

VIRTUAL EVENT

3rd GLOBAL SUMMIT ON

ADVANCES IN EARTH SCIENCE AND CLIMATE CHANGE



SEPTEMBER 26-27, 2024



PROGRAM-AT-A-GLANCE >>

**YOUR FIRST CHOICE
FOR RESEARCH
INGENUITY**

ADV. ESCC 2024

DAY 1

SEPTEMBER 26, 2024

Scientific Program

BST - British Summer Time

06:45-07:00 Opening Ceremony

Topics: Earth Science | Climate Change | Soil Science | Climate Change and Human Health | Renewable Energy | Green Technology Innovation | Climate Resilient Infrastructure | Pollution Control | Biodiversity | Atmospheric Chemistry | Natural Hazards | Oceanography | History of Pandemics Effect on Climate Change | Sewage Treatment

Distinguished Speaker Talks

07:00-07:20

Title: Energy application of fullerene nanowhiskers and related fullerene nanomaterials

Kun'ichi Miyazawa, Tokyo University of Science, Japan

07:20-07:40

Title: Application of space technology to combat climate change in China: Status quo, shortcoming, and possible ways out

Yongliang Yan, Beijing Jiaotong University, China

07:40-08:00

Title: AI-empowered educational metaverse for climate change awareness and mitigation: An interdisciplinary approach

Dongxing Yu, Sanda University, China

08:00-08:20

Title: Constructing the efficacy of adaptive capacity-building strategies in earthquake-prone communities

Bih-Chuan Lin, Da-yeh University, Taiwan

08:20-08:40

Title: Exploring spatial transformation through Le Corbusier's concept of 'unlimited growth': A case study of university campus space adaptation

Xuan-Xi Wang, Dayeh University, Taiwan

08:40-09:00

Title: Eisenhower's cold war in Greenland and climate change

David M. Watry, University of Malta, Malta

09:00-09:20

Title: Asphalt mixtures incorporating electric arc furnace slag and basic oxygen furnace slag as partial replacement for conventional aggregates in road construction

Naveen GM, Government Engineering College, Kushalnagar, India

09:20-09:40

Title: Upper-air meteorological elements in climate study

Rajasri Sen Jaiswal, *Gopalan College of Engineering, India*

Refreshment Break 09:40-09:55

09:55-10:15

Title: Nature-like mining technology - A local solution to global problems

Kalabin Gennady V and Galchenko Yuri, *Institute for Problems of Integrated Development of Subsoil named after Academician N.V. Melnikov of the Russian Academy of Sciences, Russia*

10:15-10:35

Title: Development of the biological turnover theory

Argenta A. Titlyanova, *Institute of Soil Science and Agrochemistry of the Siberian Branch of the Russian Academy of Science, Russia*

10:35-10:55

Title: Comparative predictions of turbulent non-isothermal flow of a viscoplastic fluid with yield stress

Maksim Pakhomov, *Kutateladze Institute of Thermophysics, Siberian Branch of the Russian Academy of Science, Russia*

Uzak Zhapbasbayev, *Satbayev University, Kazakhstan*

10:55-11:15

Title: Complex restoration of oil-contaminated soils with new reagents containing multicomponent alloys

Akhanova Tanzilya Rinatovna, *Satbayev University, Kazakhstan*

11:15-11:35

Title: How accurate can be the information on the building stock of a large city for seismic analysis

Carlos Sousa Oliveira, *Universidade de Lisboa, Portugal*

11:35-11:55

Title: Nurturing innovative work behaviour through workplace learning among knowledge workers of small and medium businesses

Syed Tanveer Hussain Shah, *Abdul Wali Khan University, Pakistan*

11:55-12:15

Title: Impact of diversity management on organizational performance in hotel organizations: A conceptual framework

Astha Bhanot, *Princess Nourah bint Abdulrahman University, Saudi Arabia*

12:15-12:35

Title: Effect of some biopesticides based on essential oil and plant extracts on postharvest mango stem-end rot disease caused by *Lasiodiplodia theobromae*

Yefounignui Souleymane Yeo, *University Félix Houphouët-Boigny, Côte d'Ivoire*

Lunch Break 12:35-13:10

13:10-13:30

Title: Dendroremediation of arsenic: Time-dependent processes in selected forest tree species

Sylwia Budzyńska, *Poznań University of Life Sciences, Poland*

13:30-13:50	<p>Title: Green practices and green innovation: The mediated-moderated role of value co-creation and green creativity</p> <p>Theresa Obuobisa-Darko and Stewart Hevi, <i>Ghana Communication Technology University, Ghana</i></p>
13:50-14:10	<p>Title: Taiwan river muds from source to sink: Provenance control, inherited weathering, and offshore dispersal pathways</p> <p>Kalyani Nayak, <i>CEG Laboratories, UK</i></p>
14:10-14:30	<p>Title: Environmental sustainability and intelligence as well as general green technologies</p> <p>Jinsong Wu, <i>University of Chile, Chile</i></p>
14:30-14:50	<p>Title: Evaluating the associations between environmental contaminants, climate change, and human health outcomes within the United States</p> <p>Naveen Joseph, <i>Radford University, USA</i></p>
14:50-15:10	<p>Title: Urban climate dynamics: Analyzing the impact of green cover and air pollution on land surface temperature-A comparative study across Chicago, San Francisco, and Phoenix, USA</p> <p>Sepideh Azizi, <i>University of Illinois Urbana champaign, USA</i></p>
Refreshment Break 15:10-15:25	
15:25-15:45	<p>Title: A report on the study for rational and reliable pattern mining</p> <p>Tongyuan Wang, <i>TechEngine Plus Com, Montreal, Canada</i></p>
15:45-16:05	<p>Title: What are smart neighborhoods? A definition based on data from a city in Argentina</p> <p>María Verónica Alderete, <i>Instituto de Investigaciones Económicas y Sociales del Sur, Argentina</i></p>
Panel Discussion	
End of Day 1	



06:45-07:00 Opening Ceremony

Topics: Earth Science | Climate Change | Soil Science | Climate Change and Human Health | Renewable Energy | Green Technology Innovation | Climate Resilient Infrastructure | Pollution Control | Biodiversity | Atmospheric Chemistry | Natural Hazards | Oceanography | History of Pandemics Effect on Climate Change | Sewage Treatment

Distinguished Speaker Talks

07:00-07:20

Title: Exploring strategies for fostering children's risk-friendly spaces

Marion Sturges, *Western Sydney University, Australia*

07:20-07:40

Title: Acidification prior to drying of digestate solids affects nutrient uptake and fertilizer value when applied to maize

Jingna Liu, *Sun Yat-Sen University, China*

07:40-08:00

Title: A study on traditional and modern Japanese tea houses

Yun-Chia Chang, *Dayeh University, Taiwan*

08:00-08:20

Title: The exploration of intrinsic spatial fluidity: A case study of contemporary small residences in Japan

Yuan-Zhen Li, *Dayeh University, Taiwan*

08:20-08:40

Title: Exploring the spatial implications of minimalist architecture in residential spaces

Tzu-Wei Tu, *Dayeh University, Taiwan*

08:40-09:00

Title: 'From Protests to Wall Art!': Introducing Environmental Issues in Three Master Theses (Department of English, College of Arts, University of Mosul, Nineveh, Iraq)

Huda Halawachy, *University of Mosul, Iraq*

09:00-09:20

Title: "Murals Transform Communities" The Social Identity of the Artists' Murals in Mosul and Erbil: A Thematic Approach

Shamal Shakir Taher, *University of Mosul, Iraq*

09:20-09:40

Title: Data-driven AI (Artificial Intelligence) detection furnishes economic pathways for microplastics

Shefali Arora, *University of Petroleum and Energy Studies (UPES), India*

Refreshment Break 09:40-09:55

09:55-10:15

Title: Targeting mineral resources with remote sensing and field techniques: A case study from South Purulia Shear Zone

Pankajini Mahanta, *Fakir Mohan University, India*

10:15-10:35

Title: The role of magnetism in the origin of Saturn's visible dense rings

Vladimir Tchernyi, *Modern Science Institute, SAIBR, Russia*

10:35-10:55

Title: Vulnerability assessment of springflow using groundwater aquifer storage-discharge model in Indian middle Himalaya

Soukhin Tarafdar, *G.B. Pant National Institute of Himalayan Environment, Garhwal Regional Centre, India*

10:55-11:15

Title: Siberian traps and Permian-Triassic mass-extinction: Do they link?

Nadezhda Krivolutskaya, *Vernadsky Institute of Geochemistry and Analytical Chemistry RAS, Russia*

11:15-11:35

Title: A climate health policy: Will it be a better approach to overcome the greatest global challenge of the 21st century? A review to explore public and public health officials' perceptions towards policy development

Lilanga Hasini Fernando Batawalage, *Edinburgh Napier University, UK*

11:35-11:55

Title: Modelling and tracing green house gases rupturing stratopause rate of the earth using radionuclides curium rutherfordium inter atomic nuclear chain reaction in space with helium nuclide

Niranjan Kumar, *Kumar International R & D Consultant Pvt Ltd, India*

11:55-12:15

Title: Rethinking Green Infrastructure as a Multifunctional Approach

Mosissa Samuel Tsegaye, Shen Zhongwei and Tekelemariam Eden, *Southwest Jiaotong University, China*

12:15-12:35

Title: Multiscale geological modelling to enhance conceptual understanding in complex environments

Hayet CHIHI, *Georesources Laboratory, Centre for Water Research and Technologies, Tunisia*

Lunch Break 12:35-13:10

13:10-13:30

Title: Leveraging energy-efficient high-performance computing with Flamingo Search Algorithm for sustainable precision agriculture in the context of climate change adaptation

Paul Rodrigues, *King Khalid University, Saudi Arabia*

13:30-13:50

Title: Brain re-engineering and the use of information systems (Mobile Phone App) for enhancing smallholder farmers' productivity in South Africa

Ikechi Kelechi Agbugba, *York St John University, UK and Rivers State University, Nigeria*

13:50-14:10

Title: On the values of deformation area and location of strong earthquake aftershocks on the earth's surface

Eduard Y. Khachiyan, *Institute of Geological Sciences, National Academy of Sciences of the Republic of Armenia, National University of Architecture and Construction of Armenia, Armenia*

14:10-14:30

Title: Mitigation measures of mining waste impact on the environment by reprocessing for sustainable development

Chiraz Abdelmalak Babbou, *University of Tunis El Manar, Tunisia*

14:30-14:50

Title: A tale of two cities: Report on a comparison of air pollution governance in the Los Angeles area of the USA and the Beijing-Tianjin-Hebei area of China

