazide and quinoline moiety iii) a chromone-quinolinyI hydrazide Schiff base as dual sensors iv) nitro-furaldehyde based Schiff base as multy-analyte sensors for the detection of the concerned toxic ions.

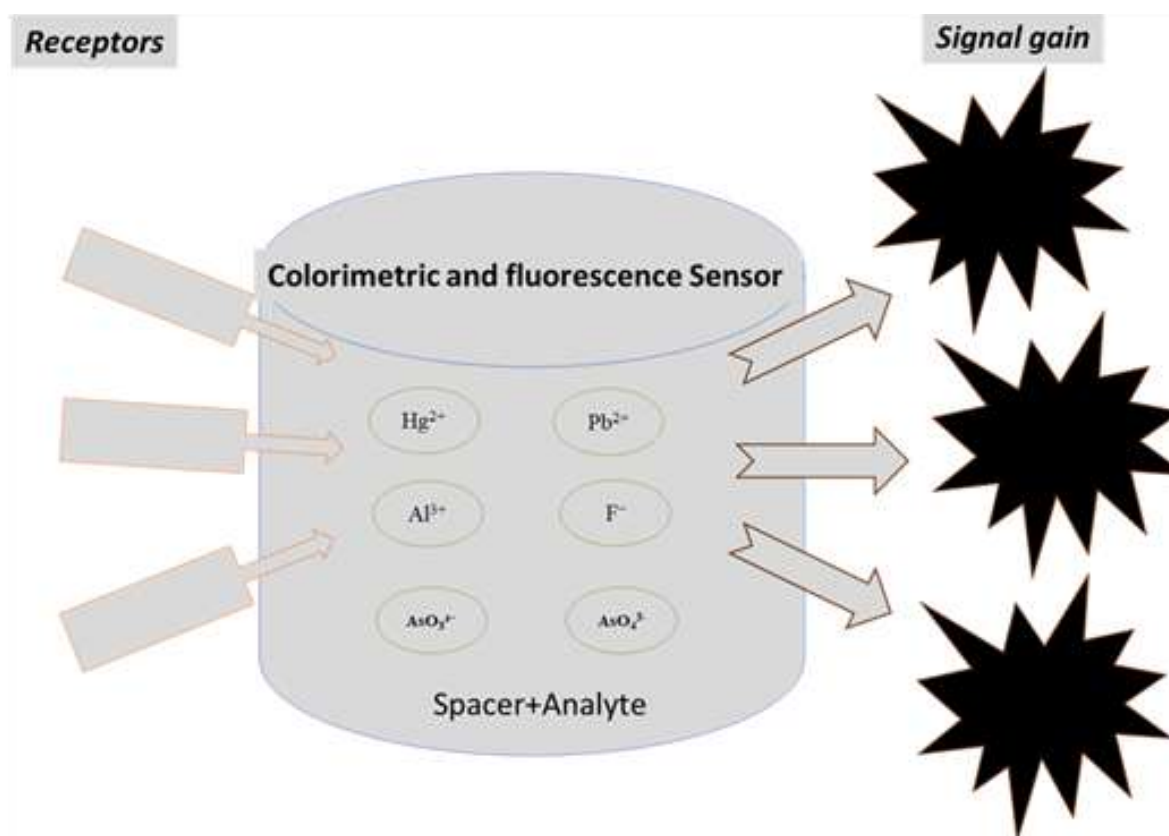
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**Results:** The detection of toxic ions characterized by FTIR, UV-Vis, Fluorescence spectroscopic studies and also by various signalling mechanisms.

**Scope:** This work will help future researchers to design unknown organic fluorescent Schiff's bases from non-fluorescence Schiff's bases by incorporating specific chromophores like different organic functional groups.

The creation of single, double and multi-ion chemosensors has been vibrant research in recent years due to its biological significance.



## Biography

Dr. Samir Kanti Datta received his Ph.D. Degree in Chemistry from the University of Calcutta, India in 1984. Now attached to The Bhawanipur Education College (Affiliated to the University of Calcutta), Kolkata, India as Dean of Science and former faculty in Chemistry, St. Xavier's College (Autonomous), Kolkata, India. More than 30 years experienced in teaching and research. Research interests: Phytochemistry, Organo-metallic chemistry, Bio-inorganic chemistry and Chemosensors. Good number of publications in national and international journals [ Journal of Molecular Structure, Elsevier, 2019, Michrochimica Acta (Wien)Springer Verlag and Journal of Fluorescence, Springer Nature, 2025.]

Member and Fellow of the Royal Society of Chemistry, UK. Awarded Royal Society of Chemistry, UK Inclusion and diversity research grant in chemical sciences on a project 'Chemistry behind Phytochemicals and medicinal importance in curing diseases of human being 'in 2022. Visited reputed universities of France and UK for attending summer school, seminars and visiting research laboratories in 1991, 2012, 2015 and 2017



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## The Ancient Water Supply System of Saldae: Digitalization and Characterization (case of romain tunnel El Habel of Bejaia in Algeria)

**Souad Laoues**

Mouloud Mammeri University of Tizi Ouzou, Algeria

Over the last few decades, digitization in the cultural sector has significantly advanced, becoming essential for the management and preservation of heritage. New technologies for data acquisition and processing have become crucial in protecting and enhancing cultural sites. Among these innovations, the 3D laser scanner stands out as a powerful tool, particularly for capturing the complexity and variability of spaces such as hypogean and underground structures. These natural or man-made cavities and tunnels often require precise surveys and inspections, which are effectively facilitated by laser scanning systems (LSS).

This article presents the results of a survey conducted using the Leica-BLK 360 3D laser scanner at the El Habel tunnel, an iconic component of the Roman aqueduct at Toudja-Bejaia (ancient Saldae). The aqueduct has suffered continuous damage, and its deterioration poses a significant challenge to its preservation for future generations. After unsuccessful attempts with traditional topographical surveying and photogrammetry, we turned to non-destructive lasergrammetry, which has proven to be more accurate and reliable. The goal of this study is to create a digitized model of the tunnel that will allow for a precise reconstruction of its route, characterization of its morphology and components, and examination of the Nonius Datus error. This error, which is linked to the historical significance of the Roman aqueduct of Saldae, remains a central mystery in ancient hydraulic engineering and continues to provoke questions about the design of these remarkable systems.

### Biography

Souad Laoues, is an Assistant Professor in architecture at UMMTO University, Algeria. She holds a doctorate in architecture and the archaeology of ancient worlds, completed under joint supervision by Epau of Algiers and the Doctoral School 60: TTSD, ASM laboratory, UPV Montpellier 3, France. In her academic role, Souad supervises Master II students, particularly in Project modules 9 and 10, as well as the end-of-study projects



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(PFE) and theses. Additionally, she manages workshops in the department of architecture. Souad's career also includes a successful tenure as a liberal architect from 2007 to 2015, during which she won the National Architecture Award in 2015 and received a nomination for the 2012 Agha Khan Prize for Architecture. Before her private practice, she held senior positions in Algeria's civil service, including Head of Department and President of the Bid Opening Committee from 1988 to 2007.

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## Investigation of Radioactive Inventory and Microstructural Features along the Reactor Pressure Vessel of Greifswald Nuclear Power Plant-Future Insights in Decommissioning Process and Repository Conditions

**Ghada Yassin, Erik Pönitz, Jörg Konheiser and Astrid Barkleit**

Institute of Resource Ecology, Helmholtz Zentrum Dresden Rossendorf HZDR, Germany

Following the decommissioning process of nuclear power plants (NPPs) in Germany, comprehensive study based on both radiological protection and environmental assessment needs to be done. We focused our work on the reactor pressure vessel (RPV), one of the main shielding barrier of the radioactive fuel. The RPV is mainly exposed to high neutron induced reactions, thus contributing to the mostly activated material with different radioisotopes produced. Furthermore, the behavior of RPV steel material related to different parameters during the long term operation including neutron fluence, temperature gradient, and its composition, followed by decommissioning process, and interim storage, is still underexplored. We focused our studies on the determination of the activity distribution of radionuclides (RNs), produced along the RPV. Furthermore, we investigated the phase composition of the activated RPV steel material, in understanding the corrosion behavior after decommissioning and long term storage. In this context, the activities of both, the  $\gamma$ -emitting RN Co-60 with a half-life ( $t/2$ ) of 5.27<sup>a</sup> and the long lived  $\beta$ -emitting C-14 ( $t/2$ : 5700<sup>a</sup>), were determined. Both constitute important concern in the safety assessment during the decommissioning on the one hand and of deep geological repositories on the other hand. For the first time, we identified microstructural differences between the first and second generation RPV reactor units of the Greifswald NPP. Surface analysis measurements based on SEM/EDS revealed the presence of Mo-rich precipitates, and (Mn, S) inclusions with the presence of secondary micro-inclusions within the first generation reactor units. We unraveled their phase characterization and identified the presence of key oxide phases ( $\gamma$ -Fe<sub>2</sub>O<sub>3</sub>, Fe<sub>3</sub>O<sub>4</sub>), silicates (Mn-SiO<sub>3</sub>), and sulfides (MnS, FeS). Our findings open new models in the radiological protection process and on developing accurate scenario conditions for future repositories.

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This research was funded by the German Federal Ministry of Research and Education BMBF under the contract number 15S9412.

## Biography

Dr. Ghada Yassin holds PhD in Chemistry from Jacobs University Bremen, Germany. She has been involved in the initiation of several research projects related to environmental and life sciences. She gained profound experience in the analysis of complex mixture in food chemistry and natural products related to human health. During her career, she developed her experience in the analysis of complex mixture, natural organic matter (NOM) in marine environmental research at the Center of Marine Environmental Sciences MARUM, Bremen. Furthermore, she has interesting postdoctoral researcher experience at Helmholtz Zentrum Dresden Rossendorf HZDR in the field of radioanalytical chemistry research with environmental impact. During her career, she developed her ideas and conceptualisation in supporting scientific strategies. She likes to build scientific network and invest her multicultural background in building bridges for better sustainable future.

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## Determinants of Sustainability-Driven Green Entrepreneurial Intentions among SMEs in the Electric Vehicle Component Industry

**Zhao Kongling (Sheila)<sup>1</sup>, Annamalah Sanmugam<sup>2</sup> and Kalisri Logeswaran  
Aravindan<sup>3</sup>**

<sup>1</sup>China International Council for the Promotion of Multinational Corporations, China | Bufori Motor Car Company (M) SDN. BHD, Malaysia

<sup>2</sup>SEGI University, Malaysia

<sup>3</sup>Multimedia University, Malaysia

The pursuit of sustainability in the electric vehicle (EV) industry has brought increasing attention to the entrepreneurial role of small and medium-sized enterprises (SMEs). This study examines the factors shaping green entrepreneurial intentions (GEI) among SMEs engaged in the EV component sector in China. Drawing on the Theory of Planned Behaviour (TPB) and Organizational Commitment (OC) perspectives, the research investigates how attitude, behavioural control, social expectations, and organizational commitment influence entrepreneurial orientation toward sustainability, while also considering the moderating role of openness to experience.

A quantitative survey was conducted among 383 SMEs, applying a partial least squares structural equation modelling (PLS-SEM) approach to test hypothesized relationships. The findings confirm that all four examined factors—attitude, perceived behavioural control, subjective norms, and organizational commitment—positively affect GEI. Among them, organizational commitment emerged as a particularly influential driver. Moreover, openness to experience was found to strengthen the effects of both attitude and subjective norms, suggesting that personality traits can amplify the impact of external and organizational factors on sustainable intentions.

This research contributes to the theoretical development of GEI by integrating behavioural and organizational perspectives with individual characteristics. From a practical standpoint, the results highlight the importance of nurturing organizational commitment and promoting psychological openness in order to foster sustainability-oriented entrepreneur-

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ship. These insights are especially relevant for policymakers, industry leaders, and support institutions aiming to accelerate green transitions in the EV component supply chain.

## Biography

Zhao Kongling is a PhD candidate in Management at SEGi University, Malaysia, and has continuously served at the China International Council for the Promotion of Multinational Corporations (CICPMC) before and during her doctoral studies. Her professional experience at CICPMC spans international cooperation, government affairs, and high-level event management, providing her with a strong foundation in policy and industry engagement. Parallel to her career, her academic research focuses on sustainability, green entrepreneurship, and organizational behavior, with particular emphasis on small and medium-sized enterprises (SMEs) in the electric vehicle component industry. She has successfully published in international journals, including Discover Sustainability, where her study highlights the determinants of green entrepreneurial intentions. Combining her industry experience with rigorous academic inquiry, she is dedicated to bridging research and practice in advancing sustainable development and green innovation on a global scale.

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## Comparative Modelling of the Rainfall Runoff Pattern of the Solöz River using the WEAP Model within the Framework of Climate Change Scenarios

**Bihter SEZER GÜNEY** and **Feza ÖRÜÇ KARAER**

Environmental Engineering Department, Faculty of Engineering, Bursa Uludağ University, Turkey

Today, water is not only vital for human life and health and ecosystems, but also a basic necessity for the development of countries. Water scarcity is becoming an increasingly prominent and widespread problem. WEAP (Water Evaluation and Planning System) is a flexible, integrated, and transparent planning tool created in 1988 to assess the sustainability of current water demand and supply dynamics and evaluate alternative scenarios over long periods. It is a programme based on an integrated approach to water resources planning. Recent studies indicate that Turkey is one of the most vulnerable countries in the Mediterranean region, facing severe warming and drought. In this study, climate projections for the Solöz River, which feeds the Iznik Lake basin in Turkey, a climate change hotspot, were modelled using WEAP and CMIP6. The model results were projected up to 2100, and the results for the medium, short and long term were interpreted. The model results were statistically analysed in comparison with the observed results. Simulation results, which best simulated precipitation by considering HadGEM3-GC31-MM values, were examined based on NSE, PBIAS, and R2 values. Future projection anomalies include short-term (2030-2050), medium-term (2050-2070), and long-term (2070-2100) periods, based on the IPCC assessment report (AR6) reference year 1995-2014. The aim of the study is to observe how the net water budget in the Solöz River Basin changes when the climate change scenario is taken into account, and to understand what changes will occur in a stream feeding the lake basin when the climate change scenario that has been found to give the best results for Turkey is projected using the Weap model. While establishing the logical framework, the focus was on examining the extent to which the climate change scenario was accurately projected by comparing the statistical results obtained between 1995 and 2002 with the statistical results of the 2100 projection, supported by statistical analysis.



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## Biography

Bihter SEZER GÜNEY has completed her doctoral studies at Bursa Uludağ University and is currently working on her thesis. She is conducting research on lake and river hydrology and sustainability in the Department of Environmental Engineering. She is also the Chief Engineer of Water Registry and Allocations at the General Directorate of State Hydraulic Works in Bursa. Her field of work primarily involves water usage, but she is currently planning our hydrogeological studies, which are the initial phase of this work. Since it is not possible to proceed with sustainability-related studies without addressing climate change, she is also conducting research on this topic. Their primary focus is on the net water budget within the framework of all the topics she has mentioned. She received an email from us stating that their article titled 'Estimation of Solöz River Water Balance Components and Rainfall Runoff Pattern with WEAP Model 1' has had a significant impact among those working in this field, and she was invited to the conference. She has also prepared another paper for the conference in this field.

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## Pyrometallurgical Reduction of Copper Slag with Biochar for Metal Recovery

**Desmond Attah-Kyei**

Metso Metals Oy, Finland

Large amounts of slag are generated during pyrometallurgical processing in copper production. Due to the presence of valuable elements, the improper disposal of huge quantities of copper slag produced, results in significant loss of resources as well as environmental issues. Analyses of the copper slag show that it contains valuable metals, particularly copper and nickel. In this work, four biochars were employed as fossil-free reducing agents to recover valuable metals from the slag. Reduction experiments were performed in a vertical furnace at temperatures 1250, 1300 and 1350°C for 60 minutes in order to investigate the effect of temperature. Moreover, the effect of time on reduction progress was studied at 1250 °C and the concentrations of CO and CO<sub>2</sub> in the off-gas were measured with a gas analyzer. Copper slag was reacted with metallurgical coke for comparison and the products were analyzed with EPMA and LA-ICPMS.

The results revealed that reduction rapidly progresses to the formation of metal alloy within ten minutes. Valuable metals like copper, nickel and arsenic were the first to be reduced to the metal phase. As reduction time increased, iron was also reduced and combined with the metal droplet. The use of biochar as reductant was shown to be more effective than coke especially at lower temperatures. In addition, thermodynamic modelling was performed with Factsage and HSC and compared with the experimental results. The simulations with HSC showed the sequence of reactions taking place and the calculations by Factsage were in agreement with the experiments.

### Biography

Desmond has completed his PhD from Aalto University in Finland. He is currently working as an engineer at Metso Metals Oy. He has been investigating employing alternative reductants to recover valuable metals from secondary sources and has published several papers on in reputed journals.

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**DAY 02**

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## Greenhouse Gas Emissions from Aluminium Production – The Way towards Net-Zero Emissions

**Halvor Kvande<sup>1,2</sup>**

<sup>1</sup>Previously, Norsk Hydro, Norway

<sup>2</sup>Retired from Norwegian University of Science and Technology (NTNU), Norway

Primary aluminium production will play a crucial role in industrial decarbonization. The aluminium industry is currently responsible for 2% of the anthropogenic global greenhouse gas (GHG) emissions, corresponding to 1.1 billion metric tons per year. Presently more than 80% of the International Aluminium Institute (IAI) members are now aiming for net-zero or neutrality GHG emissions by 2050. And they have made roadmaps for process decarbonization to achieve this very ambitious goal.

This is a big and challenging task. It is clear that business-as-usual is far from enough to achieve net-zero greenhouse gas emissions. From what is known today we need new and yet-to-be-developed production technologies. The commercial adoption of these technologies will require a significant investment across the aluminium industry. In the present paper the way forward and the expected changes in aluminium production technology will be presented and discussed.

### Biography

Halvor Kvande received his Ph.D. in 1972 from the Norwegian University of Science and Technology (NTNU) and the Norwegian degree of Doctor Technicae from the same university in 1979. He started his industrial career with Hydro Aluminium in 1980 and retired in 2012. His major field of interest has been R&D on the Hall-Héroult process for production of aluminium. From 1990 to 2005 he also served as an adjunct Professor at NTNU. From 2009 to 2011 he was Professor and Qatalum Chair at Qatar University in Doha, Qatar.

Halvor Kvande is author or co-author of more than 180 scientific and technical papers, as well as five books on aluminium electrolysis and related topics. His research work has been appraised by several awards and honours, including his contribution (as a member of the Intergovernmental Panel on Climate Change) to the 2007 Nobel Peace Prize.



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## Natural Risk Reduction Educational Experiment at School: Through *Episodes of Situated Learning (ESL)* as Interactive Education

**G.L. Piangiamore, A. Maramai and G. La Fauci**

Istituto Nazionale di Geofisica e Vulcanologia, Italy

To enhance learning with a positive outcome on students' engagement, favoring the strengthening of the educational relationship between teacher and students, our experience has proved that the *Episodes of Situated Learning (ELS, EAS in Italian, Rivoltella, 2013)* is a valid method. Over the past ten years, we have tested that *ESL* is an innovative and meaningful approach to natural risk reduction plan for schools. *ESL*, on the basis of the *flipped class* model, is a participative methodology in which students develop a digital innovative product as a final result of an *active learning* process. The main aim of the *ES-Les* designed by INGV researchers is to spread core concepts on geophysical phenomena (earthquakes, tsunamis, ...), stimulating students to implement first hand effective digital products to communicate what they have learnt on natural risk reduction, both with their peers and with adults. Students have had the opportunity to meet geophysical researchers and become researchers themselves for a short period, working in *cooperative learning*. Scientists have shared with the students their knowledge and the database from which to gather data to create final digital product to spread core scientific concepts.

This experience involved about 5000 students from both middle (ISCED 2) and high schools (ISCED 3) from all over Italy, always with great interest from both the students and the teachers, also in remote learning during the pandemic and online special scientific events (European Researchers' Night, World Water Day, World Earth Day and World Ocean Day). Experienced *ESLes* have been designed to stimulate a meaningful approach and they have turned out to be a teaching method able to promote active citizenship best practice and social responsibility.

The importance of learning lesson from the past to reduce natural disasters in the future has been one of the key aspects that was highlighted during the School- Research interaction.

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## Biography

### **Giovanna Lucia Piangiamore**

Research Scientist at Istituto Nazionale di Geofisica e Vulcanologia. She is a Geologist/Geophysicist with PhD and Master in Geophysics and Scientific Journalism-Institutional Science Communication. She is project leader in Science Outreach and Natural Risk Education projects. She is referent of the MUGED Museum of Durnia (CB) and of Piovono idee! active path of discovery on hydrogeological risk and climate change. She is developer of scientific dissemination products, as the GeoQuest TROPOMAG and Risk detective serious games and video on the geomagnetic field and author of paper both in the scientific field and in didactic-informative experiments (design and management of EAS - Episodes of Situated Learning, geoevents, geoactivity, laboratories, scientific games -team, role and table-, exhibitions, active paths of discovery, ...).

She is responsible of science outreach programs as well as coordinator and co-organizer of scientific outreach venues (Planet week, OpenScience, Science Festivals, European Researchers' Night, ...).

### **Alessandra Maramai**

Senior Researcher at Istituto Nazionale di Geofisica e Vulcanologia (INGV) of Rome, tsunami expert: study of historical tsunamis and tsunami hazard – Design and implementation of the Euro-Mediterranean Tsunami Catalogue (EMTC), of the Italian Tsunami Effects Database (ITED) and of the Adriatic Meteotsunami and Tsunami (DAMT) - Observation and measures of tsunami effects in post-event surveys in the Mediterranean Sea and in the Indian Ocean – Realization of a tsunami hazard map for eastern Sicily and Gargano coasts - Study for the characterization of the coasts of Sicily for the tsunami hazard - Member of the International Tsunami Survey Team - Scientific advisor for educational publications – Responsible of some EU projects in tsunami field - Instructor of training course in some Italian Civil Protection Service projects - Study of Italian historical earthquakes - Post-event field surveys for damaging Italian earthquakes as expert member of the QUEST (Quick Earthquake Survey Team) INGV group.

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## Large-Scale Atmospheric Circulation Modulates *Prosopis nigra* Growth in Subtropical Woodlands of Southeastern South America

**Silvana Sione<sup>1,2</sup>, Ricardo Villalba<sup>3</sup> and Ana Srur<sup>3</sup>**

<sup>1</sup>CICyTTP CONICET, Argentina

<sup>2</sup>Universidad Nacional de Entre Ríos, Argentina

<sup>3</sup>Laboratorio de Dendrocronología e Historia Ambiental IANIGLA-CONICET, Argentina

El Niño-Southern Oscillation (ENSO), the dominant mode of interannual climate variability on a global scale, has a significant impact on the dynamics of forest ecosystems. Precipitation variations in northeastern Argentina are largely modulated by ENSO. We determine the relationships between ENSO and tree growth variations in *Prosopis nigra*, one of the dominant tree species in the subtropical xerophytic forests of northeastern Argentina. Based on 23 cross-sections, we developed a high-quality chronology ( $R_{bar}=0.24$  and  $EPS=0.92$ ). In addition, spatial correlation patterns for both local precipitation and *P. nigra* chronology variations were determined with the 2m ERA5 gridded temperature dataset across the Pacific and eastern Atlantic south of 20°N. July-February precipitation variations at the study site are significantly correlated ( $r=0.51$ ) with sea surface temperature (SST) in the tropical Pacific, specifically with the ENSO 3.4 region (Fig. 1).

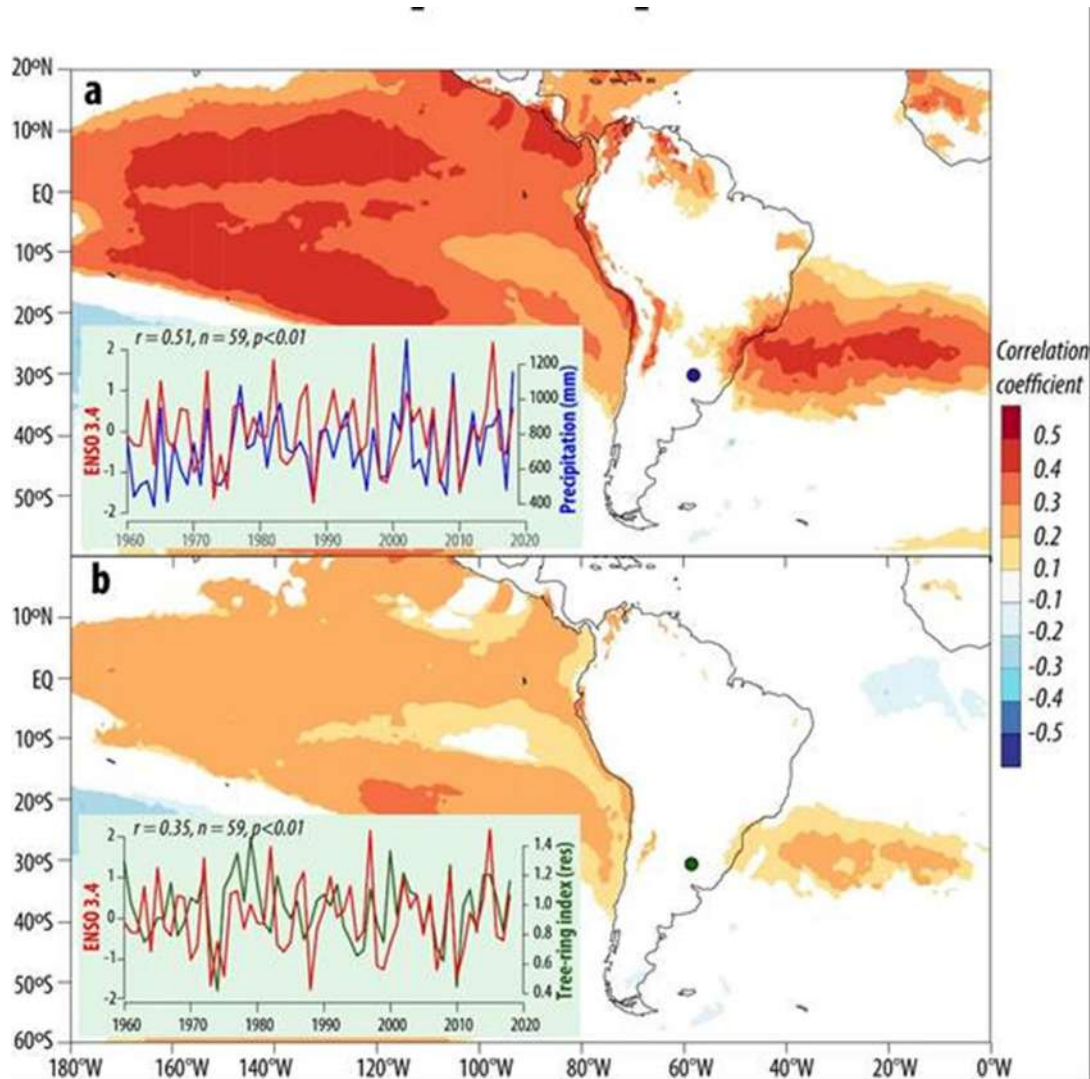
Although less pronounced, there is also a significant correlation between July-February ENSO 3.4 temperatures and *P. nigra* growth ( $r=0.35$ ) over the period 1960-2018. The relationships between tree growth and ENSO 3.4 have strengthened over time, reaching a magnitude comparable to that of July-February precipitation from 1990 to the present ( $r=0.52$  and  $r=0.59$  for precipitation and tree growth, respectively). This increase in the relationship between ENSO 3.4 and growth reflects the close link between local climate and tree growth in recent decades. Our work shows for the first time the strong influence of ENSO 3.4, mediated by changes in local precipitation, on the growth of *P. nigra* in the study region. In addition, the spatial patterns of correlation suggest that both regional precipitation and *P. nigra* growth are also modulated by subtropical Atlantic SSTs in the vicinity of South America (Fig.1). These findings may help to improve our knowledge of the vulnerability of



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xerophytic forests to large-scale atmosphere-ocean variations rooted in the tropical Pacific.



**Figure 1.** Spatial patterns of correlation between T2m surface temperatures from the ERA5 gridded database and precipitation variations at the study site (a), and the *Prosopis nigra* growth (b). Temporal variations in local precipitation and ENSO 3.4 are inset in (a), while temporal variations between the *P. nigra* chronology and ENSO 3.4 are inset in (b). The dot indicates the location of the study site.

## Biography

PhD in Earth and Environmental Sciences (University of A Coruña, Spain). Professor and researcher of National University of Entre Ríos (Argentina). PostDoc at National Scientific and Technical Research Council (CONICET). Most research focuses on ecosystem services, particularly on forest carbon sequestration and management in woodlands of northeastern Argentina. Member of Argentine Forestry Science and Technology Network (REDFORar). Member of the National Observatory of Land Degradation and Desertification (Argentina).

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## Assessing the Impact of Climate Change on Future River Flows using Neural Networks: A Case Study of the Tagus River (Iberian Peninsula)

**Diego Fernández-Nóvoa<sup>1</sup>, Pedro M.M. Soares<sup>2</sup>, Orlando García-Feal<sup>1,3</sup>, Xurxo Costoya<sup>1</sup>, Ricardo M. Trigo<sup>2,4</sup> and Moncho Gómez-Gesteira<sup>1</sup>**

<sup>1</sup>Centro de Investigación Mariña (CIM), Universidade de Vigo, Environmental Physics Laboratory (EPhysLab), Spain

<sup>2</sup>Instituto Dom Luiz (IDL), Faculdade de Ciências, Universidade de Lisboa, Portugal

<sup>3</sup>Water and Environmental Engineering Group, Department of Civil Engineering, Universidade da Coruña, Spain

<sup>4</sup>Departamento de Meteorologia, Universidade Federal do Rio de Janeiro, Brazil

Climate change is significantly altering the hydrological cycle, making it essential to assess the future evolution of river flows, particularly in vulnerable basins. To address this challenge, an innovative methodology, that employs an ensemble of neural networks to estimate river flow based on atmospheric variables, was developed. The Tagus River, whose basin is highly susceptible to both flooding and water scarcity situations, was chosen to apply the developed methodology.

The methodology involves constructing neural networks with varying configurations, and applying specific data processing techniques, such as data bucketing. These neural networks are trained using historical precipitation and temperature records to model the hydrological processes and provide the corresponding river flows. Following a rigorous validation process, a multi-model ensemble is developed using the validated neural networks, which is then supplied with climate model data to derive historical and projected river flows. This procedure enables a comprehensive analysis of past and future river flow trends, with a particular focus on drought and flood events.

Results demonstrate the effectiveness of the neural network approach in hydrological modeling within the Tagus basin. The outcomes reveal a significant intensification of the hydrological cycle under the SSP5-8.5 scenario, with an increase in the occurrence of both water scarcity and flooding events. By the end of the century, available water is projected

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to decrease by approximately 20%, which will be particularly critical during the summer, when dry months are expected to increase by nearly 600%. Additionally, extreme flooding events are expected to become more frequent; for instance, river flows with a current five-year frequency are expected to double at the end of the century.

Finally, it is important to highlight that the developed methodology can be easily adapted to other basins vulnerable to climate change impacts, facilitating its transferability to different contexts and case studies.

## Biography

Diego Fernández-Nóvoa holds a Ph.D. in Marine Sciences, Technology, and Management from the University of Vigo, Spain, where he is currently a postdoctoral researcher in the Environmental Physics Laboratory (EPHysLab) research group. His research focuses on modeling the hydrological cycle, using hydrodynamic numerical models and artificial intelligence techniques. Particular emphasis is placed on extreme hydrological events, such as droughts and floods, across past, present, and future contexts. Techniques for downscaling climate data are also applied to improve projections. A key aspect of his work is understanding and assessing the impacts of climate change on extreme hydrological processes, as well as developing mitigation and adaptation strategies, including early warning systems. He has authored multiple publications in international scientific journals, presented his research at numerous conferences and seminars, and actively collaborate with, and lead, various research projects.

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## Decoding Climate Complexity through a Knowledge Graph Approach to Empower Evidence-based Policymaking



**Vanni Resta<sup>1</sup>, Maria Amata Garito<sup>1</sup>, Andrea Falegnami<sup>1</sup>, Andrea Tomassi<sup>1</sup> and  
Riccardo Valentini<sup>2</sup>**

<sup>1</sup>Uninettuno International Telematic University, Italy

<sup>2</sup>Department of Forest Environment and Resources, University of Tuscia, Italy

Addressing climate change with the urgency it demands requires innovative tools to support evidence-based policymaking. This study presents a knowledge management system that utilizes a semantic knowledge graph to improve access to and comprehension of the Summary for Policymakers (SPM) from the Intergovernmental Panel on Climate Change's Sixth Assessment Report (AR6). The tool is designed to help policymakers navigate the vast and complex body of information by organizing the SPM content into a structured network of nodes and relationships, aligned with the taxonomies developed by IPCC authors. Key concepts are organized hierarchically within an interconnected note system, enabling both strong and weak thematic associations to be explored seamlessly. The findings indicate that this cognitive support system not only preserves the integrity of the original documents but also highlights cross-cutting themes, offering a more holistic view of climate-related issues. It facilitates rapid access to critical information, thereby enhancing the timeliness and scientific grounding of policy decisions. AR6 leaves no doubt about the human causes of climate change and emphasizes the need for immediate and effective action. The proposed tool empowers policymakers to formulate science-based strategies, counter misinformation and denial, and focus efforts on mitigation and adaptation. Furthermore, integrating this system into industrial engineering and related domains can significantly improve the efficiency and effectiveness of climate-responsive decision-making processes, ultimately advancing global sustainability and resilience.

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## Biography

### Vanni Resta

Prof. Vanni Resta is an Italian economist and academic specializing in European funding, project management, and innovation. He currently serves as a Contract Professor at Sapienza University of Rome in the Department of Communication and Social Research and as a European Project Consultant and Professor at Università Telematica Internazionale Uninettuno, where he teaches courses on European funding, green economy, and organizational behaviour. Since 2019, he has also lectured in the Master's program on Europrogettazione e Professioni Europee at Sapienza University.

In addition to his academic work, Prof. Resta has been President of the Fondazione Manlio Resta Onlus since 2008, focusing on research, training, and dissemination in economics and social development. With over three decades of experience, his career spans consultancy, research, and leadership roles in Italy and abroad, with deep expertise in European programs, project evaluation, and economic development.

### Maria Amata Garito

Maria Amata Garito is Professor Emeritus of Psychotechnologies and President and Rector of the International Telematic University UNINETTUNO.

From 1994 to 2013 she worked as full professor of Psychotechnologies at the Psychology Faculty of the University of Rome "La Sapienza" and also at the Sorbonne University in Paris. She was Director General of CATTID (Center for Applications of Television and Technologies of Distance Education) at "La Sapienza" from 1984 to 1990. Expert in technologies and artificial intelligence applied to teaching and learning processes she created:

- In 1991 Consorzio NETTUNO in which she had the role of Director General.
- In 2005 the International Telematic University UNINETTUNO.
- In 2002 for UNESCO, she designed the organizational and psycho-pedagogic model of the Arab Open University in Kuwait.
- In 2009 she designed and realized the new psycho-pedagogic-didactic model to create a video course.
- In 2015 she realized the Distance University for Refugees for free.