Wang Xi, *Shanghai Jiao Tong University, China*

Richard Ottinger, *Pace University, USA*

14:50-15:10

Title: Complex slab geometry beneath the Colombian eastern cordillera revealed by high-precision earthquake relocation

Carlos Andrés Vergara Espinosa, *Universidad Industrial de Santander, Colombia*

15:10-15:30

Title: Effect of a chitosan-based packaging material on the domestic storage of "ready-to-cook" meat products: Evaluation of biogenic amines production, phthalates migration, and in vitro antimicrobial activity's impact on aspergillus Niger

Nicoletta De Vietro, *University of Bari Aldo Moro, Italy*

Panel Discussion

End of Day 2



DISTINGUISHED SPEAKER TALKS

DAY 1

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Energy application of fullerene nanowhiskers and related fullerene nanomaterials

Kun'ichi Miyazawa

Department of Industrial Chemistry, Faculty of Engineering, Tokyo University of Science, Japan

Fullerene nanowhiskers (FNWs) are thin single-crystal fibers composed of C_{60} , C_{70} , endohedral, or functionalized fullerene molecules [1]. FNWs exhibit n-type semiconducting properties and have a diverse range of energy, biology and environmental applications such as solar cells, superconductors, and scaffolds for cell growth, photocatalysts and fuel cell catalysts. FNWs can be synthesized using a facile method called “liquid-liquid interfacial precipitation (LLIP) method”. In addition to the fibrous fullerene nanomaterials, two-dimensional fullerene nanomaterials such as fullerene nanosheets and micron-size cubic crystals composed of fullerene molecules can be synthesized using the LLIP method as well. The LLIP synthesis of fullerene nanomaterials can be conducted at cool room temperature using simple apparatuses such as glass bottles and refrigerators. Various catalytic elements can be doped into the fullerene nanomaterials in solution. This paper reviews recent research development of the low-dimensional fullerene nanomaterials. [1] Fullerene Nanowhiskers (Second Edition), edited by K. Miyazawa, Y. Ochiai, M. Tachibana, T. Kizuka, and S. Nakamura (Pan Stanford Publishing Pte. Ltd., 2019).

Biography

Dr. Kun'ichi Miyazawa is now working with Nano Alloy Technology Inc. (Nagaoka, Japan), and also with Tokyo University of Science as a visiting researcher. He received Doctor of Engineering degree from The University of Tokyo in 1987. He was a lecturer in the School of Engineering at The University of Tokyo from 1989 to 2002, and moved to National Institute for Materials Science (NIMS) in 2002, where he studied various fullerene nanomaterials as a group leader of Fullerene Engineering Group. From 2016, he has been mainly engaged in the transmission electron microscopy study of fullerenes, carbon and metal nanomaterials.



Application of space technology to combat climate change in China: Status quo, shortcoming, and possible ways out

Yongliang Yan¹, Xingyu Yang¹, Yanzhang Zeng², Xu Qi¹ and Dejiezi Zhou¹

¹School of Law, Beijing Jiaotong University, China

²School of Mechanical, Electronic and Control Engineering, Beijingjiaotong University, China

Space technology has a key role in climate actions, including climate change monitoring, weather forecasting, disaster management, and search and rescue operations. China as a major spacefaring power attaches importance to the application of space technology to combat climate change. This research conducts a comparative analysis of China's practices of applying space technology in climate actions and similar practices of other countries, such as the USA, Canada, and Japan, and some international organizations, such as ESA, in an attempt to review the limitation of China's practices in the application of space technology to combat climate change and formulate several models for other countries to follow in their climate actions, in particular in the area of space capacity building. Current international law, including the Outer Space Treaty of 1967, the United Nations Framework Convention on Climate Change (UNFCCC) of 1992, the Paris Agreement of 2015, and the Glasgow Climate Pact of 2021, has provided some important rules for the application of space technology to combat climate change. However, it is noteworthy that China has not provided a systematic legal or policy-level regime for applying space technology to combat climate change. Under such circumstances, this article proposes that China should consider establishing a systematic legal framework for coordinating national efforts to combat climate change through space technology efficiently and effectively. The regimes under the legal framework may at least include an institutional coordination regime, space technology and resource integration regime, space capacity building regime, information sharing regime, and international cooperation regime for space technology application in the areas of climate change monitoring, weather forecasting, disaster management, and search and rescue operations.

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Biography

Yongliang Yan is an Assistant Professor of Law at the Law School of Beijing Jiaotong University in China. He holds an LL. B and an LL.M from Shenzhen University in China, and a Ph.D. from the University of Hong Kong. His work centers on questions of the long-term sustainability of outer space activities, anti-weaponization, space weather, space law education, space capacity building, environmental ethics, climate change, emergency management in outer space, etc. He teaches Public International Law (in English) and International Organizational Law (in Chinese). His current research areas include Space Law, Aerospace Technology Law, International Environmental Law, and interdisciplinary research.



AI-empowered educational metaverse for climate change awareness and mitigation: An interdisciplinary approach

Dongxing Yu

Sanda University, China

Climate change presents one of the most pressing challenges of our time, threatening global economic stability and sustainable development. This presentation explores an innovative, interdisciplinary approach to climate change education and mitigation through the integration of Artificial Intelligence (AI) and Educational Metaverse technologies. Drawing from our research at Sanda University's Institute for Education and Sustainable Development and the VR Education Lab, we present a novel framework for immersive, AI-driven learning experiences that enhance climate change awareness and foster sustainable practices.

Our approach leverages cutting-edge AI technologies, including large language models and generative AI, to create adaptive, personalized learning environments within an educational metaverse. This virtual space allows learners to visualize complex climate systems, interact with simulated environments, and understand the long-term impacts of human activities on the global climate.

Biography

Dr. Dongxing Yu is an Associate Professor and department chair at Sanda University, specializing in Teaching Chinese to Speakers of Other Languages (TCFL). With a background in linguistics and educational technology, he has made significant contributions to the fields of AI, metaverse, and online education. Dr. Yu is at the forefront of research on integrating these technologies to create immersive and personalized learning experiences, particularly in the context of climate change education and sustainable development. His work at Sanda University's Institute for Education and Sustainable Development and VR Education Lab focuses on developing AI-powered virtual instructors and immersive VR scenarios to enhance climate literacy and foster sustainable practices. Dr. Yu's interdisciplinary approach combines linguistics, educational technology, environmental science, and computer science to create innovative solutions for global challenges.



Constructing the efficacy of adaptive capacity-building strategies in earthquake-prone communities

Bih-Chuan Lin¹ and Chun-Hung Lee²

¹Department of Architecture and Interior Design /Graduate School of Architecture, Da-yeh University, Taiwan

²Center for Interdisciplinary Research on Ecology and Sustainability, College of Environmental Studies, National Dong Hwa University, Taiwan

Earthquakes are unpredictable natural disasters with the potential to cause severe damage to human lives and property. Therefore, developing community-based disaster management strategies that integrate community participation, coordination, and adaptive capacity within disaster organisations is crucial for effective disaster management. This study uses the importance-performance analysis (IPA) method to assess the efficacy of adaptive capacity-building strategies in earthquake-prone communities. The IPA results highlight the significance of adopting a collaborative and community-centred approach to disaster management. Specifically, the study indicates that both urban and suburban residents prioritise establishing community disaster crisis teams and empowering non-governmental organisations (NGOs) to enhance preparedness and recovery efforts. Meanwhile, suburban residents emphasise the need for community disaster management structures, along with regular prevention lectures, courses, training, and drills to improve residents' disaster preparedness and awareness. The collaboration between governments and non-profit organisations plays a crucial role in strengthening communities' resilience against disasters. These findings offer valuable insights into theoretical design and decision-making processes for implementing adaptive capacity-building strategies in earthquake-prone communities.

Biography

Bih-Chuan Lin is an Assistant Professor in the Department of Architecture and Interior Design and the Graduate School of Architecture at Da-yeh University, Taiwan. She earned her Ph.D. in Natural Resources and Environment Studies from National Dong Hwa University (NDHU) in 2023. Previously, she was a Ph.D. candidate at National Cheng Kung University (NCKU) and completed her Master of Architecture at King Saud University (KSU) in 2004.

Dr. Lin's professional experience includes roles as an architecture designer for Jingsi Temple & Tzu Chi

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Foundation and work with the CECI Engineering Division. She also has experience as an international visiting lecturer and is currently an editor for several journals, including the Disaster and Emergency Medicine Journal, Building Engineering Journal, and the Journal of Intelligent Control and System Engineering.

Her recent research focuses on disaster management and urban resilience, with publications in journals such as the International Journal of Disaster Risk Reduction and the International Journal of Natural Hazards. Her notable projects include evaluating ecosystem services on the Hualien East Coast and assessing the impact of land use changes due to photoelectric development.

Dr. Lin has been recognized with several awards, including the Best Researcher Award at the International Research Awards on Global Business, Economics, Finance, and Social Science in September 2023.



Exploring spatial transformation through Le Corbusier's concept of 'unlimited growth': A case study of university campus space adaptation

Xuan-Xi Wang², Bih-Chuan Lin¹ and Chin-Feng Lin³

¹Assistant Professor, Graduate School of Architecture, DaYeh University, Taiwan

²Master Student, Graduate School of Architecture, DaYeh University, Taiwan

³Project Assistant Professor-level professional technic, Department of Architecture and Interior Design, Dayeh University, Taiwan

With Taiwan grappling with ongoing demographic challenges stemming from declining birth rates, the demand for university educational space has gradually decreased. This has resulted in significant amounts of campus space lying vacant. Since 2023, several universities have stopped admissions annually, and this number is expected to increase to five more in 2024, making the reuse of campus space an urgent priority. While Taiwan has extensively discussed and studied the reuse of idle campus space, university campuses often have dispersed spatial organization, necessitating reorganization to meet new societal demands.

This study adopts Le Corbusier's concept of "unlimited growth" to propose strategies for the adaptive reuse of university campus spaces in Taiwan. Le Corbusier's architectural philosophy emphasizes adaptability and scalability to address evolving social needs. Analyzing these principles, this research identifies practical approaches for effectively transforming university campuses to serve societal needs better. The principles of flexibility and sustainability inherent in Le Corbusier's design philosophy offer valuable guidance for the adaptive reuse of campus spaces.

This research offers theoretical support and practical guidance for architects, urban planners, and policymakers aiming to achieve sustainable development of university campus spaces amidst demographic changes in Taiwan.

Biography

Wang Xuan-Xi is a graduate student in the Graduate School of Architecture at Da-Yeh University, Taiwan. She specializes in spatial design, with a strong interest in the adaptive reuse of existing buildings. Wang Xuan-Xi is also skilled in engaging in relevant discussions and contemplations within her field, showcasing her dedication to architectural innovation and thoughtful design.



Eisenhower's cold war in Greenland and climate change

David M. Watry

Campus Hub, University of Malta, Malta

The Eisenhower administration advertised Camp Century, a U.S. Army base with a nuclear reactor under northern Greenland's ice, as a scientific project to the Danish government and the American public. They concealed a covert military plan to construct tunnels and silos for up to 600 nuclear missiles. Camp Century led to an enormous amount of radioactive, chemical, and biological waste under Greenland's ice. Eisenhower had used diplomatic *fait accompli* tactics to achieve his Cold War military objectives. In the end, Camp Century had to be demolished, threatening incalculable damage to Greenland's environment from a combination of radioactive waste and melting ice from 21st century climate change. This story raises critical issues about diplomacy, military strategy, scientific research, nuclear technology, and climate change. Ironically, the Danish government had tried to supervise and control American military goals in Greenland to be in accordance with their no nuclear weapons on Danish soil policy. At one point, the U.S. inquired if Denmark really wanted to know about nuclear weapons in Greenland. The Danish prime minister skillfully dodged the question maintaining a certain "plausible deniability" on his knowledge of nuclear weapons in Greenland. The U.S. Army also employed secrecy and deception regarding "Project Iceworm." Amazingly, Camp Century did provide significant scientific research on climate change. Scientists drilled to the bottom of Greenland's ice cap, which provided valuable and precise information about climate change from the distant past to the present. Unfortunately, the removal of the nuclear reactor led to a devastating discharge of radioactive wastewater into the ice cap. The Camp Century site threatens Greenland and the world with an ecological cataclysm due to global warming. This is a clear warning to future generations about the real hazards and dangers of climate change.

Biography

David M. Watry has a Ph.D. in Transatlantic History from the University of Texas at Arlington. He has recently studied and researched climate change at the Institute for European Studies, University of Malta. Watry wrote 'Ike's folly in Greenland' a book review of 'Camp Century: The Untold Story of America's Secret Arctic Military Base Under the Greenland Ice' by Kristian H. Nielsen and Henry Nielsen. He has also written 'Diplomacy at the Brink: Eisenhower, Churchill, and Eden in the Cold War' a book about Anglo-American relations and diplomacy during the 1950s.



Asphalt mixtures incorporating electric arc furnace slag and basic oxygen furnace slag as partial replacement for conventional aggregates in road construction

G. M. Naveen¹ and K. N. Chandrashekar Gowda²

¹Civil Engineering Department, Government Engineering College, Kushalnagar, India

²Department of Civil Engineering, Maharaja Institute of Technology Mysore, India

The usage of unconventional aggregate materials in road construction is still in the experimental stage. A possible environmental risk is the continued use of conventional aggregates in the construction of roads and highways. The issue may be resolved by sensible mitigating measures and essential research on substitute aggregate materials. The present article investigates the laboratory performance of asphalt mixtures incorporating electric arc furnace slag (EAF) and basic oxygen furnace (BOF) slag as partial replacements (10%,30%and50%) for conventional aggregates. The characteristics of the asphalt mixture's mix design, including abrasion loss, moisture sensitivity, rutting resistance, fatigue behaviour, and resilient modulus, were investigated. Results indicate that the mix design properties of asphalt mixtures with EAF and BOF slag were within the requirements. Further, the incorporation of EAF and BOF slag in asphalt mixtures reduced abrasion loss irrespective of replacement percentage. Moisture sensitivity, rutting, fatigue, and resilient modulus properties of asphalt mixtures with 30% EAF slag were higher compared to asphalt mixtures with 30% BOF slag and conventional mixtures. However, asphalt mixtures with 50% replacement of EAF and BOF slag were lower compared to control mixtures. According to the findings, the optimum replacement percentage for EAF and BOF steel slag is 30% conventional aggregate. When compared to BOF steel slag, EAF steel slag performed better in terms of moisture sensitivity, rutting resistance, fatigue behaviour, and resilient modulus. The results of this study can be used as a reference for creating recycled asphalt mixtures with slag aggregates sourced from the steel industry.

Biography

Dr.Naveen G M, is working as Head of the Department in Government Engineering College Kushalnagar, Karanataka, India-571234, received his BE degree from UBDT college Davangere; M.Tech in MCE,Hassan and Ph.D at National Institute of Engineering, Mysore under VTU. Research interests include the Reinforced Concrete Structure and steel structure Analysis and design in civil structures.



Upper-air meteorological elements in climate study

Rajasri Sen Jaiswal^{1,2}, Neela V S and Rasheed M

¹Gopalan College of Engineering, India

²Centre for Study on Rainfall and Radio Wave Propagation Sona College of Technology, India

The upper air meteorological elements, namely the Cloud Liquid Water (CLW), Precipitable Water (PW), and Latent Heat (LH) from Earth's surface up to 18 km above, are the key elements that provide an excellent quantitative estimate of surface rainfall. The author investigated these elements over a few locations in India and 35N-35S and 180E-180W.

The level where the CLW attains its peak is crucial in climatology. The author termed this level HPCL, by the author. It is because the PW at the HPCL explains the rainfall time series. The study shows that the higher the PW at HPCL, the higher the surface rainfall. This result holds over all the locations under investigation. The author obtained the CLW, PW, LH, and rainfall values from the data product 2A12 of the Tropical Microwave Imager (TMI) onboard the Tropical Rainfall Measuring Mission (TRMM) satellite. The TMI provides CLW, PW, and LH at 14 levels from the surface up to 18 km above.

Each element shows significant correlations with surface rainfall with a very high R^2 , especially when these enter the regression technique simultaneously. Thus, the CLW, PW, and LH are the crucial parameters in producing rainfall.

By realizing the positive correlation of these elements with surface rainfall, the author wished to investigate if these have any role in causing cyclones. The author studied the occurrence of cyclones in a few coastal locations in India and the vertical profiles of CLW, PW, and LH. The investigation indicates the occurrence of severe weather at a given place. It also shows that the occurrence probability of severe weather and the rainfall intensity, as well, increase as the number of the multiple LH evolution peaks (MLHevol) increases. This finding holds in every season and over every location studied in India. The multiple LH evolution peaks in the 9th-14th levels indicate severe weather.

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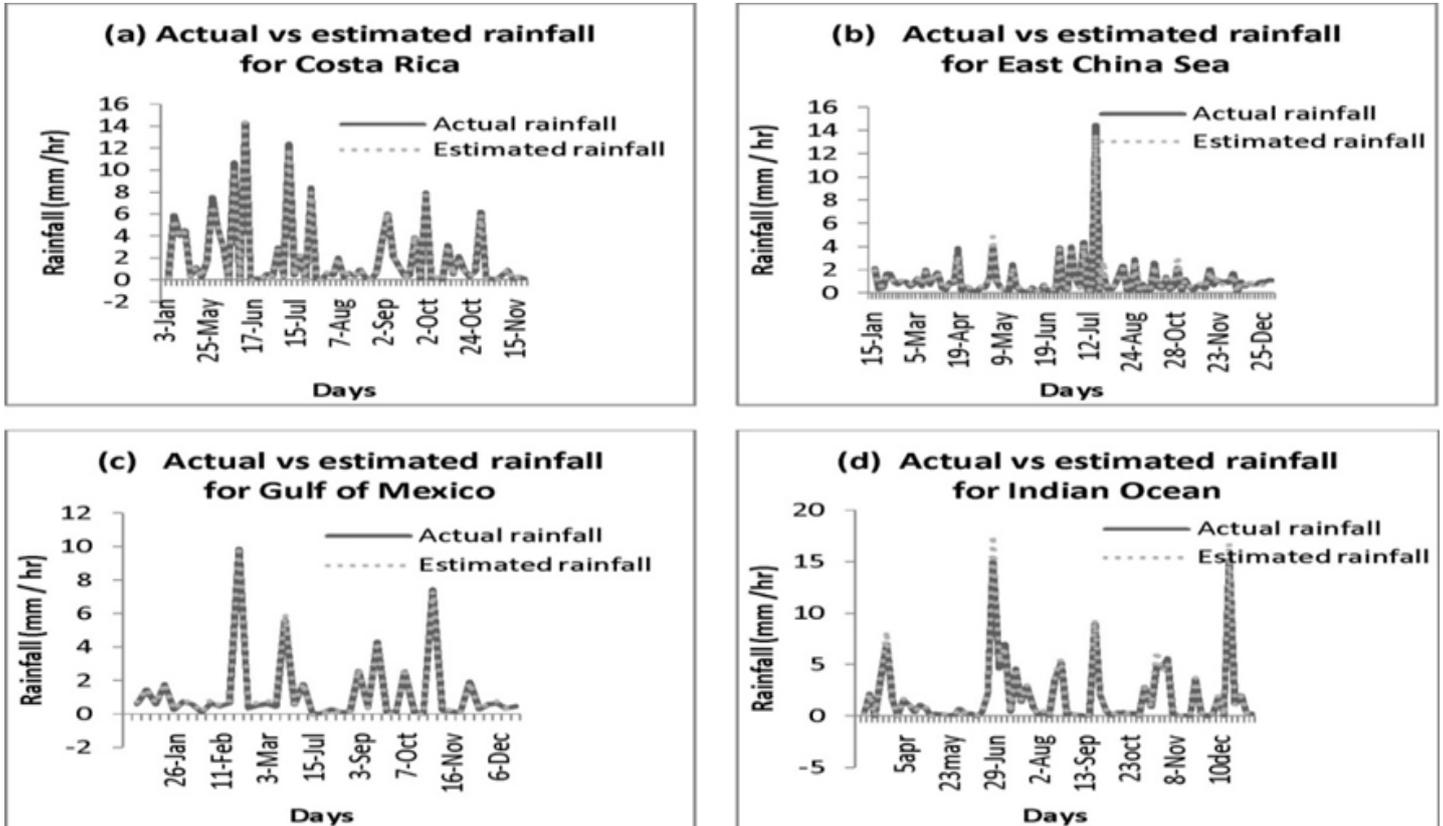


Figure 1 Actual vs. estimated rainfall over (a) Costa Rica, (b) East China Sea, (c) Gulf of Mexico, and (d) Indian Ocean

Biography

Dr. Rajasri Sen Jaiswal is the Head of the Centre for Study on Rainfall and Radio Wave Propagation and a Professor of Physics at Sona College of Technology, Salem, Tamil Nadu, India. Her areas of research are the Sun-Earth link, Remote sensing of atmosphere, oceans, and clouds, and Radio wave propagation. She has presented her research findings at International Conferences in twenty countries covering Asia, Europe, and the United States. Apart from teaching and research, she provides extension services to the students, faculties, and researchers in conducting Webinars, Conferences, and Faculty Development Programs and arranging Internships/Workshops/Training for the students. She involves the students in research. She is the Reviewer of several Journals and Conference Proceedings.