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## The History of the Brazilian Sardine (*Sardinella brasiliensis*) between Two Fishery Collapses: An Ecosystem Modeling Approach to Study its Life Cycle

**Rafael Schroeder<sup>1,2</sup> and Alberto Teodorico Correia<sup>2,3</sup>**

<sup>1</sup>Laboratório de Estudos Marinhos Aplicados, Escola Politécnica, Universidade do Vale do Itajaí (UNIVALI), Brazil

<sup>2</sup>Centro Interdisciplinar de Investigação Marinha e Ambiental (CIIMAR), Terminal de Cruzeiros do Porto de Leixões, Avenida General Norton de Matos S/N, Portugal

<sup>3</sup>Instituto de Ciências Biomédicas Abel Salazar (ICBAS), Universidade do Porto (UP), Portugal

The inter-annual fluctuations of abundance of the Brazilian sardine (*Sardinella brasiliensis*) during the last decades have deeply modified the purse seine fishery dynamics. This study evaluates the trophic relationships of the main species exploited by this fishery and the importance of its biomass for the southeast-south Brazil marine ecosystem (22° S–34° S). Data were analyzed using a mass balance model (ECOPATH) between the two fishery collapses: 2000 and 2017. From 2000 onwards, the sardine fishery adopted a multi-species character. The mean trophic level of the catches (MTL) showed a decreasing trend until 2008, when more modern vessels with greater autonomy entered the fishery and expanded the traditional fishing area to exploit northern fishing grounds. The MTL in the expanded fishing area suddenly increased and was characterized by high biomass of the Brazilian sardine and other species, with a high biomass and high ecotrophic impact, falling again to the lowest level in 2016. The model evidenced high estimates for fishing mortality, natural mortality, and flow to detritus between 2008 and 2016, when sardine fishing collapsed. During this period, a sharp drop in the primary production required to sustain the catches from 2012 onwards accompanied a significant fall in the biomass accumulation rate. This pattern was coincidental with the increasing mean temperature of the catches, which was probably acting as a limiting factor for the primary production, resulting in a higher natural mortality and flow to detritus. Furthermore, the higher fishing mortality may have led the stock to collapse.



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## Biography

Rafael Schroeder is a researcher at the Universidade do Vale do Itajaí. He is an oceanographer and holds a PhD in Environmental Science and Technology. Research interests include assessing the impact of fishing on fishery resources, including approaches to structural, morphological, and chemical signatures of otoliths to study population structure, migration patterns, and habitat connectivity in fish. His recent research interests focus on the impact of climate change on the life cycle and dynamics of fish stocks.

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## Digital Transformation: Patents as a Determinant Proxy for Industry 4.0

**Luciana Peixoto Santa Rita<sup>1</sup>, Joaquim Alexandre Ramos da Silva<sup>2</sup>, Silvia Beger Uchoa<sup>1</sup>, Ibsen Mateus Bittencourt Santana Pinto<sup>1</sup> and Jovino Pinto Filho<sup>1</sup>**

<sup>1</sup>Universidade Federal de Alagoas (UFAL), Brazil

<sup>2</sup>Universidade de Lisboa (ULisboa), Portugal

This study aims to analyze the patent indicators filed between 2008 and 2022 in the context of digital transformation in industries in Brazil and Portugal, seeking to understand the changes driven by the Fourth Industrial Revolution (4IR). The methodology used is descriptive and applied in nature, based on documentary research and access to bibliographic databases, as well as the legal protection institutes in both countries, in addition to the Questel Orbit Intelligence database. The originality of the study lies in the fact that the specific technologies that make up the 4IR, when analyzed on a large scale in the field of information systems, are less available in management studies, and the research also stands out by comparing two developing countries in terms of patents. The main results reveal that, albeit unevenly, Brazil and Portugal have participated in the development of enabling technologies in the context of digital transformation. Despite technological gaps, both countries have increased patent filings, but to a lesser extent than developed countries. The study contributes methodologically by applying comparative analysis to the literature on patents and Industry 4.0. Theoretically, it includes digital transformation in the joint analysis of patents and industrial structure. From a social and management perspective, the study proposes a diagnosis capable of reducing the gap between creators and users of Industry 4.0 technologies, which will make it possible to overcome technological gaps and encourage the adoption of new technologies and the development of associated skills, potentially generating positive impacts on society, such as job creation, increased competitiveness of

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the countries involved, as well as industrial and innovation policies in both countries.

## Biography

Luciana Peixoto Santa Rita is a Full Professor at the Federal University of Alagoas (UFAL), working in the Faculty of Economics, Business Administration, and Accounting. She holds a degree in Economics from UFAL (1993) and in Law from the Centro de enter for Higher Studies of Maceió (1994). She completed her master's degree (1999) and Ph.D. (2004) in Administration at UFAL and the University of São Paulo (USP), respectively. She conducted postdoctoral research in Industry 4.0 and Technology at the Lisbon School of Economics and Management at the University of Lisbon. Since 2006, she has been working as a consultant and researcher at the Federation of Industries of the State of Alagoas (FIEA), responsible for research on industrial, sectoral, and competitiveness indicators. She is also the coordinator of the National Public Administration Graduate Program. Her research covers topics such as innovation systems, public policies, competitiveness, Industry 4.0, industrial policy, innovation policy, technological profiles, and industrial research. She has published over 100 articles in national and international journals.

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## The Effects of Increasing Ambient Temperature and Sea Surface Temperature due to Global Warming on Combined Cycle Power Plant

**Ali Osman Büyükköse<sup>1</sup> and Asiye Aslan<sup>2</sup>**

<sup>1</sup>Enerjisa Enerji Üretim Inc., Turkey

<sup>2</sup>Electricity and Energy Department, Gonen Vocational School, Bandırma Onyedi Eylül University, Turkey

The critical consequence of climate change due to global warming is the rise in temperature. In combined cycle power plants (CCPPs), Electric Power Output (PE) is influenced by Ambient Temperature (AT) and Sea Surface Temperature (SST), especially in seawater-cooled plants. Higher AT reduces air density, decreasing the mass of air entering the gas turbine, altering the fuel-air mixture, and lowering turbine power. Higher SST reduces cooling efficiency, causing condenser vacuum loss, which decreases the steam expansion ratio and Steam Turbine Power Output. This study investigates the impact of AT and SST increases on PE using regression methods, Artificial Neural Networks (ANNs), and a hybrid LightGBM + DNN model. Target variables are condenser vacuum (V), Steam Turbine Power Output (ST Power Output), and PE. V was modeled with SST, AT, and ST Power Output as inputs; ST Power Output with V, SST, AT, and relative humidity (RH); and PE with V, SST, AT, RH, and atmospheric pressure (AP) on an hourly basis. Performance was evaluated using  $R^2$ , MAE, MAPE, MSE, and RMSE. The hybrid model achieved the best MAE values for V, ST Power Output, and PE: 0.00051, 1.0490, and 2.1942, respectively. A 1 °C rise in AT decreases plant output by 4.04681 MWh. A 1 °C rise in SST causes up to 0.001836 bara vacuum loss, reducing ST Power Output by 0.6426 MWh. Considering generator efficiency and other losses, total reductions in ST Power Output and PE are 0.7269 MWh and 0.7642 MWh. The combined effect of a 1 °C rise in AT and SST results in a 4.8110 MWh PE loss. To offset this with an average-efficiency natural gas, imported coal, or lignite power plant would emit approximately 610, 11,184, and 19,913 tCO<sub>2</sub>e, respectively.

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## Biography

Ali Osman Büyükköse graduated in 2000 from Marmara University, Department of Mechanical Teaching, earning the title of Technical Teacher. He completed his Mechanical Engineering degree at Balıkesir University in 2018, followed by a Master's degree with thesis in Alternative Energy Sources at Bandırma Onyedİ Eylül University's Gönen Geothermal Institute.

He began his professional career in 2003 at Enerjisa Enerji Üretim A.Ş., working in operation and maintenance at various power plants, including Kentsa, Mersin, Bandırma-1, and Bandırma-2 Natural Gas Combined Cycle Power Plants. Over his 22-year career, he has held roles such as Control Room Operator, Shift Supervisor, Operations Engineer, and Performance Monitoring & Reporting Specialist.

Since 2024, he has been serving as Deputy Manager of Reliability and Integrity and Energy Manager for NGCCPPs, focusing on efficiency improvement projects, process safety, HAZOP, change management, and technical risk assessments.

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## From Kitchen and Farm Waste to Sustainable Textiles: Valorizing Onion Peels and Local Sheep Wool in Eco- Friendly Fabric Production

**Diana Tuulik**

TTK University of Applied Sciences, Estonia Tallinn University of Technology, Estonia

The textile industry is under increasing pressure to adopt sustainable practices and reduce its environmental footprint. These studies explore the valorization of two underutilized waste streams—onion peels from the food industry and local sheep wool from the meat production—for the development of eco-friendly textile materials. The use of onion peels (*Allium cepa*) as a natural dye for cellulose-based textiles was investigated. Dyeing was performed on cotton, linen, and cotton/linen blends, with and without aluminum mordant pretreatment. Colour fastness to rubbing, perspiration, washing, and light was assessed in accordance with ISO standards. The results indicate that the extract, which is rich in tannins, imparts a warm golden hue, with improved fastness properties observed when alum mordant is applied.

The second study explores the potential of locally sourced Estonian sheep wool—often treated as a low-value by-product—to be repurposed into high-quality outerwear fabrics suitable for small-scale textile production. Wool from various sheep breeds was characterized, spun, and woven into fabric samples. The resulting textiles were evaluated for key performance properties to inform future product development and support value-added use of regional wool resources.

Together, these approaches demonstrate a circular model for textile production that leverages local, biodegradable waste materials. The findings support the transition toward low-impact, culturally rooted textile practices and offer scalable solutions for rural economies and sustainable fashion.



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## Biography

Diana Tuulik is a respected lecturer and textile researcher with over 20 years of experience in textile materials. She holds degrees in textile technology and business management, and has collaborated with several higher education institutions in Estonia. In addition to her academic work, she has provided training and consultancy services to manufacturing and commercial enterprises, with a focus on sustainable material use and eco-design. Diana actively engages with local craftsmen, farmers, and designers to promote circular economy principles. Her research combines traditional textile knowledge with contemporary sustainability practices, contributing to the development of environmentally friendly textile solutions.

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## Competitive Immobilisation of Heavy Metals using *Chrysopogon Zizanioides* from Multi- Metal Contaminated Soil

**Sobha Cyrus**

Cochin University of Science and Technology, India

Soil contamination with heavy metals is widely regarded as a major environmental challenge due to the persistent and non-degradable nature of these pollutants. Among various methods, the in-situ immobilization of heavy metals has gained significant attention as an effective strategy for addressing soil contamination. Numerous studies have demonstrated the potential of different materials to immobilize heavy metals, thus reducing their bioavailability and phyto-availability in contaminated soils. This research focused on evaluating the effectiveness of vetiver root micro powder (VRMP) in immobilizing heavy metals in soils contaminated with multiple metals- lead (Pb), cadmium (Cd), and chromium (Cr). To assess the mobility of these metals, a series of experiments, including batch studies, column leachate tests, and pot leachate trials, were conducted. The addition of VRMP to the contaminated soil resulted in an increase in pH, which in turn reduced the mobility of the heavy metals. Different proportions of VRMP (0%, 1%, 5%, and 10%) were used to determine the optimal dosage for effective remediation. The results showed that the soil treated with 10% VRMP exhibited the highest immobilization efficiency in the multi metal contaminated soils. This study proposes a green, eco-friendly solution for remediating soils contaminated by heavy metals.

### Biography

Dr. Sobha Cyrus is a passionate teacher and researcher in Geotechnical Engineering with over three decades of academic and administrative experience. Highly dedicated and technically sound, she has served as Principal and has guided numerous students in advancing their careers in civil engineering. Her research focuses on geotechnical and geo-environmental engineering, with significant contributions in areas such as soil behavior, groundwater quality, rainwater harvesting, and sustainable materials. She has authored several peer-reviewed publications in reputed journals, including Biomass Conversion and Biorefinery, Environmental Monitoring and Assessment, and Geotechnical and Geological Engineering. She has actively participated in and presented at national and international conferences, while also coordinating and attending several Faculty Development Programs and Short Term Training Programme to enhance academic excellence. A life member of ISTE and the Indian Geotechnical Society, she remains committed to advancing knowledge, promoting sustainable practices, and inspiring the next generation of engineers.

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## Analysis and Prediction of Land Cover Changes in Sinaloa's Coastal Zone, Gulf of California using Remote Sensing and GIS

**Felipe-Omar Tapia Silva** and **David A. González-Rivas**

Universidad Autónoma Metropolitana, México

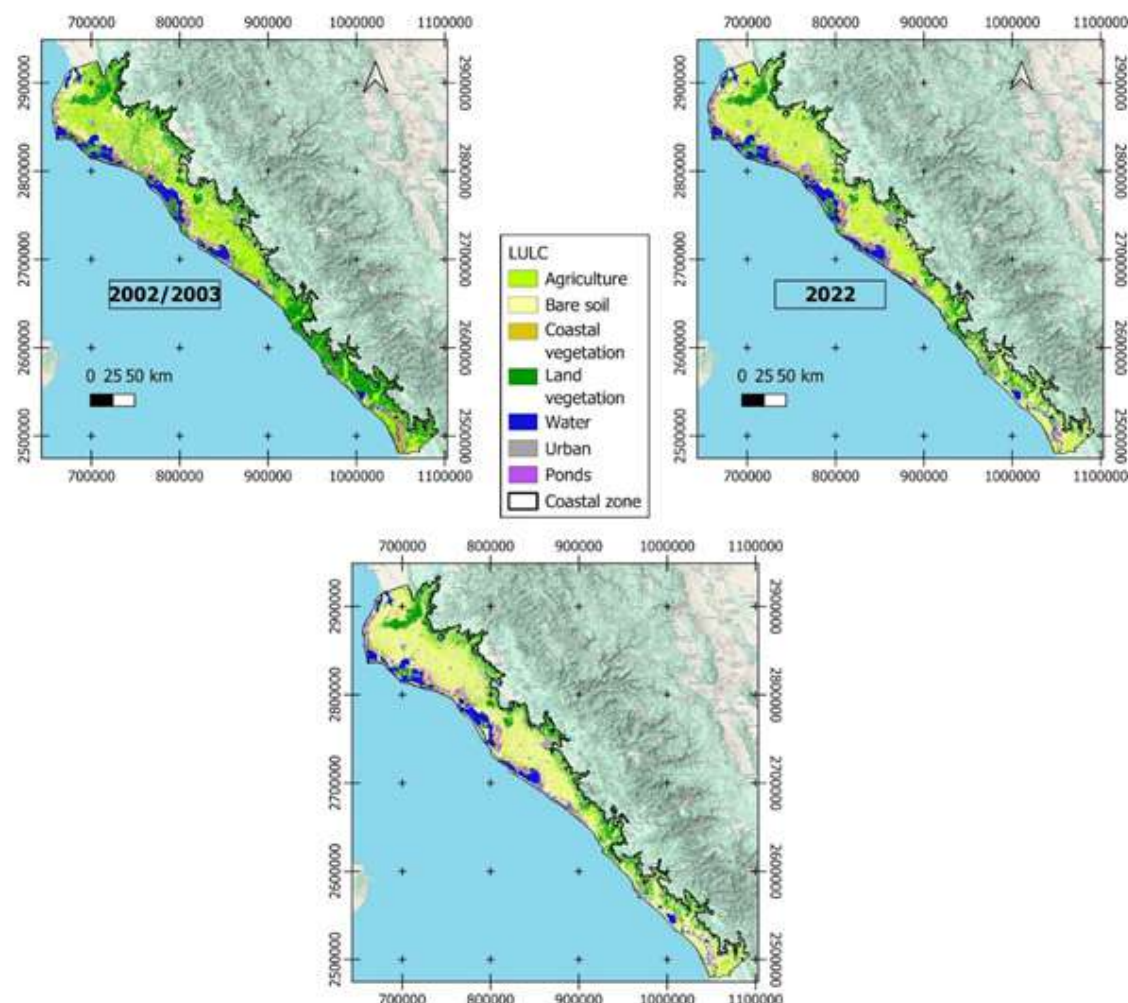
Coastal zones deliver critical ecosystem services yet experience compounding anthropogenic pressures and global change impacts. This study analyzes and contextualizes the ecological implications of Land Use/Land Cover (LULC) changes along the coast of Sinaloa, Mexico, from 2002/2003 to 2022 using Landsat 5 and 8 image classification. Random Forest (RF) classification was implemented on the Google Earth Engine platform. Results were validated following Olofsson et al. () and Pontius & Santacruz (2014). Subsequently, a predictive LULC change model for 2022–2040 was generated and validated using neural networks in QGIS with MOLUSCE. Key findings (see Table 1 and figure 1) revealed that between 2002/2003 and 2022: Shrimp farms expanded by 123% and urban areas by 111.7%; coastal vegetation declined by 44%, primarily converted to bare soil (26.5%) and agriculture (7.8%); terrestrial vegetation decreased by 39.8%, transitioning mainly to bare soil (36.9%) and agriculture (12.5%). Projections for 2022–2040 indicate: a 36.7% increase in bare soil, a 44% reduction in coastal vegetation, and a slight decline in aquaculture farms (2.7%). These results suggest an ongoing process of bare soil expansion, potentially linked to climate change-induced desertification. Anthropogenic covers (e.g., ponds) appear to be approaching expansion limits following intense recent growth. We concluded that LULC changes over the past two decades—verified through satellite imagery analysis—have altered the region's ecological functionality. However, the 2040 predicted values require further validation using alternative predictive models to better assess the predicted changes.