Nature-like mining technology - A local solution to global problems



Kalabin G.V and **Galchenko Yu.P**

Institute for Problems of Integrated Development of Subsoil named after Academician N.V. Melnikov of the Russian Academy of Sciences, Russia

Over the last millennium of the existence of civilization, a new form of human interaction with the Earth's biosphere has emerged - a permanent anthropogenic crisis generated by the growing discrepancy between the level of consumption and the resource capabilities of the Planet. At the present stage of the crisis of the geospheres, the artificial anthroposphere, built on the basis of matter and energy extracted from the bowels of the Planet, absorbs all the natural geospheres of the Earth in volumes exceeding the protective capabilities of their self-healing. The prospects for a radical solution to this problem today are connected not with the constant innovative development of existing mining technologies, but with the need to change the general concept of the technological paradigm for the development of the mineral resource complex in the direction of ensuring an environmental rather than an economic imperative.

At the stage of cognitive analysis, a scientific hypothesis was put forward and developed, suggesting that the degree of coincidence of the properties of natural and artificial systems is determined by the degree of homeostatic similarity of their functional structures. The competence of transforming a biological homeostat into a technological one was proven by replacing its content elements with anthropogenic target analogues.

Biotechnological principles for the formation of natural-technical systems that ensure parallel, non-destructive development of their antagonistic components are formulated:

- the principle of preventiveness - eliminating or minimizing the negative impact of technogenic factors before the start of mass extraction of lithosphere matter;
- the principle of selectivity - only minerals are extracted and brought to the surface;
- the principle of tolerance - regulation of the interaction between the techno- and biosphere solely according to biological indicators and criteria;
- the principle of energy security - the use of energy from natural renewable sources;

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- the principle of a closed cycle, reflecting the need for waste-free production.

Methods for transforming general principles into the structure of technological clusters of mining technical systems for the development of deposits of the main geological and morphological types are substantiated. Basic designs of nature-like mining technologies have been created and patented, providing a co-evolutionary form of interaction between the components of the bio- and technosphere during the extraction of solid minerals.

Biography

Kalabin Gennady - mining engineer, Doctor of Technical Sciences, Professor, Honored Scientist of the Russian Federation, Chief Researcher at the Institute for Problems of Integrated Development of Subsoil of the Russian Academy of Sciences, named after Academician N.V. Melnikov (Moscow). Director-organizer of the Institute for Problems of Industrial Ecology of the North of the Kola Scientific Center of the Russian Academy of Sciences (Apatity, Murmansk region). Specialist in the field of exploration of the Earth's subsoil, geoecology and aero- and thermodynamics of mining operations. Author of more than 280 scientific publications.

Galchenko Yuri - mining engineer, Doctor of Technical Sciences, professor, chief researcher at the Institute for Problems of Integrated Mineral Resources Development of the Russian Academy of Sciences, named after Academician N.V. Melnikov (Moscow). Specialist in the field of exploration of the Earth's interior, geoecology and explosive destruction of rocks. Author of more than 450 scientific publications.

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Development of the biological turnover theory

Argenta A. Titlyanova

Institute of Soil Science and Agrochemistry of the Siberian Branch of the Russian Academy of Science, Russia

In the biological turnover of ecosystems in temperate zones, grasslands are distinguished by high net primary production, the predominance of below-ground plant organs over above-ground ones, and stability.

The stability of grasslands over time is determined by changes in species composition, various survival strategies of organisms, high productivity of dominant plant species, the fund of seeds in the soil and their introduction by the wind and water flowing down the catena from other ecosystems, and the rapid release of nutrients from plant residues during their mineralization.

Research of various ecosystems have shown that climatic and weather conditions, the position and exposure of the ecosystem in the relief, and soil properties determine the amount of net primary production of grasslands.

In every ecosystem of the Earth there is not only a turnover, but also continuous potent incoming and outgoing flows of substances and energy produced by humans.

Anthropogenic pressure changes the structure of the exchange processes in and between the atmosphere, hydrosphere, phytosphere and lithosphere. Origins: globalization of consumption patterns, extraction and transportation of natural resources, production of goods requiring the presence of various components that are delivered from different countries and continents.

Potent anthropogenic flows pass and affect all layers of the biosphere and all ecosystems. These flows are formed by land transport (railways and roads), sea and river routes, various pipelines and air traffic from country to country, from continent to continent. The amount of transported substance by humans is many times greater than natural flows of substances. The boundaries between ecosystems are collapsing – the city turns into a village, the village into a field, the field into a village, and so on. In the concrete there are no undisturbed ecosystems left. Under human influence, the types of ecosystems change, thus forests are often replaced by swamps

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in the north, in the south - by deserted steppes. The well known model of biological turnover is outdated, so now the turnover of substances does not look like a circle, but a network of diverse processes. Each cell of the network is a cycle of a certain ecosystem; there is a continuous exchange of matter and energy across the boundaries of the cell. In the network the law of conservation of matter and energy works, as well as, known to us, the law of the bottleneck, which can be either the substance or the speed of the process, and, probably, other network laws that are still unknown to us.

Biography

Dr. Argenta A. Titlyanova is the Chief Scientific Officer at the Institute of Soil Science and Agrochemistry of the Siberian Branch of the Russian Academy of Sciences since 1999.

She graduated from Leningrad State University in 1952 with a degree in radiochemistry and obtained a doctorate in biology from Novosibirsk in 1978.

Her career highlights include serving as Deputy Dean of the Natural Science Department at Novosibirsk State University (1964-1971), researcher at the Institute of Soil Science and Agrochemistry (1970-1972), and head of the Biogeocenology Laboratory at the Institute of Soil Science and Agrochemistry (1972-1999).

Her research focuses on grass ecosystem productivity, stability, and succession; nutrient cycling; and biological turnover.

She has authored significant publications on ecosystem functions and biological turnover, including books and journal articles.

Dr. Titlyanova has served on the editorial boards of *Vegetatio* and *Journal of Vegetation Science* (1981-1993) and was head of the "Grasslands" section in the Council on Biogeocenology at the USSR Academy of Science (1983-1991).



Comparative predictions of turbulent non-isothermal flow of a viscoplastic fluid with yield stress

M. Pakhomov¹ and U. Zhapbasbayev²

¹Kutateladze Institute of Thermophysics, Siberian Branch of the Russian Academy of Science, Russia

²Satbayev University, Kazakhstan

RANS simulation of turbulent non-isothermal flow in a pipe by transition of Newtonian high-viscosity waxy crude oil into a viscoplastic non-Newtonian fluid is carried out. The turbulence of fluid flow in a pipe is described using elliptical relaxation Reynolds stress model (second-moment closure) of Manceau and Hanjalić (Phys. of Fluids, 2002). The effective (apparent) viscosity is defined using the simple linear Bingham-Schwedoff rheology model. The viscosity of the non-Newtonian turbulent fluid depends not only on the average turbulent velocity of the flow, but also on fluctuations of the shear rate tensor Gavrilov and Rudyak (Int. J. Non-Newtonian Fluid Mech., 2016). The set of governing RANS equations of continuity, momentum in axial and radial directions, and the energy of a turbulent incompressible non-Newtonian fluid has the form Pakhomov and Zhapbasbayev (Heliyon, 2024).

The aim of the present paper is to investigate the flow and heat transfer in a turbulent hydrodynamically steady-state incompressible non-Newtonian fluid flowing in a round pipe.

The simulations show the boundaries of the region of manifestation of Newtonian behavior and fluid transition to a viscoplastic state. The Reynolds stress model shows significant anisotropy in the velocity fluctuation profiles of Newtonian and non-Newtonian viscoplastic fluids. The shift of locus of maximal magnitudes of turbulent fluctuations, Reynolds stress, and turbulent kinetic energy towards flow core region is observed. The height of the zone with a fully stopped fluid is predicted and determined numerically. The appearance of a stagnation zone near the wall causes significant decrease in wall friction and heat transfer due to a decrease in the environment temperature.

A set of mathematical models has been developed to describe the flow and heat transfer of

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laminar and turbulent two-phase droplet-laden and bubbly flows has been developed. For laminar and turbulent two-phase flows, it is shown that the addition of evaporating droplets makes it possible to effectively control the flow structure, the level of gas phase turbulence and heat transfer. The problems of studying gas-droplet and bubbly separated and impinging jets are solved, and the mechanisms for controlling turbulence and intensification of heat transfer are shown. The study of the flow structure and heat transfer in polydispersed bubbly flow for various flow geometries is carried out, and the main factors influencing the change in the mean and turbulent flow structure and the intensification of heat transfer are shown. The model of transition of non-isothermal of Newtonian turbulent fluid into a viscoplastic non-Newtonian fluid is numerically carried out.

Biography

Dr. Maksim Pakhomov, PhD, is a prominent researcher and Professor, currently serving as the Deputy Director of the Laboratory of Thermal and Gas Dynamics at the Kutateladze Institute of Thermophysics, part of the Siberian Branch of the Russian Academy of Sciences in Novosibirsk, Russia. With a strong focus on thermal physics and gas dynamics, Dr. Pakhomov has made significant contributions to the understanding of fluid dynamics, heat transfer, and related areas.

His research spans various aspects of thermophysical processes, where he has authored numerous publications in esteemed scientific journals. As a leader in his field, Dr. Pakhomov plays a key role in directing advanced research projects and fostering innovation in thermal and gas dynamics. His work at the prestigious Kutateladze Institute contributes to the ongoing development of fundamental and applied research in Russia, solidifying his reputation as a major figure in the scientific community.

Professor Uzak Zhapbasbayev is a distinguished scholar from Kazakhstan, currently affiliated with Satpayev University. He is well-regarded for his contributions to the fields of mechanical engineering and material science. With extensive research experience, Professor Zhapbasbayev has been actively involved in numerous scientific projects and has co-authored several influential publications.