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**Table 1.** Detected 2002/03-2040 LULC changes and predicted 2022-2040 changes for the coastal zone of Sinaloa Mexico.

|                    | 2003   | 2022    | 2040    | $\Delta$ (2002/03-2022) in ha | $\Delta$ (2002/03-2022) in % | $\Delta$ (2022-2040) in ha | $\Delta$ (2022-2040) in % |
|--------------------|--------|---------|---------|-------------------------------|------------------------------|----------------------------|---------------------------|
| Agriculture        | 630665 | 572939  | 267643  | -57725                        | -9.15                        | -305297                    | -53.29                    |
| Bare soil          | 677867 | 1041609 | 1423649 | 363742                        | 53.66                        | 382040                     | 36.68                     |
| Coastal vegetation | 125072 | 69959   | 39101   | -55113                        | -44.06                       | -30858                     | -44.11                    |
| Land vegetation    | 831450 | 500521  | 473530  | -330929                       | -39.8                        | -26991                     | -5.39                     |
| Water              | 222147 | 219330  | 219640  | -2817                         | -1.27                        | 310                        | 0.14                      |
| Urban              | 27830  | 58915   | 42225   | 31085                         | 111.69                       | -16690                     | -28.33                    |
| Ponds              | 41921  | 93679   | 91166   | 51758                         | 123.46                       | -2514                      | -2.68                     |



**Figure.** Maps of detected 2002/03-2040 LULC changes and predicted 2022-2040 changes for the coastal zone of Sinaloa Mexico.

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Dr. Tapia's research focuses on the application of Geographic Information Systems (GIS), Spatial Analysis, and Remote Sensing (RS) to model aspects of water and other natural resources. He earned his doctoral degree in 2002 from the Humboldt University of Berlin's Institute for Urban and Rural Ecological Projects in Germany. He has held postdoctoral positions at Texas State University in San Marcos, Texas; the German Research Centre for Geosciences (GFZ) in Potsdam, Germany; and CentroGeo in Mexico City. He has published articles on the application of disciplines such as GIS, RS, and spatial analysis to address water-related issues in rural and urban areas. He has supervised and advised Master's and Ph.D. theses in Applied Geomatics. For the past decade, he has coordinated and taught the Certificate Program in GIS and Remote Sensing with an emphasis on open-source software. Currently, he holds Level 1 status in Mexico's National System of Researchers (SNI).

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## Radial Growth of *Prosopis affinis* and its Relationship with Soil Water Content in Subtropical Woodlands of Argentina

**Marcelo Wilson<sup>1</sup>, Silvana Sione<sup>2,3</sup>, Ricardo Villalba<sup>3</sup>, Ana Srur<sup>3</sup> and Silvia Ledesma<sup>2</sup>**

<sup>1</sup>Instituto Nacional de Tecnología Agropecuaria EEA Paraná/CONICET, Argentina

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<sup>3</sup>Laboratorio de Dendrocronología e Historia Ambiental IANIGLA-CONICET, Argentina

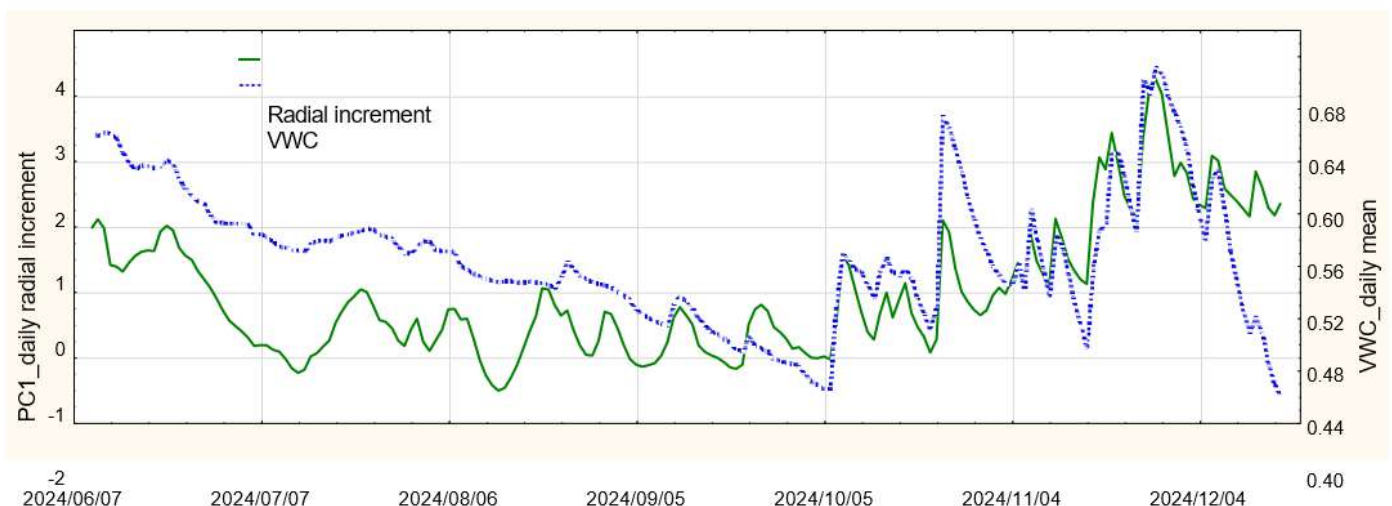
The physiological processes that modulate tree growth are influenced by environmental factors. Water availability is one of the most important growth limiting factors in many subtropical regions. In this work, we analyzed the variation of radial growth of *Prosopis affinis* and its relationship with soil volumetric water content (SWC) in a subtropical semi-xerophytic forest in northeastern Argentina. The study site has soils with a high content of montmorillonite-type clays and therefore high-water retention. Point dendrometers were installed in 6 individuals to record variations in radial growth, complemented by temperature and SWC records. The high resolution of the dendrometric and environmental records (every 15 min) allowed a direct evaluation of the relationship between growth and environmental conditions. In the period June-December 2024 (winter-spring), the 6 individuals showed a similar growth pattern, with a high percentage of common variance in radial increment among the trees (76% common variance in daily growth, Fig. 1). At the beginning of the study period, the soil was under saturated conditions (VWC = 0.62 v/v). We found a slightly decreasing trend of radial increment from the beginning of June to mid-October, accompanying the decrease in VWC. The trend of radial increment remains positive from mid-October to early December, after which radial increment stabilizes or shows a negative trend in some individuals. Variations in tree growth are strongly related to VWC ( $r = 0.60$ ,  $p = 0.001$ ,  $n = 191$ ). This relationship is even stronger ( $r = 0.70$ ,  $p = 0.001$ ,  $n = 81$  days) when the period from the beginning of growth in mid-October is considered (Fig. 1). The shift from a variable but smoothed decreasing pattern to a more variable and saw-like ascending pattern is related to the different intensities of the daily hydration-dehydration cycle occurring in the



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trees. Although each radial oscillation resulting from daily hydration-dehydration appears to respect a well-defined pattern of temporal variation, variations in the magnitude of the hydration-dehydration processes are highly variable from day to day. These variations are very pronounced in most of the individuals studied, reaching, in some of the trees, daily hydrations ranging from 15 to more than 200 microns. These variations seem to be strongly influenced by the hydroclimatic conditions. The highest hydration events correspond to increases in VWC as a result of rainfall at the site. Conversely, more pronounced dehydrations are associated with low VWC values and high soil temperatures, resulting in higher evapotranspiration and water loss. Changes in the magnitude of the dendrometric data could be used to evaluate temporal variations and analyze them until (irreversible) growth data are obtained and related to hydroclimatic conditions. Although the growth series presented here correspond to a short period of time, they provide evidence for the strong dependence of radial tree growth on VWC in clay soils of semi-xerophytic subtropical forests.



**Fig. 1.** Comparison between daily variations in radial increment of 6 individuals of *Prosopis affinis* (represented as PC1 of radial growth of the 6 trees) and variations in soil moisture content (VWC).

## Biography

PhD in Earth and Environmental Sciences (University of A Coruña, Spain). Head of the Department of Natural Resources and Environmental Management (INTA EEA Paraná). PostDoc in agro-environmental monitoring, with a focus on the Land Degradation Neutrality (LDN) and selection of appropriate sustainable land management (SLM) practices for local and regional implementation. Representative for INTA in the Directory of the National Observatory of Land Degradation and Desertification (Argentina). Member of Argentine Forestry Science and Technology Network (REDFORar) and Commission of Soil Sciences and Land Use Planning of the Argentinean Federation of Agronomists Engineers.

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## Sustainable Concrete with Artificial Aggregates Coming From Waste Pelletization

**Valeria Corinaldesi**

Università Politecnica delle Marche, Italy

The use of artificial aggregates manufactured from waste and by-product materials, as an alternative to natural aggregate, has attracted considerable research interest. Extensive research has been conducted to pre-process or pre-treat different source of wastes to be used as raw materials for artificial aggregates (AAs) production. In this experimental work artificial aggregates have been manufactured by means of cold-bonding granulation. Cold-bonding pelletization is carried out through a rotating plate device allowing the formation of pelletized aggregates from waste materials through gravitational and centrifugal forces. In addition to traditional single step cold bonding granulation, a double pelletization was carried out to reach AAs with improved properties. In the one- step pelletization the waste is incorporated within the binding matrix, while in the two-step pelletization, a second incapsulation is made in order to obtain AAs embedded within an outer shell likely able to improve their physical properties.

Several concrete mixtures were designed by alternatively adding either single-bond AAs or double- bond AAs at different dosages (0% - 10% - 20% and 30% replacement by weight of aggregate). Then, several Artificial Aggregate Concretes (AACs) specimens were manufactured in order to characterize fresh concrete rheological behaviour as well as hardened concrete mechanical and physical properties. In detail, besides to fresh consistency tests, density evaluations were carried out at fresh and hardened state; compression, indirect tensile and bending tests were performed at both early age and long term. All AACs, including those prepared with 30% double-bond pelletization, achieved adequate mechanical performances for structural use in building.

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## Biography

Dr. Valeria Corinaldesi received her Ms. Degree in Civil Engineering at the University of Ancona (Italy) in 1998 then a Ph.D. in Materials' Engineering at the University of Bologna (Italy) in 2002. She is Full Professor of Materials Science and Technology at the Università Politecnica delle Marche since 2018. She is co- author of more than 300 publications mainly on peer-reviewed international journals and conference proceedings and co-inventor of 2 national patents and inventor of one European patent (EP). Her overall scientific production received more than 6000 citations with H-index of 42, Researcher ID 8117205500, Orcid code: 0000-0001-9372-5032.

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## Enhancing Properties of Coconut Shell Aggregate Concrete using Pre-Treated Coconut Shell Aggregates

**Deepa Balakrishnan S<sup>1</sup> and Sujatha A<sup>2</sup>**

<sup>1</sup>Professor, School of Engineering, Cochin University of Science and Technology, India

<sup>2</sup>Research Scholar, School of Engineering, Cochin University of Science and Technology, India

As sustainable construction practices gain emphasis, coconut shells have emerged as a promising bio-based lightweight aggregate, providing an eco-friendly alternative to conventional materials. Abundant in regions like India, coconut shells offer significant potential for producing lightweight concrete capable of achieving structural-grade strength when properly pre-treated. This study focuses on enhancing the properties of coconut shell aggregate concrete using treated coconut shell aggregates, which involve grout coating followed by heat treatment. Concrete specimens were prepared using pre-treated coconut shell aggregates and evaluated for key durability and performance parameters, including water absorption, sorptivity, rapid chloride penetration, and resistance to elevated temperatures. The experimental results demonstrated that the pre-treatment significantly reduced the water absorption and sorptivity of the concrete, indicating improved impermeability. Furthermore, enhanced resistance to chloride ion penetration was observed, suggesting better durability against aggressive environmental conditions. The pre-treated aggregates also contributed to improved thermal stability of the concrete under elevated temperatures. Overall, the pre-treatment of coconut shell aggregates proved to be an effective method for improving the strength and durability characteristics of coconut shell aggregate concrete. This approach not only increases the reliability and service life of concrete made with bio-based aggregates but also supports sustainable construction practices by utilizing agricultural waste materials efficiently. The findings highlight the potential of grout-coated and heat-treated coconut shells as a viable, eco-friendly solution for producing durable lightweight concrete suitable for structural applications.

### Biography

With over 29 years of experience in civil and structural engineering, she is currently Professor and Head of

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Civil Engineering Department, at Cochin University of Science and Technology, a leading technical university in India. She is a Fellow of the Institution of Engineers India and a member of Indian Society for Technical Education, Indian Concrete Institute and Indian Society of Earthquake Technology. She has a strong engineering background and an MTech and PhD in Civil and Structural Engineering from CUSAT, Kerala, India. Apart from teaching and research, she has undertaken many structural consultancy works across Kerala and offered solutions for many challenging situations as their technical consultant. She has acted as a member of the audit teams for agencies like AICTE and universities for evaluating the technical education institutions for their approval. Her research interests are in the areas of Interaction studies on structures, and Development and studies on special concrete.

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## Application of Geophysical Techniques to Identify the Causes of Instability in Roadways Built on Conductive Ground (Fez region, Morocco)

**A. Benamara<sup>1</sup>, I. Salhi<sup>1</sup>, K. Krami<sup>1</sup>, I. Sebbani<sup>1</sup>, R. Ajana<sup>1</sup>, A. Hamidi<sup>1</sup>, S. Ben Abbou<sup>1</sup>, M. Radouan<sup>1</sup>, L. Tarik<sup>2</sup> and I. Dakir<sup>3</sup>**

<sup>1</sup>Department of Engineering Mechanics and Structures, Civil Engineering and Geo-environment Team, National School of Arts and Crafts, University of Moulay Ismail, Morocco

<sup>2</sup>Department of Geology, Faculty of Science and Technology, University of Moulay Ismail, Morocco

<sup>3</sup>Department of Geology, Faculty of Science, Choib Dokkali University, Morocco

In geotechnics, there are many applications in which the problems of structural contact dynamics are involved. Indeed, ground movements have become very threatening for constructible soils and road constructions. Due to the importance of the problem and in order to improve the understanding of ground movements, numerous works and considerable efforts have been deployed and have contributed to obtaining encouraging results, particularly for areas reserved for urban construction, despite the complexity of the prospected terrains. Currently, the coupling of geophysics with geotechnics constitutes the most appropriate procedure for characterizing the dynamics of these movements. Many studies have focused in this direction by diversifying the applications of geophysical techniques in order to identify anomalies relating to the deterioration of roadways and collapses of developed land.

In order to identify areas at risk of ground movement and to properly diagnose the pathology of road degradation, we undertook a geophysical study using electrical tomography coupled with electromagnetic techniques to characterize the quality of roadways laid in conductive and poor quality environments. This work aims not only to identify the causes of the deterioration of these routes, but also to provide sufficiently useful information that can be used to enrich the geotechnical analysis in the case of construction projects, on which planning services must rely before any construction. The study area is marked by the presence of geological formations of a mainly marly nature, with structural contacts hidden at depth and whose configuration is mainly uneven, which favors the instability of



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the land in place where sliding and subsidence phenomena are frequently encountered.

## Biography

Adresse: Department of Engineering Mechanics and Structures, Civil Engineering Unit, National Higher School of Arts and Crafts Meknes.

Currently, Professor of Higher Education in Applied Geophysics in ENSAM of Meknes,

Expert in Geophysics with many design office and for the National organizations.

For the field of activity, it mainly concerns the water search and mineral prospecting sector using geophysical methods, and also the civil engineering and geotechnical sectors.

For scientific research, he is a member of the Laboratory and Supervisor of several End of Study Projects for engineering students and for Master's students in the Faculty of Science and Technology of Errachidia.

Supervisor of several theses in Morocco currently Thesis Director for 6 Students in ENSAM of Meknes, University of Moulay Ismail).

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## Numerical Modeling of Non-Equilibrium Model for Sediment Transport in Vegetated Channels by Roe Scheme

**S. Jelti and A. Serghini**

ESTN of Mohammed First University, Morocco

This work presents sediment transport over mobile bed in vegetated channels. The mathematical model is a combination of the shallow water for water-sediment mixture, the transport diffusion and the bed morphology change equations, drag forces induced by vegetation present on the bottom of natural channels. The mathematical model is solved by the finite volume Roe scheme, associated with a right and a left treatment of the source term. It is obvious that vegetation can markedly affect the fluvial process in streams or natural rivers; therefore it is necessary to identify and quantify this effect. The method is applied on different test cases with the aim to highlight the effects of vegetation on flow and sediment transport, as well as the performance of the mathematical model and the numerical scheme in use. The obtained results show that the presence of vegetation has significant effects on sediment transports.

### Biography

Sanae JELTI is a professor at higher school of technology Nador at Mohammed first university, specialized in hydraulic and civil engineering. She obtained her Master's in Environmental and Civil Engineering in 2012 and her Ph.D. in Fluid Mechanics in 2020. Jelti's research focuses on the numerical modeling of fluid flows and sediment transport in various environmental and engineering applications. Her work aims to better understand fluid behavior for improved water resource management and sustainable infrastructure design. She teaches hydraulic and civil engineering courses at higher school of technology Nador.

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## Environmental Sustainability of Fast-Moving Consumer Goods Companies in Nigeria: The Role of Green Logistics Practices

**Jude C. Nwaulune and Ajike Emmanuel O**

Department of Business Administration and Marketing, School of Management Sciences,  
Babcock University, Nigeria

Environmental sustainability has become a critical focus for modern organizations, particularly due to the heavy dependence on fossil fuels and non-renewable energy sources in long-term logistics operations. The environmental degradation caused by transportation activities, especially through the use of heavy-duty vehicles, has raised significant concerns regarding air, land, and water pollution. In response to these challenges, this study examines the relationship between green logistics practices and the environmental sustainability of fast-moving consumer goods (FMCG) companies in Nigeria. This investigation is timely, considering the global shift toward sustainable business practices and the increasing integration of environmental concerns into corporate logistics strategies, particularly in the FMCG sector. Previous research suggests that many FMCG firms struggle with environmental sustainability due to the limited incorporation of green logistics into their operational models. This study aims to bridge that gap. A survey research design was employed, and data were collected through structured questionnaires distributed using a simple random sampling technique. Of the 519 questionnaires administered, 502 were returned, representing a response rate of 96.7%. The collected data were analysed using both descriptive and inferential statistical tools. The results revealed a statistically significant relationship between green logistics practices and environmental sustainability ( $Adj. R^2 = 0.017$ ;  $F(4, 480) = 323.087$ ,  $p < 0.05$ ). Based on these findings, the study concludes that green logistics practices contribute positively to the environmental sustainability of FMCG firms in Nigeria. Consequently, it is recommended that FMCG companies adopt a more holistic sustainability strategy that fully integrates green logistics practices to enhance their long-term environmental performance.

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## Biography

Dr. Jude Nwaulune, PhD, is a leader and researcher in the oil and gas industry, based in Nigeria, and currently serves as the Managing Director of Rainoil Logistics Services Limited, a subsidiary of Rainoil Group. Jude holds a Postgraduate Diploma, Master's, and Doctorate in Business Administration, Journalism, Marketing Communications, and Strategic Marketing Management. He also holds Professional memberships in the Chartered Institute of Personnel Management of Nigeria, the National Institute of Marketing of Nigeria, the Nigerian Institute of Management, the Nigerian Institute of Public Relations, Advertising Regulatory Council of Nigeria, and the Nigerian Institute of Training and Development. Jude is a Green Scholar and has published several articles in both local and international journals and authored three books on Celebrity Endorsement, Brand Management, and Green Logistics. Jude enjoys reading, writing, and playing Golf.

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## Juggling between Economic Growth and Tourism Sustainability: A Tale of Ladakh's Journey

**Ishika Jaiswal**

Faculty of Economics, Indian Institute of Management Sambalpur, India

The tourism sector in the Indian Himalayan Region (IHR) has undergone significant expansion and diversification in recent decades, making it a leading contributor to India's economic growth as the sector is anticipated to have an average annual growth rate of 7.9% from 2013 to 2023. However, the environmental impact of expanding tourism questions its sustainability. The Ladakh region stands at a crossroads, grappling with the repercussions of mass tourism and an oversight of carrying capacity in its development. This has triggered apprehensions among policymakers, residents, and visitors alike. While Ladakh boasts tourism potential, there is a growing acknowledgment that the trajectory of tourism development must shift towards sustainability. Addressing the concerns and risks associated with tourism development in Ladakh necessitates a multifaceted approach. In essence, Ladakh's challenge lies in transforming its tourism landscape into a model that not only reaps economic benefits but also safeguards its ecological and cultural treasures, ensuring a harmonious coexistence between hosts and visitors. Therefore, policy crevices should be analyzed but comprehensively, master plans should be rolled out but strategically, climate change challenges should be tackled but cautiously and actions should be taken but inclusively so that Ladakh's beautiful landscapes, spectacular beauty, and breathtaking experiences can be enjoyed forever *via* maintaining ecological balance, adopting sustainable tourism practices, and synchronizing the stakeholders with customized needs of the region.

### Biography

Dr. Ishika Jaiswal is an Assistant Professor in Economics at the Indian Institute of Management (IIM) Sambalpur. She holds a doctorate in applied economics from the University of Lucknow. Her research areas include Labor Economics, Emerging Issues in the Indian Economy, Behavioural Economics and Sustainability. She has co-authored a textbook titled "Indian Economy" and authored a research book titled "Demographic

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Transition in Major Indian States". She actively publishes research papers in several national and international journals and has presented her work in various conferences and doctoral colloquiums at reputed institutions like IISc Bengaluru, IBS Hyderabad, IIM Nagpur and alike. She has presented papers at international conferences, as well, in India's neighbouring nations like Nepal and Bangladesh. She is also associated with several reputed journals as a reviewer.



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## Spontaneous Formation of Evolutionary Game Strategies for Long- Term Carbon Emission Reduction Based on Low- Carbon Trading Mechanism

**Zhanggen Zhu<sup>1</sup>, Lefeng Cheng<sup>2</sup> and Teng Shen<sup>2</sup>**

<sup>1</sup>School of Mathematics and Information Science, Guangzhou University, China

<sup>2</sup>School of Mechanical and Electrical Engineering, Guangzhou University, China

This research focuses on exploring the strategic interactions among local governments, power grid enterprises, and market regulators in long - term carbon emission reduction.

In China, where coal - based power generation leads to high carbon emissions, we apply evolutionary game theory. We first build a two - group evolutionary game model between the government and power enterprises, and then develop it into a three - party model with third - party regulators.

The results show that in the two - party game, the equilibrium is affected by factors like enterprises' production cost - benefits and government regulatory costs, and an ideal stable state is hard to reach without third - party regulation. In the three - party game, when power enterprises' low - carbon production benefits exceed costs (excluding carbon trading costs), the government's fine revenue exceeds regulatory costs, and third - party regulators' supervision benefits exceed costs, power enterprises will choose low - carbon production, the government will regulate, and third - party regulators will supervise.

In conclusion, our research supports government regulation in relevant markets. The government should adjust carbon trading policies, strengthen third - party supervision, and support enterprises' low - carbon innovation for a win - win in environmental protection and economic development.

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## Biography

Zhu Zhanggen, a master of mechanical engineering from Guangzhou University, focuses his research on theoretical mathematics, robotics, artificial intelligence, computer graphics, and other fields. During his master's program, he participated in the research on the "Transient Transport Mechanism of Droplets in CD - like Microfluidic Chips". In terms of academic publications, he has published numerous papers in domestic and international journals such as the Journal of Micromechanics and Microengineering and Mathematics. His research encompasses various areas, including microfluidic chips and the dynamic analysis of parallel platforms. Currently, he serves as a reviewer for multiple international magazines and works as a research assistant in the field of artificial intelligence at Tongji University.

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## A Practical Abdominal Voice Wearable Device Improves Nutritional Status and Reduces Risk Factors for Intradialytic Hypotension

**Chen Han**

Doctoral Program in Design, College of Design, National Taipei University of Technology, Taiwan

Historically, feeding during hemodialysis treatment has been associated with an increased risk of adverse intradialytic symptoms and events, risks that have led to the implementation of restrictive in-center feeding and nutrition policies. However, recent studies have documented a shift in clinical practice, with an increasing number of physicians viewing intradialytic diet and supplement management as a simple and effective way to increase caloric in-take and improve nutritional status in hemodialysis patients. Early studies have shown that eating during hemodialysis treatment results in a rapid drop in blood pressure after a meal and increases the incidence of symptomatic intradialytic hypotension.

The proposed sound wearable device (AbSound) aims to realize a complete system architecture integrating bowel sound monitoring, data analysis, and real-time feedback via a high-sensitivity microphone and a multi-sensor array. In clinical applications, long-term continuous recording of bowel movement frequency and characteristics can provide more physiological references for the medical team and the patients themselves.

The AbSound device is a non-invasive signal acquisition device that can be attached to the abdomen and simultaneously acquire multiple related signals. By precisely positioning and adjusting microphones and specific sensors, we can capture faint but complex bowel sounds and gain insight into real-time gastrointestinal function.

This AbSound study investigated the effects of diet and dietary structure on hemodynamic stability and health-related quality of life during hemodialysis treatment and the expected benefits of this strategy on diet, health-related quality of life, and reduced incidence of hypotension. pressure.

We conclude that the effects of this AbSound need the warrant further studies addressing

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the effect of intradialytic feeding on chronic hemodialysis, with risk factors for blood pressure being captured through the expected benefits of this strategy on caloric intake and nutritional status.

## Biography

Chen Han has long pursued interdisciplinary research and practice at the intersection of healthcare technology and human–computer interaction. Since the doctoral stage, she has been an active participant in the international scholarly community, publishing in leading journals and presenting at major conferences—while serving as a teaching assistant for multiple courses and building substantial experience in both teaching and research. She has also been invited on numerous occasions to deliver specialized lectures at universities abroad, demonstrating mature public-speaking skills and cross-cultural communication competence. Her work centers on medical HCI and user experience, encompassing requirements elicitation, system ideation, interaction design, prototyping and validation, and user evaluation, with a consistent emphasis on evidence-based, empirically driven design.

She has won numerous awards in global innovation and entrepreneurship competitions, including three global championships. She focuses on interdisciplinary integration, promoting sustainable innovation, and transforming medical technology into tangible clinical and societal value.

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## Metropolitanization in India and Changing Ecology; Insights of Two Major Metros of India - Delhi & Mumbai

**Smita Salunke**

Assistant Professor, Akbar Peerbhoy College of Commerce & Economics, India

The 21<sup>st</sup> century world is characterized by rapid technological advancements, global inter-connectedness and significant challenges in the form of several socio-economic and environmental issues plaguing most cities. Implications are visible in the form of unsustainable growth of the cities, apart from pollution and degradation that come as a result of constant modification of landscapes.

Amongst the several factors leading to public health trepidations across the globe, air pollution contributes substantially to premature mortality with greater impact in developing nations.

The striking feature of India's urbanization in the 21<sup>st</sup> century is the escalating growth in number of cities and metros and the ever increasing urban populace in these cities. From one in 1901 to 56 metropolitans in 2011 shows the significant increase, much attributed to ever burgeoning influx and economic transformation.

The study compares air pollution challenges in Mumbai and Delhi, focusing on dominant pollutants and their trends over the last decade. Qualitative analysis of the empirical data based on published data and air quality modeling findings reveal elevated  $PM_{2.5}$  levels in winters. Stubble burning, vehicular emissions and meteorological factors significantly influence air quality. The year 2022-23, Delhi saw a 10% fall in  $PM_{2.5}$  levels as compared to the average of previous three years. In contrast, Mumbai registered a 30% increase in  $PM_{2.5}$  levels followed by other peninsular Indian cities like Coimbatore, which saw a 28% increase, and Bengaluru, a 20% increase. During 2014-15 Mumbai recorded high concentrations of  $NO_x$  and  $PM_{10}$  values. The fact that Mumbai now reveals higher concentrations of  $PM_{2.5}$  is more worrisome, as  $PM_{2.5}$  causes more harm than  $PM_{10}$ .

Though there have been initiatives to address metro based issues like the Smart Cities Mis-

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sion and Atal Mission for Rejuvenation and Urban Transformation (AMRUT), but the path to cleaner air remains challenging. This calls for sustainability of a balanced metropolitan growth, through inclusive and holistic development strategies.

## Biography

Dr. Smita Salunke is an academician, researcher and author from Mumbai, India. She specializes in Climatology with Geography as her main discipline. Presently an Assistant Professor in the Environmental Studies Department at Akbar Peerbhoy College of Commerce & Economics, Mumbai, and her work often focuses on environmental sustainability, gender and other social issues. She has participated and presented research papers at several national and international conferences; and has also successfully completed Research Projects funded by the Government of India. She has also authored a book and has also been invited as a Guest Speaker at several State and National forums, including one by the Ministry of Environment, Forest and Climate Change, New Delhi, India.



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## Production of Organo-Mineral Fertilizer (OMF) using Organic Waste and Mineral Resources (Pozzolan and Limestone)

**Kpouyie Bintou**

Global Intergrate Sustainable Services, Cameroon

The production of ecological fertilisers is a major challenge to reduce the harmful effects of chemical fertilisers. Millions of tons of urban organic waste are produced daily, posing a sustainable management. These organic waste provides useful elements for plants' growth (including  $\text{NO}_3^-$ ,  $\text{NH}^+$ ,  $\text{Ca}^{2+}$ ,  $\text{Mg}^{2+}$ ,  $\text{K}^+$ ,  $\text{Na}^+$ , etc.). Also, huge deposits of mineral resources are available such as pozzolan, rich in  $\text{P}_2\text{O}_5$ ,  $\text{K}_2\text{O}$ ,  $\text{Na}_2\text{O}$ , and limestone mainly composed of  $\text{CaCO}_3$  with an alkaline pH. Hence the need to exploit these resources to manufacture durable fertilizers using organic waste and mineral resources.

The methodology consist to characterize organic waste and mineral resources, then to pre-treat the organic waste (sorting, composting, stabilization, mineralization); to concentrate the useful substances of the mineral resources; to carry out mineral activation; to proceed with formulations and granulation.

Physicochemical analyses of raw materials from the West region of Cameroon show average nitrogen contents,  $\text{P}_2\text{O}_5$ ,  $\text{K}_2\text{O}$ ,  $\text{Na}_2\text{O}$ , interesting for the manufacture of organo-mineral fertilizers with progressive release. Initial trials carried out on bean crops has already shown interesting results, with an improvement of about 25% in the crop production.

This study at the end, will lead to a patented process for optimization and production of ecological fertilisers that can enrich soils for years after their use due to progressive liberation. It will thus provide a sustainable solution to the problem of food security and also contribute for environmental protection.

### Biography

Kpouyie Bintou completed her master's degree from the University of Yaounde I, Cameroon. She has an interest in pollution and waste management and works with an environmental organization that carries out projects and missions in sustainable waste management.

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## Climate Change and Biogeochemical Cycles: Speciation of Trace Metal Elements and their Transfer to Alfalfa Plants (*Medicago sativa* L.)

**Lina Chebbi<sup>1</sup>, Itab Boughattas<sup>2</sup> and Nouredine Bousserhine<sup>1</sup>**

<sup>1</sup>LEESU, Paris-East Créteil University (UPEC), Ecole des ponts, France

<sup>2</sup>Laboratory of Ecotoxicology and Agrobiodiversity, Higher Institute of Agronomy Chott-Meriem,  
Sousse University, Tunisia

Global warming and heavy metal pollution are two major environmental challenges affecting agricultural systems. Rising temperatures, as projected by the IPCC, may exacerbate the mobility and uptake of toxic metals in crops, posing risks to ecosystems and human health. While temperature effects on plant growth are well documented, their combined impact with soil contamination on metal accumulation and plant responses remains poorly studied. This study aims to evaluate the effects of elevated temperature on heavy metal speciation in soil and the physiological and biochemical responses of alfalfa plants (*Medicago sativa*). Plants were exposed to three temperature regimes (25°C, 27°C, and 29°C) for 60 days. Agronomic parameters, including shoot and root length, as well as chlorophyll content, were measured. The concentrations of Pb, Zn, Cd, and Cu in soils, roots and shoots were quantified via chemical analysis. Additionally, oxidative stress biomarkers such as malondialdehyde (MDA), glutathione-S-transferase (GST), and catalase (CAT) were assessed. Our data showed that the highest temperature (29°C) increased the bioavailability of Zn, Pb, and Cd, leading to greater accumulation in alfalfa tissues grown in contaminated soil. Biochemical analyses revealed that the antioxidant defense system was significantly affected under the combined stress of elevated temperature and heavy metal exposure, as evidenced by increased CAT and GST activities. These findings highlight the need to consider temperature as a key factor influencing heavy metal behaviour in soils and their potential impact on crop health and food safety under climate change.

### Biography

Lina Chebbi is currently a PhD candidate in Environmental Science and Technology. Her research focuses on the impact of climate change—particularly drought and flooding—on heavy metal speciation in agricultural soils and their transfer to plants such as alfalfa. She applies a multidisciplinary approach that combines soil and plant chemistry, controlled environment experiments, and metagenomic analysis of microbial communities.

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## Modeling and Monitoring System for Circular Bio-Economy Implementation in Ukraine: Integration with EU Strategies, Agricultural Case Study

**Orest Koleshchuk, Viktoriya Voytsekhovska, Stepan Vorobets, Olena Zahoretska and Darii Koleshchuk**

Lviv Polytechnic National University, Ukraine

In the current difficult climatic, environmental and socio-political conditions of the functioning of Ukrainian statehood, the application of the principles of the circular economy in the practical plane of their implementation is extremely relevant. Given the fact that the priority direction of its strategic development is the integration of all social processes into a single European space, where the paradigm of the circular economy is a priority in determining the strategic directions of the development of its economy, as the fundamental basis of the entire system of processes of the European space.

The issue of implementing economic processes in Ukraine into a single economic European space requires the introduction of systems for their permanent monitoring in order to adequately correct them for the fastest possible alignment with the coordinate system that determines the strategic directions of the development of economic processes in the European Community. Since the relevant metrics for assessing progressive processes in the development of the circular economy have been introduced for the countries of the European Union, which are ultimately fixed at the level of the relevant indicators, a similar practice provides for their introduction in Ukraine. At the initial stage, this involves appropriate changes in the statistical reporting of entities of production and economic activity with their subsequent reflection in reports formed by state statistical bodies. This is considered as an alternative process of fixing the real implementation of the principles of the circular economy. Only under the conditions of implementing such changes can we consider the possibility of introducing into practice a system for monitoring the effectiveness of activities in this direction. Our previous research in the direction of building an effective system for monitoring Ukraine's progress in implementing the principles of the circular economy was quite justified, in our opinion, based on the information model, which is defined within

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the framework of Eurostat on the basis of fixing the relevant metrics in the context of individual countries. The absorption of the apparatus of fuzzy sets makes it possible to rank the countries of the European Community and Ukraine's position in relation to them. On the other hand, it is important for Ukraine to determine priority areas of activity in the field of the circular economy and to be able to monitor the level of achievement of strategic goals in this area. We have proposed appropriate approaches and features of implementing such a system through the use of simulation modeling systems using fuzzy controllers, the basis of which is a fuzzy knowledge base and which must be strictly identified under the strategic goals of Ukraine in the field of developing the principles of the circular economy.

Therefore, it is quite obvious that the above is only the tip of the iceberg, which we will conditionally call the circular economy. The principles of the circular economy provide for its development in many directions. Perhaps one of the priorities is the development of the economy in the direction of deep processing of input raw materials and materials. And this requires an adequate change in the business model of production and economic structures and in particular its business functionality. We will consider the features of its formalization and assessment of effectiveness on the example of agricultural enterprises engaged in the cultivation of grain and the promising possibilities of using such a by-product as straw. In particular, the construction of a formalized model of the main business processes in this industry. Evaluation of financial and economic results taking into account the option of modifying the business functionality using business analytics systems with their further detailing using simulation modeling systems. Which ultimately made it possible to assess the cost of the by-product in this industry as an input raw material for solving the energy problems of territorial communities. And this is presented by us as a further direction of practical research in the field of developing the principles of the circular economy.