One of his recent research endeavors is supported by a grant from the Science Committee of the Ministry of Science and Higher Education of the Republic of Kazakhstan (Grant number AP23486543, 2024-2026). This funding underscores his ongoing commitment to advancing scientific knowledge and addressing key challenges in his field. His expertise has earned him recognition both locally and internationally. Throughout his academic career, Professor Zhapbasbayev has played a vital role in mentoring young researchers and contributing to the development of Kazakhstan's scientific community.



Complex restoration of oil-contaminated soils with new reagents containing multicomponent alloys

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¹Kazakh National Technical University after K.I. Satpayev, Kazakhstan

²Association of Producers and Consumers of Petrochemical Products, Kazakhstan

Soil contamination by petroleum hydrocarbons poses a serious environmental problem for food security and public health, leading to a decrease in the functional activity of the microbiota of soil biocenoses, and limiting the growth and development of plants.

The aim of the study was to develop methods for the restoration of oil-contaminated soils using new reagents based on organomineral biofertilizer "Kazuglegumus" and multicomponent alloys of light and dispersed metals. The choice of these reagents is determined by their ability to form adducts with petroleum hydrocarbons and stable complexes with heavy metals.

To demonstrate the structure and composition of the new organomineral reagents, as well as soils with different degrees of contamination, chemical and physicochemical methods (FT-IR, SEM, EDX, DSC, TG) were used. The working hypothesis was that aluminum alloy forms complex compounds with humic or fulvic acids, which are either slightly toxic or non-toxic to plants. The effectiveness of cleaning oil-contaminated soils was studied, revealing a reduction in the concentration of oil in soil samples by 12-22% depending on the concentration of reagents and the oil content in the soil.

The effect of oil contamination on leguminous plants, which have the ability to accumulate and then release nitrogen into the soil and exhibit properties of cover crops, was studied. The phytotoxicity of soils was studied by sowing turfgrass, and sainfoin under laboratory and field conditions. Accelerated plant growth was observed in soil samples treated with a sorbent based on Raou-85 alloy and "Kazuglegumus" fertilizer (potassium humate). Plant treatment contributes to an increase in the number of shoots and green mass in the aboveground part of the plant, as well as branching of the root system.

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These experiments are explained by the action of the alloy in reducing the concentration of oil to permissible limits, as well as the transformation of natural humic substances and additionally applied potassium humate, which increased their biological activity. The results represent an effective solution for the restoration of oil-contaminated soils.

The work was performed at the expense of the program-targeted funding of the Ministry of Science and Higher Education of the Republic of Kazakhstan for 2024-2026.

Biography

T. R. Akhanova is a Magister and a dedicated researcher at Satbayev University in Almaty, Kazakhstan. With a strong academic background, she has been actively contributing to the fields of engineering and applied sciences. Her research interests focus on advanced technologies and innovations that aim to address key challenges in her field.

Akhanova is also recognized for her collaborative work and contributions to scientific projects at Satbayev University, where she is involved in both teaching and research. Her profile is available on ORCID (<https://orcid.org/0000-0002-83431150>), showcasing her academic publications and research contributions. As a rising figure in Kazakhstan's academic landscape, she continues to pursue excellence in research and education, playing an important role in advancing scientific knowledge within her university and beyond.



How accurate can be the information on the building stock of a large city for seismic analysis

Carlos Sousa Oliveira¹, Mónica Amaral Ferreira^{1,2} and Carla Pousada²

¹CERIS/Instituto Superior Técnico, Universidade de Lisboa, Portugal

²ReSist, Camara Municipal de Lisboa, Portugal

One of the most difficult problems in estimating the amount of damage and other consequences of earthquake occurrences is to know the behavior of the building stock under the waves generated by the earthquake. Apart from the hazard to which the stock is subjected, we need to know the existing exposition and the corresponding vulnerability. Many studies have been done on individual buildings or groups of similar typologies. However, when we have a city of 1M inhabitants occupying circa 60000 polygons, with the co-existence of old and very old structures built without any modern code requirements and modern buildings, some of which challenge “mother nature,” the situation is very difficult to handle. Modern cities have required the accomplishment of every 10 years of a census since 1919, asking all questions that could give an answer, but, unfortunately, in many instances, this multi-million euro inquiry is not accurate due to a lack of knowledge of inquiring people. For the older cases, we do not know well which structural and architectural modifications took place along their life span.

We initiated a project with CML (Lisbon City Council) trying to solve some of the most critical problems, the ones that involve more people who cannot afford retrofitting.

This paper explains how the City was divided into sectors of identical urban development, how to obtain the most complete information on the exterior and interior without the use of evasive technologies, and how to check for the works done in the past, most of which weaken the structure.

We considered two inquiries for the analysis: one for a macro-scale (data obtained essentially from the Census) and the other for a micro-scale level, based on building visual inspection (exterior and interior). We use multiple sources of information, some from CML studies made in the past, and promote the individual building by building inspection. In the end, we will compare the two analyses and obtain an estimate of the errors involved.

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Biography

C.S.Oliveira got his PhD from the University of California, Berkeley, in 1975 and a Full Professor Position at Instituto Superior Tecnico, University of Lisbon, Portugal, in 1992, after 20 years of research at the National Civil Engineering Laboratory in Lisbon. He retired in 2016 and got Emeritus Title from Universidade de Lisboa in June 2022. His main field of interest is earthquake engineering, emphasizing engineering seismology, namely strong motion, seismic hazard, and risk mitigations. His “scientific hobby” deals with in-situ/analytical vibrations of various types of civil engineering structures, and currently, he is preparing a book on his findings. He is an Associate Editor of the Bulletin of Earthquake Engineering and a Member of the Portuguese Academy of Sciences and the Academy of Engineering.

He was awarded the “Nicholas Ambraseys Distinguished Lecture Award” by the “European Association of Earthquake Engineering” in 2021, recognizing his contribution to developing his area of expertise.



Nurturing innovative work behaviour through workplace learning among knowledge workers of small and medium businesses

Syed Tanveer Hussain Shah¹, Syed Mohsin Ali Shah¹ and Hatem El Gohary²

¹Abdul Wali Khan University, Pakistan

²College of Business and Economics, Qatar University, Qatar

Organisations need to be innovative to be able to face the complexity and turbulence of the environmental forces and factors surrounding them. This is true in the case of all types of organisations, including SMEs, where innovations are essential for their survival and growth. As such, organisations need to nurture Innovative Work Behaviour (IWB) among their employees through different means. To achieve such ultimate goal, Workplaces Employees Learning can benefit many companies. Meanwhile, Workplace Learning (WPL) can improve the competencies and skills of employees and help their IWB. This research focuses on the role of WPL as a predictor of IWB among knowledge workers of SMEs in developing countries (i.e. Pakistan). Through convenient sampling technique, questionnaires were distributed among employees of 173 SMEs, resulting in 311 useable questionnaires. Data were analysed using SmartPLS 3. The results indicated that WPL facilitated IWB among SME employees, with informal and incidental learning being the most critical predictors compared to formal means of learning. The research results reinforce the importance of WPL and IWB, and their implications are beneficial for SMEs and the academic society.

Biography

Syed Tanveer Hussain Shah completed his PhD (Management Science) from Abdul Wali Khan University, Mardan (AWKUM), Pakistan. Prior to that, he completed his MSc degree in Management and International Business from Birmingham City University, United Kingdom. He is working as Lecturer in HRM at AWKUM since 2016. Before that, he have worked as Lecturer at UOH, Pakistan from 2014-2016. He is currently working on different research studies focused on the antecedents and facilitator of employee driven innovations in diverse organization settings. His particular focus is on IWB, Knowledge workers, and SMEs in developing countries.



Impact of diversity management on organizational performance in hotel organizations: A conceptual framework

Astha Bhanot

College of Business Administration, Princess Nourah bint Abdulrahman University, Saudi Arabia

The study aims to shed light on the relationship between diversity management practices and organizational performance. Specifically, it shows that effective diversity management practices can lead to the hiring of more capable and efficient staff members from a wider range of backgrounds and with varying demographic differences. This is particularly relevant in the hotel industry, where a diverse workforce is highly sought after due to the wide range of cultures and languages represented among guests.

The study has four primary aims, which are listed below.

1. To ascertain the function and necessity of putting strategies for managing diversity in hotels into place.
2. To evaluate the impact of diversity management techniques on the hotel industry's organizational performance.
3. To evaluate how diversity management techniques have improved the organizational performance of the hotel industry.
4. To evaluate the detrimental effects of diversity management techniques on the hotel industry's organizational performance.

As a result, an effort is made to quantify the potential benefits and drawbacks of diversity management techniques for organizational performance, particularly for hotel organizations. The methodology used in this research is based on a methodical review of the literature. Various scientific internet databases, including Web Knowledge, Emerald, Saga, ProQuest, and Science Direct, are taken into account throughout the literature review process. Secondary data was gathered from several publications, articles, and other sources, both published and unpublished. Data from non-governmental and governmental groups was examined. The three major keywords utilized to search these online databases are: organizational performance,

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learning organizations, and diversity management techniques. In-depth analyses of pertinent papers were conducted to determine what has previously been done and what still needs to be done. The study's conclusions show that diversity management will undoubtedly improve organizational performance and be advantageous for the company provided it is implemented correctly, on the proper schedule, and taking into account all of the issues and concerns it raises.

Biography

Dr. Astha Bhanot is working as an Assistant Professor in the Department of Management, College of Business Administration, Princess Nourah bint Abdulrahman University, Riyadh, Saudi Arabia. She has more than 15 years of teaching, research and publication. She has published 2 authored books, 3 edited books and many articles in International and National Journals. She has attended and presented many research paper in International and National Conferences and Seminars. Has in-depth understanding of learning process and strives to adapt effective and innovative methods in imparting knowledge to the students. Passionate and dedicate educationalist who works well under pressure both individually and as a part of a team. Exceptional in presentation, interpersonal and communication skills. Is tech-savvy with over 5 years of experience in teaching online education with profound exposure in using cutting-edge learning technologies and strategies. Is a committed teacher with a strong work ethic and with a drive for excellence in teaching.