## Biography

Orest Koleshchuk earned his PhD in Economics in 2011 and Doctor of Sciences in 2020 from Lviv Polytechnic National University, where he currently serves as Head of the Department of Business Economics and Investments. He has over 15 years of academic experience, advancing from Assistant to Professor, and is the guarantor of the Educational Program "Digital Economy." Dr. Koleshchuk is the author of numerous research publications in leading peer-reviewed journals, serves as an expert of the National Agency for Higher Education Quality Assurance of Ukraine, and is a graduate of the British Council's Academic Managers Professional Development Programme (2025).



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## Balancing Tourism Expansion and Ecosystem Sustainability: Experiences from Goa's Coastal Destinations (India)

**Nandkumar Sawant<sup>1</sup>** and **Ventakesh Prabhugaonkar<sup>2</sup>**

<sup>1</sup>Professor & Head, Department of Geography and Research Center, Parvatibai Chowgule College (Autonomous), India

<sup>2</sup>Assistant Professor, Department of Geoinformatics, Government College of Commerce and Economics (Autonomous), India

Coastal tourist destinations, particularly in tropical regions, are globally renowned for their allure of sun, sand, and sea. Tourism, as one of the fastest-growing sectors, has brought significant economic prosperity and employment opportunities; however, it has also caused adverse impacts on the environment and local communities over time. Coastal tourism in Goa, India, has seen a substantial influx of visitors over the decades, with the 21st century witnessing unprecedented growth, leading to numerous consequences. This highlights the necessity of revisiting and reassessing tourism development to ensure sustainability.

Focusing on Calangute, Baga and Anjuna, iconic coastal tourist hotspots in Goa - India, this research evaluates the current stage of tourism development and explores the resulting land transformation and changes in Land Use and Land Cover (LULC). These changes have profoundly influenced the coastal landscape, ecology, and microclimate, leading to challenges for coastal ecosystems. The research applies Butler's Tourism Area Life Cycle (TALC), which outlines six predictable growth stages: discovery to stagnation, and either decline or rejuvenation. Geospatial techniques, combined with advanced predictive modeling, are utilized to analyze changes in LULC, land surface temperature, and other environmental parameters. Formulas have been employed to calculate surface radiance, brightness temperature, NDVI (Normalized Difference Vegetation Index), vegetation proportion, land surface emissivity, and land surface temperature. Further, a change matrix and predictive analysis were conducted, incorporating the Markov Chain Model (CA-Markov) to assess spatial dynamics and project future trends.

The findings suggest that tourism in Calangute and Anjuna has reached the final stage

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of TALC, signifying a considerable shift in land use—from agriculture and green spaces to urbanized and commercial areas. These changes have impacted the coastal ecosystem, contributing to landscape transformation, microclimate alterations, and a notable rise in temperature, highlighting the implications of climate change. Additionally, these destinations have exceeded their carrying capacity, further stressing the fragile coastal ecosystem. Although these destinations have reached a peak in terms of development, intervention strategies and planned, sustainable measures can help rejuvenate and preserve these tourist attractions for future generations.

## Biography

Dr. Nandkumar Sawant is a distinguished academic and researcher from Goa, India, specializing in geography, tourism, and environmental studies. Presently he is the head of the department of Geography at Parvati Chowgule College, Goa- India. He was also visiting faculty to university at University of La reunion, France and University of Jayawardene, Sri Lanka.

Dr. Sawant's work often focuses on coastal tourism, land use changes, and sustainability, particularly in Goa. He has undertaken multiple research projects, including international collaborations, such as a comparative study of tourism in Goa and Thailand and also collaborative international research with university of La reunion funded by European Union. His expertise extends to geospatial techniques and predictive modeling, which he applies to assess environmental and socio-economic impacts. Internationally, travelled to more than 13 countries for teaching, research and exchange programme.

In addition to his academic achievements, he has received numerous awards, including the State Award for Best Teacher and the Educational Leadership Award. He has served on various government bodies, such as the Goa State Coastal Zone Management Authority, contributing to policy-making and sustainable development.



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## Enhancing the Efficiency of Lithium-Ion Batteries: The Role of Physical Properties in Anode Material Selection

**Surajudeen Sikiru**

School of Physics and Materials Studies, Faculty of Applied Sciences, Universiti Teknologi Mara,  
Malaysia

The efficacy of lithium-ion batteries (LIBs) is mostly influenced by the choice of anode materials, which are essential in defining the battery's capacity, longevity, charging rate, and overall performance. This study examines the correlation between the physical characteristics of different anode materials and their influence on the efficiency of lithium-ion batteries. Critical physical attributes, including as electrical conductivity, structural integrity, specific capacity, and thermal properties, are examined to ascertain their impact on battery performance. Materials like graphite, silicon, and transition metal oxides are studied, emphasizing their charge/discharge efficiency, cycle longevity, and safety. Graphite, despite its prevalent usage, is limited by energy density and long-term stability, leading to the investigation of silicon-based anodes that provide markedly better specific capacities, but encounter challenges associated with expansion during cycle. Additionally, the influence of nano-structuring, composite materials, and surface coatings on addressing these problems is examined. The study highlights that augmenting the physical characteristics of anode materials might enhance battery efficiency, making them more appropriate for sophisticated applications in electric cars, portable devices, and extensive energy storage systems. This study advances the optimization of anode materials in lithium-ion batteries, offering insights for the development of next-generation energy storage systems.

### Biography

Dr. Surajudeen Sikiru Olalekan is presently a Senior Lecturer at the School of Physics and Materials Studies Faculty of Applied Sciences Universiti Teknologi Mara (UiTM) Shah Alam Malaysia. He worked as a research officer at Fundamental and Applied Science Universiti Teknologi PETRONAS under the advanced electromagnetic center and institute of a Hydrocarbon recovery center from 2017 to 2018, and Graduate research assistant from 2018 to 2021. He also worked as a Postdoctoral researcher at the Center of Subsurface Imaging (CSI) Universiti Teknologi PETRONAS, Tronoh, Perak, and as a Postdoctoral researcher at the Institute of Pow-

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er Engineering Universiti Tenaga Nasional (UNITEN) Malaysia between 2022 to 2023. He obtained his Doctor of Philosophy in Applied Science (Major in Physics) at Universiti Teknologi PETRONAS Malaysia. He completed his master's in computer science and engineering at Management and Science University Malaysia, and he obtained his Bachelor of Technology in Pure and Applied Physics at the Ladoke Akintola University of Technology Ogbomoso Nigeria. His areas of expertise are Nanotechnology, Nanocomposites, Molecular dynamics Simulation, Materials Characterization, Sustainable Energy, Material Simulation, Magnetic and Dielectric Nanoparticles, Phase Change Materials, Supercapacitor, Graphene and Carbon Nanotubes, Solar radiation, and renewable energy applications. Serving as the first author on more than thirty (30) high-impact factor journals indexed in ISI/Scopus and co-author of many more.

He was listed among the world's Top 2% scientists for single-year achievement in 2024. Dr. Surajudeen is an editorial board member of the Journal of Polymer Materials and Applied Science and Technology Express. A guest editor for an international journal of membrane science and technology, journal of Fluid Dynamics and Materials Processing for a special issue, Applied Chemical Engineering, and Journal of Polymer Materials.

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## Human-Machine Partnership and Digital Communication: Practices of Distance Learning

**Ryhor Miniankou and Aliaksandr Puptsau**

European Humanities University, Lithuania

Communication practices have always played a key role in the development of human society. Digitalization introduces particularly radical transformations into these practices, effectively reshaping all aspects of social life including educational activities. The purpose of this lecture is to outline the key trends of this process in the educational sphere, with an emphasis on practical solutions to related challenges. At the core of our approach, there is the belief that it is no longer possible to speak of contemporary education without considering the transformative role of artificial intelligence (AI) in educational practices. Under its influence, the education system will, in the coming decades, take on fundamentally different forms, characteristics of which we can hardly predict today. Central to this transformation is a phenomenon we describe as human-machine partnership (HMP) – a space of interaction where humans and machines are increasingly becoming equivalent agents. Understanding the trends of developing this process requires analyzing the specific features of human-machine communication across various digital formats. The emergence of so-called humachines is becoming increasingly evident. However, despite the widespread adoption of digital communication tools, their quality – especially in distance education – has not yet reached the required level, as shown by our analysis of the experiences of university teachers and students. To enhance the effectiveness of digital learning communications, it is essential to integrate and coordinate the efforts of researchers across disciplines such as sociology, educational science, computer science, AI etc. Educational institutions must prioritize the development of digital communication skills in training specialists of all profiles – skills that are crucial in the context of HMP, such as critical thinking, creativity, AI-literacy, and the ability to work with big data. Our research into digital communications in distance learning may serve as one of the foundations for designing and implementing relevant training programs.

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## Biography

**Ryhor Miniankou** – PhD in Philosophy, Professor, the Academic Department of Social Sciences, European Humanities University (Vilnius, Lithuania). Education: philosophy. Teaching: social philosophy, social theory, theory and practice of higher education, social practices and technology in mediaspace. Research: social theory, identity theory, higher education in the context of digitalization and AI. Author of many publications on social philosophy and theory, and higher education, including monographs.

**Aliaksandr Puptsau** – PhD in Pedagogy, Professor, the Academic Department of Social Sciences, European Humanities University (Vilnius, Lithuania). Education: mathematics. Teaching: mathematics, statistics, computer modelling, didactics of distance learning, artificial intelligence. Research: theory and methods of computer science teaching; educology and communication in digital education, AI. Author of many publications on education studies and computer science including several monographs and textbooks.

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## Polysaccharide Nanoemulsions for Antifungal and Anthelmintic Applications

**Flavia Oliveira Monteiro da Silva Abreu<sup>1</sup>, Joice Farias do Nascimento<sup>1</sup>, Maria Rayanne Teixeira de Araujo<sup>1</sup>, Helcio Silva dos Santos<sup>1</sup>, Matheus Luiggi<sup>2</sup>, Lorena Mayana Bezerra de Oliveira<sup>2</sup>, Júlio Cesar Sousa Prado<sup>3</sup> and Raquel Oliveira dos Santos Fontenelle<sup>3</sup>**

<sup>1</sup>Laboratory of Natural Polymers, State University of Ceará, Brazil

<sup>2</sup>Parasitic Diseases Laboratory, State University of Ceará, Brazil

<sup>3</sup>Laboratory of Microbiology, State University of Vale do Acaraú, Brazil

The aim of this study was to assess the antifungal and anthelmintic effect and cytotoxicity of Benzyl 4-Aminochalcone (B4AM) and its nanoemulsions (NMs). Nanoemulsions were prepared using ultrasound and were characterized by potential zeta and particle size. NMs were evaluated for antifungal effect against *C. albicans* strains using the broth microdilution method [1]. The anthelmintic effect was evaluated by the Adult Worm Motility Test (AWMT) with *Haemonchus contortus* as described by Hounzangbe-Adote [2]. Cytotoxicity was evaluated on murine fibroblasts by the MTT test.

NMs exhibited nanodroplets with an average size ranging from 87 to 450 nm, increasing in size with higher B4AM concentration. The zeta potential values were below -40mV, indicating excellent electrostatic stability. The inhibitory capacity tested against five *Candida* spp strains showed that NMs with B4AM at a dosage of 1.5 mg/mL exhibited 2-3.5 times greater inhibitory capacity than pure chalcone at a concentration of 10 mg/mL as showed in Figure 1.

In the AWMT test, at the highest concentration tested (0.8 mg/mL), both formulations inhibited (100%) *H. contortus* motility at 3- and 6-hours post-exposure. At the second-highest concentration (0.4 mg/mL), the nanoemulsion showed superior results compared to the free chalcone, indicating that nanoencapsulation enhanced the adulticidal effect on *H. contortus*. The adulticidal effect of the formulations was dose dependent.

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The nanoemulsions with biopolymers generated nanodroplets exhibiting enhanced stability compared to free B4AM. They demonstrated significant anthelmintic activity and antifungal inhibitory capacity against *C. albicans*. Importantly, the nanoemulsions reduced the toxicity of B4AM, eliminating cytotoxic effects on murine fibroblasts (L929) in the MTT test. These findings highlight the potential of this formulation as a promising candidate for biomedical applications, given its improved stability, efficacy, and safety profile.

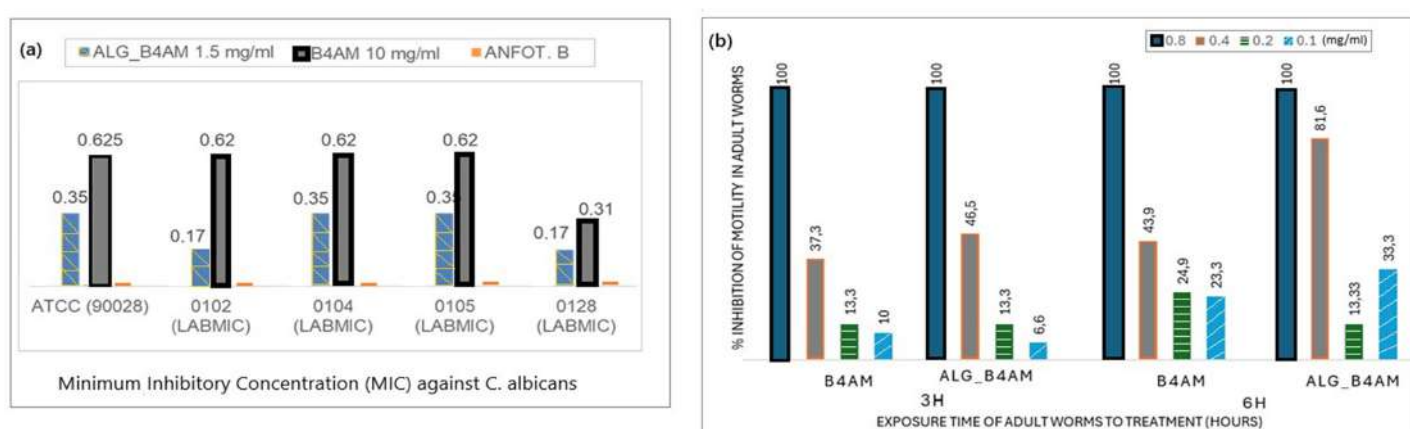


Figure 1: Nanoemulsions behavior: (a) MIC against *C. albicans* and (b) Adult Worm Motility Test (AWMT) against *H. Contortus*.

## Biography

Flavia Oliveira Monteiro da Silva Abreu academic background includes Chemistry and Material Science, with degrees earned at UFRGS in Chemistry and Engineering. Expert in developing polymeric materials for controlled drug release, modifying polysaccharides chemically, and blending polymers with elastomers. Her experience includes professorships and research at Universidade de Fortaleza (UNIFOR), and she currently holds an adjunct professorship in General and Analytical Chemistry at Universidade Estadual do Ceará (UECE) and is also a faculty member of the Natural Sciences Program (PPGCN). Over the past 5 years, while serving as coordinator of the Natural Polymers Laboratory at UECE, they have produced over 30 articles.



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## Microplastic Presence and Pollution-Related Patterns in Native European Oyster, *Ostrea Edulis*, in the Solent Region

**Giovanna Sidaoui-Haddad, Lina M. Zapata-Restrepo, Katherine Bawden,  
Eleanor Spencer, Ian D. Williams and Malcolm Hudson**

School of Geography and Environmental Sciences, University of Southampton, UK

Microplastics (MPs) present a persistent threat to marine ecosystems and can adversely affect aquatic organisms. Due to their filter-feeding behaviour, bivalves are susceptible to the ingestion and bioaccumulation of MPs, including those adsorbed with other organisms or persistent organic pollutants. This study investigates the presence and characteristics of MPs in European flat oysters (*Ostrea edulis*) from the Solent region in Southern England. MPs were extracted from oyster tissues using enzymatic digestion with Proteinase-K and analysed using Raman spectroscopy.

Oysters collected from more densely populated coastal areas contained significantly higher concentrations of MPs compared to those from rural sites. Among the particles identified, fibres were the most abundant, followed by irregular and spherical forms. A significant inverse correlation was observed between shell size and MP abundance. The presence of MPs in *O. edulis* has implications for trophic transfer within marine food webs and highlights a potential pathway for human exposure. These findings support the use of *O. edulis* as a bio-monitoring species for assessing MP pollution, offering valuable insights into the distribution, sources, and potential management of microplastic contamination in coastal environments.

### Biography

Giovanna Sidaoui Haddad holds a Master's in Environmental Science from the University of Southampton, specialising in aquatic environments and microplastic pollution. Her research focused on the presence of microplastics in the European native oyster, *Ostrea edulis*, and pollution patterns in the Solent Region, Southern England. Using Raman spectroscopy, she identified dominant microplastic types and traced their potential sources, contributing to a broader understanding of marine pollution pathways.

Giovanna also supported several PhD projects investigating the impact of microplastics on marine ecosystems. She has since continued her work in international organisations and, most recently, in sustainability consulting, where she helps companies align with global environmental standards.

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## Effect of Heatwaves on Milk Production

**Yunus ÖZTÜRK<sup>1</sup> and Ferat ZENGİN<sup>2</sup>**

<sup>1</sup>Gebze Technical University, Turkey

<sup>2</sup>Ministry of Education, Turkey

In this study, the effects of heat waves (HW) on milk production were investigated. Daily maximum temperature data recorded in 2024 were obtained from the General Directorate of Meteorology for the study. Daily milk production data recorded in 2024 were obtained from the Fethiye-Seydikemer Dairy Producers Cooperative. In this study, daily maximum temperatures were used to define HW. The 95th percentile was selected as the threshold value, and periods of high temperatures lasting at least three consecutive days were defined as HW. Using this definition, it was determined that three HWs occurred in June 2024. The amount of milk produced during HW periods was compared to that produced during reference periods, and the Risk Ratio (RR) was calculated. The significance of the results was determined using the logarithmic z-test method. The analysis revealed that milk production decreased during the three HWs in June compared to the reference periods. The RRs indicating the reduction in milk production during these three HWs were calculated as 0.80 (95% CI: 0.71–0.89,  $P < 0.05$ ), 0.76 (95% CI: 0.69–0.84,  $P < 0.05$ ), and 0.72 (95% CI: 0.67–0.76,  $P < 0.05$ ), respectively. Based on these results, milk production decreased by 20% during the first HW, 24% during the second HW, and 28% during the third HW. Additionally, the quality of milk produced during HW periods was analyzed by assessing protein, fat, and non-fat solid content. Compared to the reference periods, the milk produced during HWs showed reductions in fat and protein content. Considering the projected increase in the frequency and duration of heat waves, the results of this study highlight the need for immediate measures to prevent future declines in milk production.