Effect of some biopesticides based on essential oil and plant extracts on postharvest mango stem-end rot disease caused by *Lasiodiplodia theobromae*

Yefounnigui Souleymane Yeo

Wascal/African Center of Excellence in Climate Change, Biodiversity and Sustainable Agriculture, University Félix Houphouët-Boigny, Côte d'Ivoire

Lasiodiplodia species causing mango stem-end rot disease (SER) are mainly controlled using synthetic products, which can harm human and environmental health. Therefore, developing an eco-friendly control method, such as using plant extract products, is imperative. In this study, we evaluated the inhibitory effect of 3 biopesticides based on essential oils (ASTOUN 50 EC, FERCA 50 EC, and NECO 50 EC) at 300, 500, 700, 1000 ppm and *Moringa oleifera* leaves extracts (Methanolic and aqueous) at 5, 10, 15 and 20 g/250 ml on mycelial growth of *Lasiodiplodia theobromae* *in vitro*. Subsequently, 135 fruits (cv. Kent) per treatment were inoculated (1×10^5 spores/ml) and treated with each biopesticide (700, 1000 and 2000 ppm) and *M. oleifera* leaves extracts (15 and 20 g/250 ml) *in vivo* to evaluate their efficacy on mango SER development. The results showed that the biopesticides ASTOUN (*Cymbopogon citratus*) and NECO (*Occimum gratissimum*) completely inhibited the mycelial growth of *L. theobromae* at 700 and 1000 ppm. Similarly, *M. oleifera* methanolic extract has the highest inhibitory rate (65.45 %) compared to aqueous extract (42.44%). Moreover, 1000 and 2000 ppm of biofungicides and 15 and 20 g/250 ml of *M. oleifera* methanolic extract significantly reduced mango SER development compared to the control. This study provides evidence that these plant extracts are effective alternatives to mango SER management that are consistent with sustainable agriculture principles, promote ecological balance, and reduce the environmental impact of conventional agriculture.

Biography

Mr. Yefounnigui Souleymane YEO is a PhD scholar with a well-rounded educational background, academic achievements, and substantial contributions to research and development. He holds a Bachelor's degree in Life and Earth Sciences from Félix Houphouët-Boigny University (Côte d'Ivoire), where he demonstrated a strong academic foundation and a passion for his chosen field. He further pursued his education by completing a Master's degree in Biosecurity, Bioresources and Biotechnology at the same University. He is now completing a PhD programme in climate change, biodiversity, and sustainable agriculture at the African Center of Excellence in Climate Change, Biodiversity and Sustainable Agriculture (CEA-CCBAD), which has equipped him with advanced knowledge and skills in his expertise.

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Yefounnigui's work has resulted in several scientific publications in peer-reviewed journals that have made meaningful advancements for sustainable agriculture. He has actively participated in several conferences, notably the 12th International Congress of Plant Pathology in Lyon (France) from August 20 to 25, 2023. He has received numerous awards and honours, including the BEST RESEARCHER AWARD for Contribution and Honorable Achievement in Innovative Research in 2023.

Yefounnigui also collaborated with fellow researchers and institutes to promote knowledge exchange, among Agricultural Research for Sustainable Development (CIRAD, France), French Research Institute for Development (IRD, France), Félix Houphouët-Boigny University (Côte d'Ivoire).



Dendroremediation of arsenic: Time-dependent processes in selected forest tree species

Sylwia Budzyńska

¹Department of Chemistry, Forestry and Wood Technology Faculty,
²Poznań University of Life Sciences, Poland

The global challenge of arsenic (As) pollution, driven predominantly by anthropogenic activities, necessitates innovative solutions for environmental restoration. Dendroremediation, a specialized form of phytoremediation involving trees, holds particular appeal due to the longevity and extensive root systems of trees. The aim of the study was to determine the time-dependent changes of As_{total} and selected forms of this metalloid (As(III), As(V), DMA or the sum of other organic forms) in substrate and organs (root, stem, leaves) of 2-year-old *Quercus robur* L. and *Tilia cordata* Mill. seedlings within a 33-day-long hydroponic experiment. The form of As added to the medium undergoes dynamic changes affecting the phytoextraction of this metalloid. The results indicate the varying speed of As uptake and transport to aerial plant parts (stem and leaves). A decrease in the contents of As forms in organs of seedlings exposed to individual As forms varied, which indicates simultaneous transformations of As forms in both substrate and plant organs. The obtained results indicate the need to analyze the main forms of As in the nutrient solution and plant organs to assess plants' actual effectiveness of As phytoextraction.

Biography

Sylwia Budzyńska, Ph.D., is an assistant professor at the Department of Chemistry at the Faculty of Forestry and Wood Technology, Poznań University of Life Sciences (PULS), Poland. She is an environmental chemist (MSc at Faculty of Chemistry, Adam Mickiewicz University, Poznań, Poland) and forester (PhD at Faculty of Wood Technology, PULS, Poland). She is a member of the Polish Forest Society (PTL) and the Forest Sciences and Wood Technology Committee (KNLITD) of the Polish Academy of Sciences (PAN). Her research focuses on analyzing environmental pollution due to anthropogenic activity and biologically active compounds' role in the environment. The scientist specializes in analyzing the forms of elements, especially arsenic (As) and their changes during plant growth when phytoremediation application is evaluated. Her special interests focus on dendroremediation, i.e. phytoremediation using trees. Dr Budzyńska is an Editorial Board Member of the Journal of Food Composition and Analysis (Elsevier).

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Green practices and green innovation: The mediated-moderated roles of value co-creation and green creativity

Theresa Obuobisa-Darko and Stewart Hevi

Ghana Communication Technology University, Ghana

Purpose – This paper investigates the moderated-mediation roles of value co-creation and green creativity between green practices and green innovation among craft workers in Ghana.

Design/methodology/approach – A stratified sampling method was deployed in the selection of 224 craft entrepreneurs in Ghana. Multiple regression analysis was used to assess the hypothesized paths.

Findings – The findings show that value co-creation moderates the partially mediated role of green creativity between green practices and green innovation.

Research limitations – Cross-sectional design used in the study is methodologically restricted on assessing changing dynamics of respondents’ overtime.

Originality/value – This research is one of the first in entrepreneurship literature to explore the relevance green behaviors among craft workers in an emerging economy.

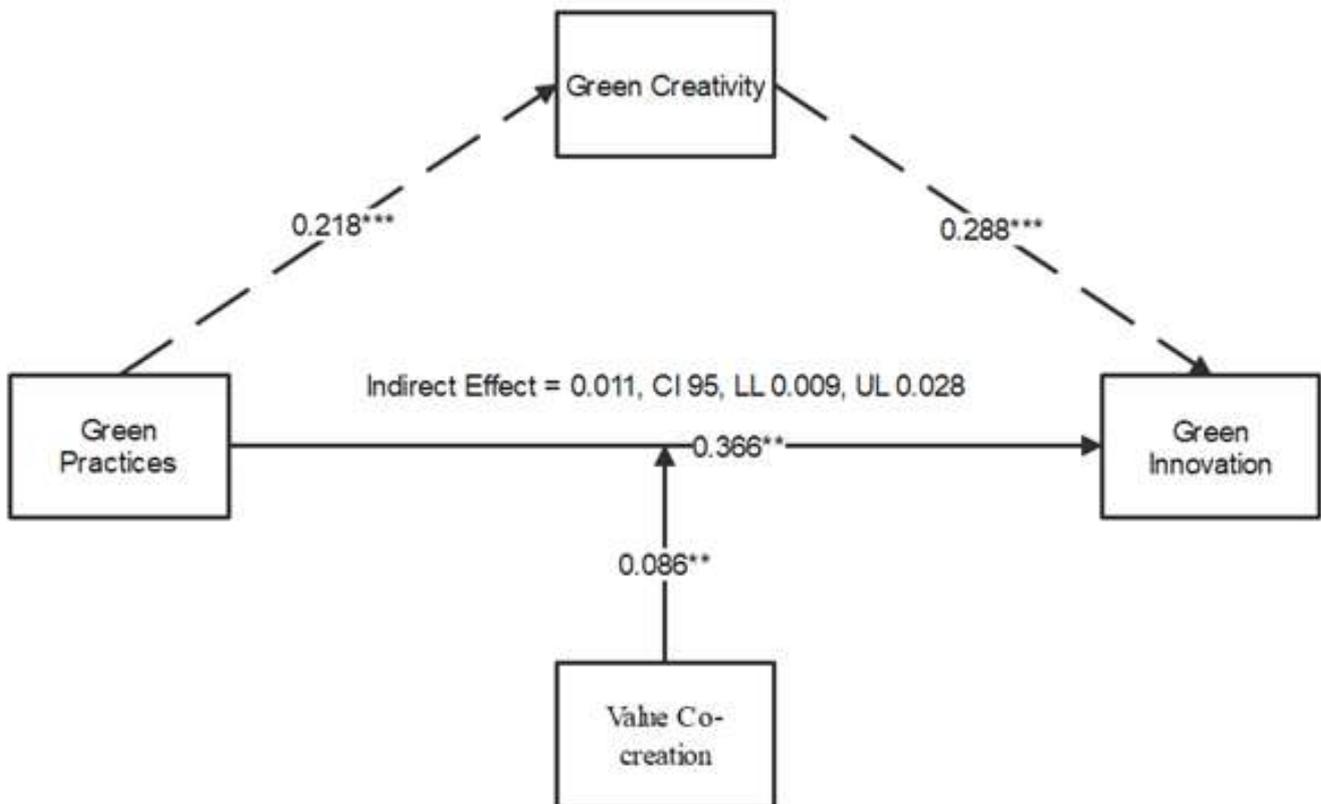
Items	CR	AVE	1	2	3	4
Green Practices	0.919	0.672	0.822			
Value Co-creation	0.945	0.574	0.372**	0.783		
Green Creativity	0.961	0.639	0.385**	0.410**	0.746	
Green Innovation	0.958	0.597	0.274**	0.219**	0.328**	0.791
Mean			3.813	3.56	3.741	3.928
SD			0.848	0.752	0.862	0.797

Note(s). SD = Standard Deviation, AVE = Average Variance Explained and CR = Composite Reliability. All inter-correlation coefficients are significant at *p < 0.05 and **p < 0.01. Italics Diagonal figures represent the square root of the AVE; sub-diagonal figures are the latent construct for inter-correlations.

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Source(s): Authors' tested (hypothesized paths) framework (2024)

Conclusion: The study establishes direct and indirect effects between green practices, value co-creation, green creativity and green innovation among craft entrepreneurs in Ghana. The integrated model was tested through the cognitive lens of effectuation theory.

Biography

Professor Theresa Obuobisa-Darko is an Associate Professor and currently Head of Department for the Management Studies in Ghana Communication Technology University, and a former Head of the Human Resource Management Department at Methodist University Ghana. Professor Obuobisa-Darko holds a Doctor of Philosophy in Public Administration and Policy Management, a Master of Philosophy in Public Administration as well as a Masters of Business Administration (Human Resource Management option). She has over thirty (30) years teaching and research experience in the field of Human Resource Management, Leadership, Organisational Development and Public Administration. Her research interests include Leadership in Organisation, sustainability, Performance Management, Health and Safety, Employee Engagement. Theresa has published in peer-reviewed journals and presented papers at both international and national conferences.



Taiwan river muds from source to sink: Provenance control, inherited weathering, and offshore dispersal pathways

Kalyani Nayak¹, Eduardo Garzanti², Andrew Tien Shun Lin³ and Sebastien Castelltort⁴

¹CEG Laboratories, UK

²Laboratory for Provenance studies, Department of Earth and Environmental Sciences, University of Milano-Bicocca, Italy

³Department of Earth Sciences, National Central University, Taiwan

⁴Department of Earth Sciences, University of Geneva, Switzerland

Clay mineralogy and geochemistry of river muds around Taiwan Island reveal dominant provenance control. Abundant illite with subordinate chlorite are derived from Cenozoic slates and shales of the axial Slate Belt and Western Foothills in the western, northern, and southern parts of the island. In eastern Taiwan, chlorite is most common in muds generated from the Tananao Complex, whereas smectite is produced by erosion of arc andesites of the Coastal Range. Kaolinite occurs in significant amounts only in western Taiwan, where it is mostly recycled from mudrocks originally generated in mainland China and accumulated along the Chinese passive margin before being tectonically accreted to the western Taiwan thrust belt. Only in more humid northern Taiwan regions, locally moderate kaolinite content associated with relatively high illite chemistry index may hint at present kaolinite formation. Mineralogical and geochemical indications of weathering are thus mostly considered to be inherited rather than indicative of present climatic and geomorphological conditions.

A comparison of clay mineral assemblages in Taiwan river muds and offshore deep-sea clays allows tracing sediment transport from land to the deep-sea. Mostly illite is supplied to the Taiwan Strait and the South China Sea, whereas subequal amounts of illite and chlorite are delivered from eastern Taiwan rivers draining the Tananao Complex to the Ryukyu forearc basin. Smectite from the Coastal Range andesites is transferred via the Xiuguluan River and Chimei Canyon directly to the Ryukyu trench. Additional amounts of smectite produced in the Ryukyu and Luzon arcs are transported southward to the Ryukyu forearc basin and northward by the Kuroshio Current, northwestward to the northern South China Sea, and northeastward to the Huatung Basin and Okinawa Trough.

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Biography

Dr. Kalyani Nayak is a skilled Environmental Geochemist and Sedimentologist with expertise in sedimentology and geochemistry. She excels in unraveling complex geological processes and understanding environmental changes through interdisciplinary approaches and advanced analytical techniques. Kalyani's passion for innovation is fueled by collaboration with diverse researchers, allowing her to constantly expand her skill set. Driven by scientific discovery, she seeks opportunities to contribute her expertise to dynamic research teams, making significant contributions to the understanding of our planet's geological and environmental processes.

Her recent publications showcase her active involvement in cutting-edge research. In *Tectonophysics* (IF 3.933), she co-authored a study on clay-mineral distribution in deep-sea sediments around Taiwan, offering insights into sediment dispersal processes. Her work in *Sedimentary Geology* (IF 3.397) explored Taiwan river muds, focusing on provenance control, weathering, and offshore dispersal pathways. Additionally, her research in *Earth-Science Reviews* (IF 12.413) examined the rapid erosion in Taiwan and the transfer of orogenic sediment to forearc basins and trenches, advancing the understanding of sedimentary dynamics in the region.

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Environmental sustainability and intelligence as well as general green technologies

Jinsong Wu

University of Chile, Chile

Although the term of green has been often used to refer to energy consumption reduction or energy efficiency by many people and literatures, green actually should refer to environmental sustainability in more general senses. Environmental sustainability issues have been important topics for recent years, which has impacted and will further impact individuals, enterprises, governments, and societies. Environmental sustainability is not simply regarding reducing the amount of waste or using less energy, but relevant to developing processes leading to completely sustainable human society in the future. The long term consequences of the relevant serious issues have not yet been fully forecasted, but it has been generally accepted in many communities that immediate responses are necessary. From 30 November to 12 December 2015, the 21th United Nations Climate Change Conferences of the Parties (COP 21) was held in Paris, France, as the a historical breakthrough and milestone towards securing the future Earth, a global agreement on the reduction of climate change, the text of which represented a consensus of the representatives of more than 193 countries attending it, which was a profound milestone for global environmental sustainability. Nowadays there is another significant tendency on data driven intelligence. This talk would discuss the history, technical issues, challenges, and new trends of data driven environmental sustainability and intelligence. Further this talk will extend the view to general green technologies.

Biography

Jinsong Wu (IEEE Senior Member) received PhD from Department of Electrical and Computer Engineering Queen's University, Canada in 2006. He won 2020 IEEE Green Communications and Computing Technical Committee Distinguished Technical Achievement Recognition Award, for his outstanding technical leadership and achievement in green wireless communications and networking. He is Vice-Chair Technical Activities (2017-2022), IEEE Environmental Engineering Initiative, a pan-IEEE effort under IEEE Technical Activities Board (TAB). He was the Founder and Founding Chair (2011-2017) of IEEE Technical Committee on Green Communications and Computing (TCGCC). He is also the co-founder and founding Vice-Chair

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(2015-present) of IEEE Technical Committee on Big Data (TCBD). He received 2017, 2019, and 2021 IEEE System Journal Best Paper Awards. His co-authored paper won 2018 IEEE TCGCC Best Magazine Paper Award. He was the leading Editor and co-author of the comprehensive book, entitled "Green Communications: Theoretical Fundamentals, Algorithms, and Applications", published by CRC Press in September 2012. He is the proposer and founding Editor-in-Chief (2022-present) for the international journal "Green Technologies and Sustainability" (GTS), co-sponsored by Elsevier and China Science Publishing & Media Ltd., jointly called KeAi.



Evaluating the associations between environmental contaminants, climate change, and human health outcomes within the United States

Naveen Joseph

Department of Geospatial Science, Radford University, USA

Recent studies have highlighted that climate change and environmental contaminants have a significant impact on human health outcomes such as cancer incidence, cardiovascular diseases, and diabetes. This study evaluates the associations between climate change, environmental contaminants, and socioeconomic factors with human health outcomes within the United States. The environmental contaminants include pesticides, metals, and water quality variables, socioeconomic factors include poverty, food production, nutrition information, and access to transportation, and climate variables include temperature, precipitation, and extreme weather events such as drought and flooding. The human health outcomes considered in this study include cancer incidence, cardiovascular diseases, and diabetes. To this aim, I use the Center for Disease and Control Wonder database on chronic conditions and communicable diseases and the food insecurity database from the USDA, which compiles the responses of household surveys from the Census Bureau. A mixed-effects regression approach will be employed to identify the relative significance of each of these variables on different human health outcomes at the county level from 2000 to 2023 for the contiguous United States. Based on a preliminary analysis, significant associations between food insecurity and diabetes incidence were identified at a P-value < 0.001 . Additionally, the statistical model developed in this study accurately estimated the diabetes incidence rate in the United States. It is expected that the findings from this study will help evaluate the relationship between human health outcomes and various environmental factors more effectively.

Biography

Naveen Joseph is an Assistant Professor of Geospatial Science at Radford University. His research interests focus on understanding human interactions, the geospatial environment in which they live, time, and public health. For my research, He primarily use geospatial datasets, statistical tools, and hydrological models to address water resource issues both at regional and nationwide scales. His research themes include large-scale and catchment-scale water resources modeling and investigating the relationships between environmental contaminants such as pesticides and human health outcomes such as cancer.



Urban climate dynamics: Analyzing the impact of green cover and air pollution on land surface temperature-A comparative study across Chicago, San Francisco, and Phoenix, USA

Sepideh Azizi

University of Illinois Urbana Champaign, USA

Rapid urbanization worldwide has significantly altered urban climates, creating a need to balance urban growth with thermal environmental quality for sustainable development. This study examines the relationship between land surface temperature (LST) and urban characteristics, particularly focusing on how green cover can mitigate urban heat and how air pollution can increase temperatures. Recognizing the predictive value of LST for urban heat island (UHI) intensity, we analyzed three distinct U.S. cities—Chicago, San Francisco, and Phoenix—each characterized by unique climate and urban planning features. This study investigates the relationship between atmospheric pollutants (SO_2 , NO_2 , CO , O_3) and the Normalized Difference Vegetation Index (NDVI) with Land Surface Temperature (LST) using regression and correlation analyses. The analysis aims to elucidate how changes in atmospheric pollutants and vegetation index affect variations in land surface temperature. Regression analysis is employed to estimate the coefficients of independent variables and quantify their impact on LST. Correlation analysis assesses the linear relationships between variables, providing insights into their pairwise associations. The study also examines multicollinearity between independent variables to identify potential confounding factors. Results reveal significant associations between atmospheric pollutants, vegetation index, and land surface temperature, contributing to our understanding of environmental factors influencing LST dynamics and informing climate change mitigation strategies.

Biography

Sepideh Azizi is a Graduate Researcher at the Department of Urban and Regional Planning, University of Illinois Urbana-Champaign. Her research areas include Regional Planning, Spatial Analysis, Sustainable Development, Environmental Planning, Remote Sensing, and Data Analysis. Sepideh is known for her innovative approach and deep understanding of sustainability, spatial analysis, environmental science, and urban and regional planning. She excels in study design, research analysis, and interpreting results from various study types. Proficient in both programming (R) and software tools such as Photoshop, GIS Pro, Google Earth Engine, Google Earth Pro, AutoCAD, SketchUp, and Twinmotion, she is committed to staying current with research trends. Sepideh is also dedicated to continuous learning through research groups, seminars, workshops, and Science Communication Fellowships to enhance her communication skills and effectiveness in her field.

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A report on the study for rational and reliable pattern mining

Tongyuan Wang

TechEngine Plus Com Montreal, Canada

The classic pattern mining is a fundamental topic and has been studied extensively for over 30 years but left with no reliable mining approach yet. This report will first present why the case is, and then what the author's study has found and what progress has made toward the reliable mining. It includes the appropriate pattern frequentness measure, the pattern generation mode, the adaptation and application of the equilibrium condition, and pattern frequency distribution theory. All the findings are well formed with no exogenous input but rigorous mathematic proofs. Furthermore, the findings extend some new conceptions and rethinking deeply on set theory and combinatorics, such that the study is not restricted in pattern mining itself but stretches to data science in general or even broader.