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## Biography

**Yunus ÖZTÜRK** has completed his PhD from the University of Marmara, in İstanbul. He studied the effects of heat waves on human health. He has 3 publications in international journals in this field. He currently works at the Turkish Ministry of National Education. He started his doctoral education at Gebze Technical University.

**Ferat ZENGİN**, in 2006, he graduated from Selçuk University, Faculty of Theology, Department of Primary Education Religious Culture and Ethics Teaching. In 2008, he completed his master's degree in Philosophy and Religious Sciences at the same university's Institute of Social Sciences. Since 2006, he has been working as a teacher and administrator in institutions under the Ministry of National Education.

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## The Antecedents of Customers' Green Purchase Intention: Bridging the Eco Gender Gap

**Ibrahim Mahmoud Darwish, Ayman Mahmoud Bazzi and Alaaeldin Abbass Ali**

Beirut Arab University, Lebanon

This study aims to investigate several factors that affect customers' green purchase intention toward eco-friendly restaurants in Lebanon. Additionally, it examines the moderating role of female dominance on the relationship between pro-environmental antecedents and customers' green purchase intention. This paper adopts a quantitative approach, and data were collected from 390 Lebanese customers using a questionnaire. The sample was selected depending on the convenience sample technique, and the study model was tested using partial least-squares equation modeling. The findings of this study reveal that environmental concern, social value, innovativeness, and PCE exerted a positive impact on customers' green purchase intention. However, the influence of materialism is not supported. Also, the findings reveal that female dominance significantly moderates the relationship between the pro-environmental antecedents and green purchase intention. Furthermore, the study underscores the importance of participating in environmental groups to increase green purchases. Marketers in green restaurants need to create a marketing strategy that focuses on materialistic female customers through specialized campaigns to capture elements that motivate their interest in green restaurants. This study contributes to green consumption literature by examining the antecedents of green purchase intention in a developing country in the Middle East, whereby, few studies investigated this relationship. Additionally, this is the first study to investigate the influence of environmental concern, social value, materialism, innovativeness, and perceived consumer effectiveness, on customers' purchase intention toward eco-friendly restaurants in Lebanon, with the moderating role of Female dominance.

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## Biography

Ibrahim Darwish is from Lebanon. He holds a Ph.D. in Marketing, an MBA, and a bachelor's degree in finance & banking from Beirut Arab University. His doctoral thesis focused on green marketing, specifically sustainability (by exploring factors influencing purchasing behavior toward green restaurants). He has published two articles in Q1-ranked journals, with his work appearing in reputable publications by Springer Nature and Emerald. In addition to his academic credentials, he has gained substantial experience as a purchasing manager for a non-profit organization and serves as a partner in a family-owned commercial trading company. Overall, he possess around 15 years of experience in business and trading.

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## Is your Contribution Fair? How Countries Justify Equity in their NDCs

**Oliver Herrera, Olga Alcaraz and Bàrbara Sureda**

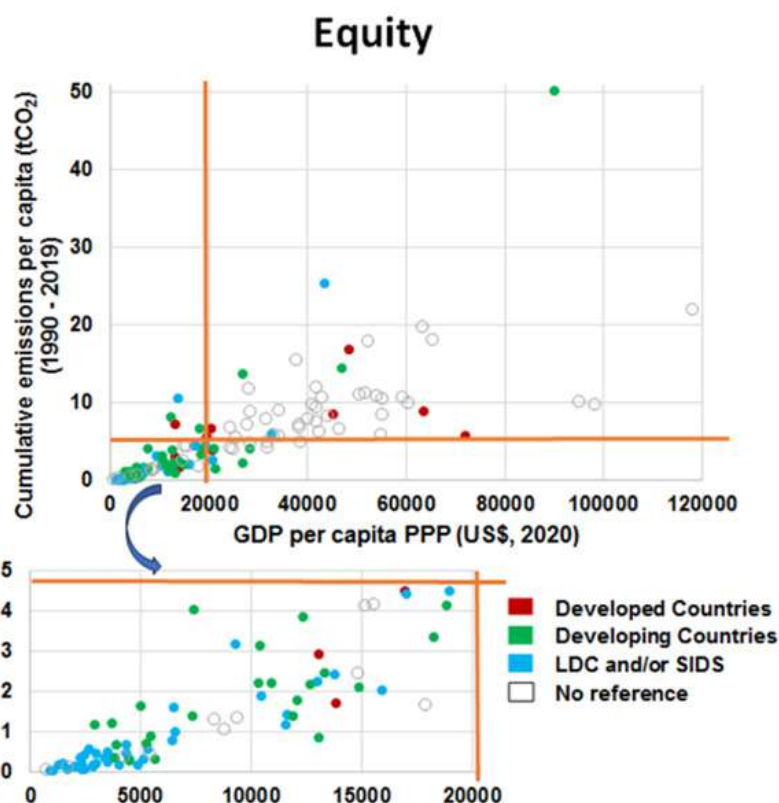
University Research Institute for Sustainability Science and Technology, Universitat Politècnica de Catalunya, Spain

There is no consensus on how to operationalize the Paris Agreement's mandate to reflect equity in its implementation. However, the Technical Dialogue Synthesis Report of the First Global Stocktake suggests that, in the mitigation component, Parties could advance in this regard by providing clearer information on fairness and ambition in their Nationally Determined Contributions (NDCs). In their second NDCs, Parties are expected to justify how their contributions are fair and ambitious in light of their national circumstances. This research reviews the fairness and ambition section of the first NDCs, focusing on principles and indicators rooted in international environmental law (IEL). Countries are grouped into three categories: developed countries; developing countries; and least developed countries (LDCs) and/or small island developing states (SIDS). In addition, countries are mapped with parameters related to historical responsibility and economic capacity. Results show that most countries use principles and indicators that support their current level of ambition, while avoiding those that would call for greater ambition. Countries with the least historical responsibility and economic capacity tend to invoke principles aligned with IEL more frequently, whereas developed countries generally avoid such references. To enhance arguments, the authors suggest that Parties base their fairness and ambition arguments in IEL principles and, where possible, use specific and commonly agreed indicators. This would improve transparency and comparability in future NDCs, and contribute to more equitable global climate action.



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**Fig. 1.** Countries referencing the principle of equity in the Fairness and Ambition section of their NDC. Perpendicular lines: global averages for GDP per capita (vertical) and cumulative emissions per capita (horizontal). Coloured dots: countries grouped by classification; white dots: countries not referencing the principle. Lower chart: zoom-in of the top chart's lower-left section. Source: Authors' own creation.

## Biography

Oliver Herrera is a Climate Policy Researcher in the Group on Governance of Climate Change at the Universitat Politècnica de Catalunya (Spain), specializing in equity in climate mitigation. He is currently pursuing a PhD in Sustainability, focusing on the implementation of the Paris Agreement on the basis of equity. With experience giving lectures at Pontificia Universidad Católica de Valparaíso (Chile) and as a Research Fellow with the Regional Academy on the United Nations, he has contributed to both academic research and policy development. His work includes coauthoring submissions to the UNFCCC, publishing in peer-reviewed journals, and supporting governments in enhancing their Nationally Determined Contributions (NDCs). He has participated as an observer in different meetings of the UNFCCC process, including COP26, and presented at international conferences.

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## Enhancing Growth and Essential Oil Quality of Peppermint (*Mentha piperita* L.) through Plant Growth- Promoting Rhizobacterial (PGPR) Applications

**Vagmi Singh<sup>1,2</sup>, Rajesh Kumar Verma<sup>2,3</sup>, Akanksha Singh<sup>2,3</sup> and Birendra Kumar<sup>1,2</sup>**

<sup>1</sup>Seed Quality Lab on MAPs, Genetics & Plant Breeding Division, CSIR-Central Institute of Medicinal and Aromatic Plants, India

<sup>2</sup>Academy of Scientific and Innovative Research (AcSIR), India

<sup>3</sup>Crop Production & Protection Division, CSIR-Central Institute of Medicinal and Aromatic Plants, India

Peppermint (*Mentha piperita* L.) is a globally cultivated medicinal and aromatic herb valued for its essential oil (EO), with a market size projected to grow from USD 230.3 million in 2024 to USD 444.6 million by 2034. Despite its economic importance, peppermint cultivation is less preferred than menthol mint (*Mentha arvensis* L.) due to lower herb and oil yields, prompting the excessive use of synthetic fertilizers. Such practices increase nitrous oxide (N<sub>2</sub>O) emissions, contributing to climate change, and raise concerns regarding the safety of plant-based products used in the culinary industry. This study aimed to evaluate the plant growth-promoting (PGP) potential of rhizobacteria on two peppermint varieties, CIM-Suras and CIM-I45-2. Surface-sterilized suckers were inoculated with five PGPR strains: *Bacillus tequilensis* (T1), *Bacillus subtilis* (T2), *Bacterium* strain BS0393 (T3), *Bacillus thuringiensis* (T4), and *Bacillus cereus* (T5). Results revealed that T2 (*Bacillus subtilis*) significantly enhanced morphological, physiological, and biochemical traits, including improved photosynthetic efficiency, chlorophyll content, and antioxidant enzyme activities (proline, SOD, catalase), indicating better tolerance to oxidative stress. The study highlights the potential of *Bacillus* spp. to improve peppermint growth, oil yield, and biomass production, thereby promoting greater atmospheric CO<sub>2</sub> capture and soil organic carbon accumulation. Integrating such sustainable inputs reduces reliance on chemical fertilizers and supports climate change mitigation strategies. Overall, the findings endorse using *Bacillus*-based bioformulations as an eco-friendly approach to enhance peppermint cultivation while contributing to environmental sustainability.

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## Biography

Ms. Vagmi Singh, a PhD Scholar at the Plant Breeding and Genetic Resource Conservation Division, CSIR-CI-MAP, Lucknow, holds an M.Sc. in Microbiology (2019) from Dr. Shakuntala Misra National Rehabilitation University, Lucknow, India. Her research focuses on the diversity of plant growth-promoting rhizobacteria associated with medicinal and aromatic crops. She has made significant contributions to plant-microbe interactions and sustainable agriculture, with 12 research publications in reputed peer-reviewed journals (Impact Factor: 24.4). Vagmi has effectively communicated her work through national and international platforms and played a key role in the release of a peppermint (*Mentha piperita* L.) variety under CSIR. Her research and science communication excellence have earned her several accolades, including the Young Microbiologist Award, Young Scientist Award, and Junior Scientist of the Year Award. With her innovative mindset and dedication, she continues to impact the fields of microbiology, plant sciences, and sustainable agriculture.

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## Improving Reference Evapotranspiration Predictions with Hybrid Modeling Approach

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<sup>4</sup>Mathematics Department, College of Humanities and Science, Prince Sattam Bin Abdulaziz University, Saudi Arabia

Accurate prediction of Reference Evapotranspiration ( $ET_0$ ) is essential for determining crop water requirements, significantly contributing to the effective management and sustainable planning of the world's scarce water resources. Many statistical and Machine Learning (ML) models have been proposed for predicting  $ET_0$ , but no universal algorithm has been found to be the best performance for all the diverse conditions. Therefore, this study introduces a novel hybrid modeling approach that integrates the Linear Mixed Effect (LME) model with Nonlinear Autoregressive Neural Network (NANN) and Support Vector Machine (SVM) ML models. By combining the strengths of LME for capturing linear patterns and NANN and SVM for modeling nonlinear residuals, this approach aims to minimize prediction errors and enhance accuracy under diverse conditions. For this purpose, climatic data from 1980 to 2021 from five meteorological stations located in Pakistan were utilized. Moreover, panel (*i.e.*, Levin Lin Chu (LLC), Im, Pesaran, and Shin (IPS)) and Moving Block Bootstrap (MBB) unit root tests were applied to investigate the stationarity in the dataset. Correlation analysis showed that temperature had the highest correlation with  $ET_0$  among climatic variables. Both hybrid models and the LME model were evaluated across five meteorological stations in Pakistan. Results from the Statistical assessment indicated that although both proposed models exhibited commendable performance in the prediction of  $ET_0$ , the hybrid model LME-SVM exhibited a comparative advantage over the hybrid model LME-NANN. The Taylor diagram confirmed a strong positive correlation between

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observed (estimated by modified Hargreaves-Samani equation) and predicted  $ET_0$  values for both hybrid models.

## Biography

Rimsha Habeeb holds a Master's degree and is currently pursuing a PhD in Applied Statistics, with extensive experience in statistical and machine learning methodologies. Her research focuses on the application of advanced analytical techniques, including Multi-Criteria Decision Making (MCDM), Time Series Analysis, Regression Modeling, Probabilistic Models, and both Supervised and Unsupervised Machine Learning, to address complex, data-driven problems. She has a strong interest in Climate Data Science and Environmental Statistics and is dedicated to bridging statistical rigor with modern machine learning to support informed decision-making across interdisciplinary domains. Rimsha has published four research articles in peer-reviewed impact factor journals. Her current work involves the integration of predictive analytics and data science tools to explore patterns in climate and environmental datasets. She is passionate about leveraging data for impactful research and practical applications.

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## A Quantitative and Qualitative Assessment of Microplastics Collected at Two Public Beaches along the East and South-East Coast of Mauritius

**Kishore Boodhoo, Roshan T. Ramessur, Ourvashee Namah and Peevidya Lakshmi Bhandu**

University of Mauritius, Mauritius

Microplastics had been collected at two sites namely Trou d'eau douce (TD) and La Cam-buse (LC) public beaches, lying in the east coast and south-east coast of Mauritius, respectively, over 6 months from September 2019 to February 2020. The sizes of the latter varied from 180  $\mu\text{m}$  to 5 mm. A higher amount of microplastics collected/6 kg sand sample was recorded at LC. Two-way ANOVA revealed that there was a considerable gap in the variability regarding quantity and size distribution of microplastics on the two beaches. The post-hoc analysis showed that the majority of the microplastics at LC were  $> 1.40$  mm whereas the smaller plastic fragments  $< 1.40$  mm were more dominant at TD (2) there was a significant interaction between location and event (  $p$ -value = 0.025). The post hoc analysis showed that the torrential rain hitting the island prior to sampling week 7 had decreased the microplastic counts at both TD and LC, but not significantly. Interestingly, the two hurricanes, prior to weeks 8 and 9, had appreciably reduced the microplastic counts at TD and, on the other hand, there was an increase in the amount of microplastics at LC, but not to a significant effect. The chemical nature (qualitative analysis) of microplastics was determined by density flotation and FTIR spectroscopy. Microplastics at TD were exclusively high density polyethylene (HDPE) in origin whereas, at LC, microplastics were both HDPE and polypropylene (PP) in origin.

### Biography

Currently he is an Associate Professor based in the chemistry department at the University of Mauritius. His research areas are microplastic monitoring on sandy beaches, ocean acidification as well as analysis of heavy metals and nutrients in aquatic systems. He also has a keen interest in climate change where he works on the modelling aspect of physical parameters in the south-west Indian Ocean (SWIO).



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## Investigation of the Growth and Mortality of Bacteria and *Synechococcus* spp. in Unvegetated and Seagrass Habitats

**Patrichka Wei-Yi Chen<sup>1</sup>, Clara Natalie Annabel<sup>1</sup>, Madeline Olivia<sup>1</sup>, Wen-Chen Chou<sup>1,2</sup>, Jian-Jhih Chen<sup>3</sup>, Ruei-Feng Shiu<sup>1,2</sup>, Vladimir Mukhanov<sup>4,5</sup>, Mariche Natividad<sup>1</sup>, Yi-Le Shen<sup>6</sup> and An-Yi Tsai<sup>1,2</sup>**

<sup>1</sup>Institute of Marine Environment and Ecology, National Taiwan Ocean University, Taiwan

<sup>2</sup>Center of Excellence for the Oceans, National Taiwan Ocean University, Taiwan

<sup>3</sup>Department of Marine Environmental Engineering, National Kaohsiung University of Science and Technology, Taiwan

<sup>4</sup>A.O. Kovalevsky Institute of Biology of the Southern Seas, Russian Academy of Sciences, Russia

<sup>5</sup>Laboratory of Marine Ecosystems, Institute for Advanced Research, Sevastopol State University, Russia

<sup>6</sup>Penghu Fisheries Biology Research Center, Fisheries Research Institute, Ministry of Agriculture, Taiwan

There is no doubt that seagrass beds constitute one of the most productive ecosystems in shallow coastal waters. Despite this, picoplankton in seagrass ecosystems has received relatively little attention. The purpose of this study was to compare picoplankton growth and mortality rates between seagrass and unvegetated habitats using chamber incubations. We tested two main hypotheses: (i) incubation with seagrass would result in higher bacterial growth rates due to increased DOM release from seagrass photosynthesis, and (ii) *Synechococcus* spp. would be lower in the presence of seagrass due to competition for inorganic nutrients. Bacterial growth rates were higher in seagrass chambers (2.44 d<sup>-1</sup>) than in non-seagrass chambers (2.31 d<sup>-1</sup>), respectively, suggesting that organic carbon coming from the seagrass community may support bacterial production. Furthermore, the growth rate of *Synechococcus* spp. was significantly lower in the seagrass treatment than in the non-seagrass treatment, likely reflecting nutrient competition with the seagrass. Small-scale chambers proved to be a useful tool for studying the factors controlling spatial and temporal patterns of picoplankton across different habitats. Furthermore, future studies should examine picoplankton growth over a wider range of spatial scales in seagrass beds and adjacent unvegetated sediment.

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## Biography

Patrichka Wei-Yi Chen is currently a PhD student at National Taiwan Ocean University, focusing on marine bacteria and virus ecology. Passionate about microbial interactions, their research explores how environmental changes shape marine ecosystems, particularly in Taiwan's coastal waters and Polar Regions. Their lab uses flow cytometry to quantify microbial populations, providing key data for discussing microbial dynamics. She is actively involved in field expeditions, from the Arctic to subtropical waters. We collaborate internationally to uncover the hidden roles of microbes in ocean biogeochemistry. Through their work, they aim to deepen their understanding of how global change impacts marine microbial life.

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## Menstruation in the Shadows of the Sea: The Untold Struggles of Coastal Women in Bangladesh

**Mohammed Julfikar Ali**

Head, Department of Business Administration, Presidency University, Bangladesh

The women and adolescent girls of seaside Bangladesh face a largely invisible and deeply personal crisis in the shadow of rising sea levels. As the reason of climate change, shrimp farming, and the declining flow of the Ganges River, saltwater is infiltrating freshwater sources, and the scarcity of clean water has turned a natural biological process into a cause of physical pain, emotional distress, and social shame. Many women are developing painful uterine diseases who are forced to use salt-contaminated water for personal hygiene, a condition further exacerbated by poverty and the lack of access to menstrual hygiene sanitary products. Out of desperation, some young girls as young as 12 (twelve) years old misuse contraceptive pills to stop their menstrual cycles entirely, an unspoken uprising against the humiliations they face. The choice, often made without any kind of medical advice, stems from deep-seated fears: fears of severe illnesses, social exclusion, and repeating the painful experiences of their mothers. Moreover, this temporary release carries serious significance, putting their long-term reproductive and mental health at risk. However, this article discovers the deeply personal challenges faced by these women, revealing the profound interplay of climate change, gender inequity, and the neglect of public health. It also examines how the destruction of saline water has not only transformed the environment but also unprotected women of their dignity and autonomy over their bodies. Therefore, it highlights that combating climate change is not solely but also about protecting ecosystems but also saving lives, one woman at a time.

### Biography

Professor Dr. Mohammed Julfikar Ali, widely known as J. Ali, is a distinguished figure in Bangladesh's educational sector, contributing over two decades to the advancement of higher education. He serves as the Chairman of the Business Administration Department at Presidency University, where he has demonstrated exceptional academic expertise. Dr. Ali has authored 10 books and published more than 35 articles in re-

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owned international journals. Also, "Leadership Studies in the Turbulent Business Ecosystem" editorial panel book has been published in London. With profound knowledge in authentic leadership, digital marketing, and customer relationship management, he is also a skilled soft skills trainer, effectively bridging academic standards with industry applications.

Dr. Ali's influence extends globally through his participation in international conferences in Switzerland, France, Poland, Turkey, China, UAE, Thailand, and India. An internationally acclaimed motivational trainer, he received the prestigious Bangali Sahitya Award 2023 and the Asian Education Award 2023, Bangkok, Thailand for his remarkable literary contributions.

He went on to complete his BBA and MBA with distinction in Marketing from the University of Rajshahi. Later, he pursued an MA in English Literature and an LLB degree as a personal interest in Dhaka. He completed his Ph.D. research at Islamic University, Kushtia, Bangladesh.

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## Leveraging Deep Learning for Early and Non-Invasive Detection of Red Palm Weevils a Novel Approach to Sustainable Agriculture

**Amal Hussein Abbas**

Al-Mustansiriya University, Iraq

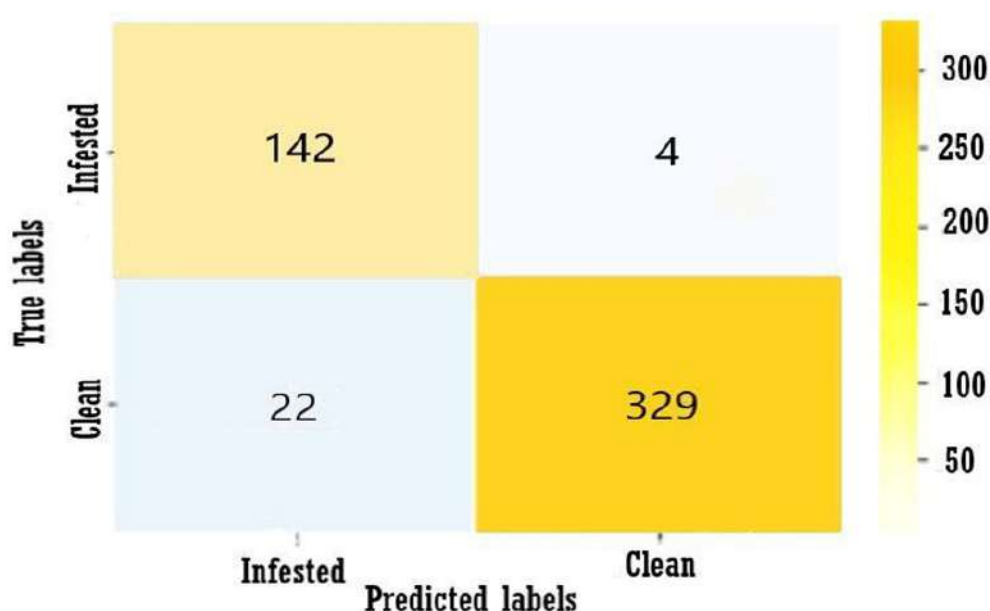
This study aims to develop a novel Internet of Things (IoT)-based acoustic detection system for the early identification of Red Palm Weevil (RPW) larvae infesting date palm trees. The primary objective is to accurately distinguish the feeding and movement sounds of RPW larvae from healthy tree sounds to enable timely pest management.

The proposed method utilizes a modified DenseNet-169 deep learning classifier. Audio recordings from the public Tree Vibes dataset were converted into spectrogram images, which served as input for the model. The dataset consisted of 497 samples (146 infested, 351 clean). The data was split 80-20 for training and testing, with the model's performance rigorously validated using 10-fold cross-validation.

The adapted DenseNet-169 model achieved a high classification accuracy of 92%. The confusion matrix (Figure) detailed the model's performance in classifying infested and clean samples correctly. The primary limitation discussed was the impact of environmental noise on the audio signals, which was identified as the main factor preventing even higher accuracy. The integration of motion sensors for visual monitoring and automatic noise-filtering sensors was suggested for future improvement.

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**Figure:** Confusion matrix for the DenseNet-169 model's results.

The research successfully demonstrates an effective IoT-oriented framework for the early detection of RPW. The DenseNet-169 model proved highly proficient, achieving 92% accuracy. This framework represents a significant advancement in smart agriculture, offering a promising solution for protecting palm trees from this destructive pest with further refinement to mitigate noise interference.

## Biography

Dr. Amal Hussein Abbas is Professor of Computer Science, College of Science at Al-Mustansiriyah University. She holds a Ph.D. in Physics (Astronomy and Processing) from the University of Baghdad (2003), M.Sc. in Physics from Al-Mustansiriyah University (1996), and a B.Sc. in Physics from the same University (1988).

With extensive academic and research experience, she has supervised numerous Master's and Ph.D. students, participated in international scientific conferences inside and outside Iraq, and published rigorous research in globally indexed journals (Scopus and Clarivate). Her research interests focus on astronomical image processing and computer applications in scientific data analysis.

She has a distinguished record of academic and research achievements and actively contributes to advancing knowledge and mentoring new generations of researchers and specialists.



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## Influential Plant in Medicinal Science and Clove: Tiny Buds with Global Fame

**Royanama Rahimi, Leila Mohtashami and Seyed Ahmad Emami**

Mashhad University of Medical Sciences, Iran

In the sixteenth century medicinal plants, which until then had been the monopoly of apothecaries, became a major topic of investigation in the medical faculties universities, where they were observed, transplanted, and grown by learned physicians both in the wild and in the newly founded botanical gardens. Tuscany was one of the main European centres in this new field of inquiry, thanks largely to the Medici Grand Dukes, who patronised and sustained research and teaching, whilst also taking a significant personal interest in plants and medicine. Now, in this poster, we want to focus on the clove plant (primary and secondary metabolites) and its effect in botanical science and pharmacology. *Syzygium aromaticum* (L.) Merr. & L.M.Perry (Myrtaceae), commonly known as clove, is a median sized tree indigenous to the Maluku Islands in Indonesia but has been cultivated in different countries around the world. Clove is famous as an ancient spice and a culinary plant and its essential oil is widely used as a food preservative, fragrance in perfumes, and anti-inflammatory agent in cosmetics industry. In the Islamic Traditional Medicine (ITM), clove has the potential to treat brain, gastrointestinal, urogenital, ocular, and dental diseases. The pharmacological activities of the essential oils and extracts of clove buds and leaves have been investigated in different *in vitro*, *in vivo*, and clinical studies. The results have presented its anti-oxidant, antiinflammatory, neuroprotective, anti-metabolic syndrome, anti-cancer, and anti-microbial properties, which not only support the application of clove in traditional medicine but also suggest new therapeutic aspects as well. In this chapter, we have summarized general information regarding ethnobotany, traditional uses, and the chemical profile of cloves and discussed its therapeutic applications that have been studied until today.

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Numerous studies regarding the chemical profile of clove have revealed the presence of phenylpropanoids, monoterpenoids, sesquiterpenoids, chromones, flavonoids, phenolic acids, tannins, and fatty acids. Most of the investigations were performed on the essential oil of buds among which the phenylpropanoid compound, eugenol, was the most dominant. The other dominating components were eugenol acetate and the sesquiterpenoid compound,  $\beta$ -caryophyllene. The essential oil can be extracted from other clove parts like the leaves or stems, but these oils have a different chemical profile in comparison to the essential oil obtained from lower buds.

## Biography

Roya Nama Rahimi is graduated from Birjand University in the field of pharmacognosy and currently working at Mashhad University of Medical Sciences among others. Publication of an article in the book Medicinal and Aromatic plants and phytochemical removal and removal of Cr(VI) by plants and experience of working with HPLC, GC-Mass, UV-Vis and Fluorescence devices and three years of work experience in Pararin Pars Pharmaceutical Company as she is a planning manager and has three years of work experience at Gol Aksirpars company in the field of extracting and purifying natural products Among the interests of reading many recent articles and purifying the effective substance of different plants and cooperating with European companies in the field of medicine, It should be noted that she also have a certificate in emergency medicine.

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## Environmental, Social and Governance (ESG) Practice: Does ESG Disclosure Matter for Firms Performance in Nigeria?

**Mustapha Ibrahim<sup>1</sup> and Salisu Saad<sup>2</sup>**

<sup>1</sup>Department of Accounting, University of Maiduguri, Nigeria

<sup>2</sup>Department of Accounting, Nasarawa State University Keffi, Nigeria

The expansion of investment opportunities and corporate activities has exposed investors and businesses to challenges that jeopardize environmental sustainability, social well-being, and governance structures (ESG), leading to negative impacts on the climate and global warming. To minimize these risks, firms make sustainability disclosures to demonstrate accountability, differentiate themselves, build stakeholders trust, and align operations with global best practices. This study examines the effect of ESG disclosures on market performance (dividend yield) of listed firms in Nigeria. The study selected eleven firms across three sectors based on stratified sampling comprising industrial goods, natural resources and oil and gas firms which pose the most risk to climate. Secondary data was obtained from annual financial statements and sustainability reports of the selected firms as well as the NGX Fact Book from 2011-2020. The study adopted mixed method research, utilizing Content and Quantitative Analysis. The study adopted a quantitative approach and employed a panel regression analysis to test the hypotheses formulated. The results indicate that disclosures on social and governance have significant positive effect on dividend yield while disclosure on environment has a negative and insignificant effect on dividend yield. The study recommends that social and governance sustainability should be sustained as they send positive signal to investors which leads to increase in stock price, enhance shareholders' confidence and guarantee a higher dividend in their holdings. On the other hand, companies in these sectors may need to reassess their strategic corporate policies to integrate environmental sustainability disclosures. This could include adopting a proactive environmental strategy that demonstrates a commitment to addressing climate change and other related concerns to attract potential investors. The study results are expected

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to facilitate policy discussions to mitigate climate risks through domestication of prudent environmental policies such as transiting into advanced technology to mitigate emissions and other harmful substances.

Numerous studies regarding the chemical profile of clove have revealed the presence of phenylpropanoids, monoterpenoids, sesquiterpenoids, chromones, flavonoids, phenolic acids, tannins, and fatty acids. Most of the investigations were performed on the essential oil of buds among which the phenylpropanoid compound, eugenol, was the most dominant. The other dominating components were eugenol acetate and the sesquiterpenoid compound,  $\beta$ -caryophyllene. The essential oil can be extracted from other clove parts like the leaves or stems, but these oils have a different chemical profile in comparison to the essential oil obtained from lower buds.

## Biography

Dr. Mustapha is a lecturer in the Department of Accounting, University of Maiduguri, Nigeria. In addition, he is a researcher, reviewer, external examiner, an associate editor, and a visiting lecturer. Over the years as a research scholar with keen interest in ESG sustainability, he has published novel articles and made his footprint in notable reputable journals such as Springer nature and Scopus. In addition, he partakes in the review of Springer nature journal (Berlin, Germany). He has also, as a PhD scholar, contributed immense write up on the Nigerian economy particularly on sustainability reporting, fiscal policy, financial reporting, and budgeting. The interplay between his academic and industry experiences has made him to be one of the best in his field. Dr. Mustapha has obtained skills and proficiency tailored towards his academic and professional career in the United Kingdom, Albania, India, Malaysia and Nigeria. He is a holder of BSc (Accounting), MSc (Accounting and Finance), and PhD (Accounting and Finance).

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## Optimizing Food Supply Chains in the Portuguese Air Force: Reducing Waste and Enhancing Sustainability through Lean Principles

**Ana Filipa Ferreira Ventura Caseiro**

Portuguese Air Force Academy Research Centre, Portugal

Food waste presents significant economic and environmental challenges. This research examines the application of Lean principles in the Portuguese Air Force's food supply chain, aiming to reduce waste and optimize resource management, including human resources and financial budgets. This study fills a critical gap in research on lean practices in public institutions, particularly in the military sector, through a case study conducted at an air base that implements Lean tools to identify and eliminate inefficiencies in food processes, with a focus on enhancing sustainability and minimizing waste. Key strategies included waste identification and continuous improvement, supported by feedback from semi-structured interviews and documentary analysis. The findings highlight that bureaucracy, excessive stakeholder involvement, poor delivery conditions, and short product shelf life contribute to food waste. The study suggests that improving metrics to measure and track waste in the supply chain, as well as sharing best practices across the institution, leads to continuous improvement. It also emphasizes the importance of advanced technology and sustainable practices in promoting economic efficiency and environmental responsibility. Lean methodologies provide a pathway to optimize resource allocation, enhance inventory systems, and minimize food waste, ultimately improving supply chain performance in military contexts. This research contributes to the field of waste management and resource optimization, providing insights for both military and civilian sectors that aim to enhance sustainability. The study demonstrates how Lean can effectively balance resource utilization while addressing modern and emerging threats, ensuring that rapid-response manpower is more sustainable.

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## Biography

Ana Filipa Caseiro is currently finishing her Master's Degree in Aeronautical Administration at the Portuguese Air Force Academy in Sintra. Aware of the everyday challenges in military administration and eager to learn more in other fields, such as sustainability and Lean Management, as a personal interest, the author developed this research for the conclusion of her Master's, opening new possibilities for the ongoing Portuguese Air Force Lean application to help navigate the institution to a more efficient response to the mission.

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## Women Fisher-Folk Barbados- A Gendered Lens

**Debra Joseph**

The University of the West Indies, Barbados

### Introduction and Background:

The small-scale fisheries sector tends to be firmly rooted in local communities, traditions and values. Many small-scale fishers are self-employed. Women are significant participants in the sector, particularly in processing activities. It is estimated that about 90 percent of all people directly dependent on capture fisheries work in the small-scale fisheries sector. As such, small-scale fisheries serve as an economic and social engine, providing food and nutrition security, employment and other multiplier effects to local economies while underpinning the livelihoods of riparian communities (SSF, 2015).

This research forms part of the Gender in Fisheries Team (GIFT) Research Framework. It examines the livelihood assets the women possess, the livelihood strategies they use and livelihood outcomes they may need.

### The Aims:

1. To discover what are the challenges, successes and gaps in the livelihoods of women fisherfolk.
2. To examine these gaps and provide recommendations for improved and enhanced quality of life and sustainable livelihoods.
3. To influence social policy in the area of fisheries.

### Methodology:

It is a qualitative study based on:

1. Case Study Research, focusing on the livelihoods of 10-12 women fisher folk who are fisherwomen and or fish processors. A semi-structured interview protocol was developed to



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examine the lives of these women (11), their challenges, issues and problems and what they need to help them function both effectively and efficiently in their jobs.

2. Photo Voice another methodology will be used. It is a participatory method articulated by Caroline Wang and Marie Anne Burris (1997).

## Results:

- Analysis Nvivo 12 Pro Software.
- Questions used for this presentation.

## Themes:

- Job satisfaction.
- Challenges.
- Is it different for women than men in the fishing industry.
- Needs.

## Biography

Dr. Debra D. Joseph is the coordinator of and tenured lecturer in Social Work at the University of the West Indies, Cave Hill, Barbados. She is also the Graduate coordinator. She is also a clinical social worker who has worked with individuals and families for over 14 years. She is also an avid supporter and researcher of social work's involvement in climate change, environmental sustainability, has published in these areas. She is also the recipient of the Jeremy Collymore Award for Research in Humanitarian Response and Disaster Risk Management 2019. Dr. Joseph has published two books entitled: 1) The Impact of Climate Change on Vulnerable Population. This is an open access book and can be downloaded from online and 2) Climate Change- Intervention Strategies and Sustainable Development in the Global South.



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