Biography

Tongyuan Wang, Ph. D, M. Sc., M. E., M. A., has studied and worked in multi fields. He got his first degree in civil engineering, then a Master in engineering management, both at Chongqing University of China in 1980s. He then worked in that university as a lecturer. Upon becoming a vice professor, he moved to Canada, where he obtained a M. A. in economics, and then he switched to computer science from Graduate Diploma to Master and Ph. D degrees, all at Concordia University by 2010. After graduation, he did not continue teaching career due to a condition there that a new Ph. D holder may starts as assistant profession without a care of previous work experience, He then works for startup company to date. During the course, he still keeps academic and industrial research. His main research interests include pattern mining and ecological smart city.



What are smart neighborhoods? A definition based on data from a city in Argentina

María Verónica Alderete

Departamento de Economía, Instituto de Investigaciones Económicas y Sociales del Sur,
Argentina

Most studies on the digital divide focus on citizens, countries or organizations. However, there is not much work on the digital divide at the neighborhood level. There are also few studies that define neighborhoods according to their level of smartness. The objective of this work is to build the concept of smart neighborhoods based on the main dimensions of a smart city: digital technology, citizen participation and environment. The research question is: does public connectivity through Wi-Fi points are correlated with the percentage of population connected to the Internet at home and/or with computers? Can both criteria define the type of neighborhood and refer to digital neighborhoods as one dimension? Is the level of digitalization of neighborhoods related to citizen participation, access to public transportation, and the presence of parks or green spaces? Then the objective is to analyze the digital divide by neighborhood, define smart neighborhoods and determine the type of relationship between them. Although the contribution is mainly conceptual, it is also based on an exploratory-descriptive analysis of neighborhoods from Bahía Blanca, a transparent city in Argentina. Results show that the lower availability of Internet and computers at home is associated with neighborhoods with Wi-Fi points (free wifi), which are also registered neighborhoods and at the same time more vulnerable. In turn, the greatest citizen participation is observed in unregistered neighborhoods. Most neighborhoods are neighborhoods with access to public transportation. Parks and green spaces are pretty extended among all the neighborhoods.

Biography

María Verónica Alderete has a PhD in Economics (Universidad Nacional del Sur, Bahía Blanca, Argentina). She holds the position of Independent Researcher of CONICET at the IIESS (Instituto de Investigaciones Económicas y Sociales del Sur, UNS-CONICET). On the other hand, she is an Adjunct Professor of the Department of Economics, Universidad Nacional del Sur in the subject of Microeconomics. She has taught postgraduate courses in knowledge and technology management. Her main research areas are: Information and knowledge society (e-commerce, e-government, ICT), Technological change and socio-economic development. She has recently published in indexed journals such as Smart cities, Journal of theoretical and applied electronic commerce research, Technology in Society, among others. She is an external reviewer for several indexed journals.

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DAY 2

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Exploring strategies for fostering children's risk- friendly spaces

Marion Sturges

Western Sydney University, Australia

This presentation will explore a variety of methodologies employed to capture and understand children's perspectives, particularly in the context of fostering risk-friendly spaces. Strategies were used to elicit the voice of young children and explore their thoughts and ideas. I explore how children's voices revealed through research, highlight the significance and preferences of children to be in the outdoors. I then argue for the creation of environments, especially outdoor spaces, to embrace children's decision making and risk-taking opportunities. This exploration aims to contribute to a nuanced understanding of children's perceptions and preferences, with a specific emphasis on outdoor spaces conducive to risk-friendly play.

Many countries, Australia included, are failing to create places that support young children's healthy growth and development (Gill, 2021). Fostering opportunities for children to express their ideas and thoughts brings about numerous advantages, benefiting not only the children themselves but also the broader community. Neglecting to pay attention to children's voices and constantly imposing adult perspectives risks impeding children's development and growth whilst actively embracing children's perspectives and integrating them into decision-making processes leads to a more inclusive and empowering society. Often the voices of young children are not given enough attention. Great focus was given to listening to the voices of young children in this study and what emerged was the important they gave to the outdoor space. This study also revealed that children used the outdoor space to engage in risky play.

Biography

Dr. Marion Sturges is an experienced educator of over 33 years. She has worked extensively across all educational sectors. Currently Marion works in the tertiary sector working with a team to prepare and support preservice educators as they undertake their professional experience placements. Marion has led and participated in numerous research projects working collaboratively with other researchers and educators. The focus of these projects is working with marginalised members of the community, including young children, people with disability, and women to ensure their rights are met and exploring how the place can support or inhibit these rights. Her PhD situated in Australian preschools drew heavily on the Child Friendly City framework in exploring participation and place.

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Acidification prior to drying of digestate solids affects nutrient uptake and fertilizer value when applied to maize

Jingna Liu^{1,2}, Dorette Sophie Müller-Stöver² and Lars Stoumann Jensen²

¹School of Agriculture and Biotechnology, Sun Yat-Sen University, China

²Department of Plant and Environmental Science, Faculty of Science, University of Copenhagen, Denmark

Acidification has proven effective in minimizing NH_3 emissions during the drying of digestate bio-solids, but its impact on soil nutrient dynamics and plant growth is less understood. This study aimed to assess the nitrogen and phosphorus efficiency of acidified-dried digestate solids as starter fertilizer for maize through a pot experiment and a soil incubation study. Two types of digestates (MDS and SDS) and two acidifying agents (concentrated H_2SO_4 and alum) were used. Drying significantly lowered the nitrogen fertilizer replacement value (N-FRV) from 42 % in untreated to 12 % in the dried material, reducing maize biomass and N uptake by 34 % and 54 %, respectively. The decline mitigated by acidification, which doubled N-FRV to 28 %. Drying enhanced maize P uptake by 25 %, indicating dried MDS as an effective P fertilizer (P-FRV of 82 %). However, alum negated the drying benefits for P uptake, aligning it with raw MDS levels. The SDS treatments showed no significant effects on maize growth or nutrient uptake, though dried SDS indicated a high N mineralization potential, N-FRV and P-FRV remained around 33 % and 26 %, respectively. The study concludes that H_2SO_4 -acidified dried MDS could serve as a suitable starter fertilizer with balanced N and high P availability, supporting early maize development. Alum may serve to preserve N value while reducing P solubility to prevent runoff. Dried SDS is less effective as a mineral fertilizer replacement, better suited for sustaining soil organic N and P levels.

Biography

Jingna Liu obtained her Ph.D. in Soil Quality and Fertility from the University of Copenhagen. She is currently serving as an Assistant Professor at Sun Yat-sen University. Her primary research interests focus on the efficient recycling of solid digestate and mitigation of greenhouse gas emissions in farmland. Her work aims to advance sustainable agricultural practices and contribute to environmental conservation, with a particular emphasis on optimizing soil health and fertility.



A study on traditional and modern Japanese tea houses

Yun-Chia Chang², Bih-Chuan Lin¹ and Yong-En Lin³

¹Assistant Professor, Graduate School of Architecture, Dayeh University, Taiwan

²Master Student, Graduate School of Architecture, Dayeh University, Taiwan

³Assistant Professor-level professional technic, Department of Architecture and Interior Design, Dayeh University, Taiwan

The popularity of the Japanese tea house is attributed to its holistic spatial design and meticulous attention to detail that embody the seven aesthetic principles of 'wabi-sabi'. Wabi-sabi is an elusive concept that defies straightforward rational articulation, encompassing two elements: 'wabi' and 'sabi'. 'Wabi' signifies a simple, unadorned way of life that seeks the intrinsic truth of simplicity and imperfection. 'Sabi' originally refers to the natural changes that occur over time, also implying tranquility and introspection. Wabi-sabi is a cautious approach to everyday life, and with time, its meaning has gradually merged to become an aesthetic definition of 'imperfection, impermanence, and incompleteness'.

The seven aesthetic principles of wabi-sabi include asymmetry, simplicity, austerity, naturalness, profundity, tranquility, and modesty. These elements, observed in nature, suggest a deep connection between the tea house space and Japanese aesthetics. The tea house is not merely a spatial entity but an elevation of spatial behavior to a spiritual dimension. Within the tea garden, the pursuit is harmony between humans and the environment; inside the tea house, the host and guests practice mutual humility and respect, experiencing the purity of the tea house space, ultimately reaching a state of unity with all things and equanimity amidst change.

This study delves into the historical evolution of the tea house spaces and their symbolic meanings to understand the behavioral changes that occur during the tea house experience. With the decline in the number of people practicing the tea ceremony, currently dominated by retired women and tourists, the construction of tea houses is diminishing, and their functional spaces are becoming increasingly simplified. Therefore, this research explores the role of the tea house in modern times and synthesizes its history to comprehend its evolution, comparing the changes between traditional and modern tea houses through case analysis.

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The study analyzes elements such as the asymmetry of the tea house space, the openings of windows and doors, sunlight exposure, and the sense of spatial ritual, to identify the most suitable spatial design for modern tea houses based on contemporary living patterns and behavioral modes. Through case analysis, the study seeks the essential components of the tea house, selects appropriate elements to preserve and integrate into the design, and contemplates how the tea house can connect with everyone's life, making it an indispensable role in people's daily lives.

Biography

Yun-Chia Chang is a graduate student in the Graduate School of Architecture at Da-Yeh University, Taiwan. Specializing in spatial design, she is particularly fascinated by the spatial dynamics and historical evolution of tea rooms. Yun-Chia's research delves into the symbolic meanings embedded within these spaces, focusing on how ritualistic elements connect and enhance the significance of various critical areas within tea rooms. With strong analytical and research skills, she systematically organizes and examines data to explore these intricate spatial relationships.



The exploration of intrinsic spatial fluidity: A case study of contemporary small residences in Japan

Yuan-Zhen Li², Bih-Chuan Lin¹ and Yong-En Lin³

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²Master Student, Graduate School of Architecture, Dayeh University, Taiwan

³Assistant Professor-level professional technic, Department of Architecture and Interior Design, Dayeh University, Taiwan

Residences, as the architectural settings where people dwell, serve as both living spaces and sanctuaries. The rapid urbanization process has led to high population density and a surge in housing demand, exacerbating the problem of residential saturation. In this context, the concept of spatial fluidity has become a core issue in residential design. Spatial fluidity refers to the flexible spaces that can adapt to users' evolving needs, including the users' bodily perceptions and experiences.

This study delves into the design principles and practical applications of spatial fluidity in contemporary residences. Through case studies, it investigates the actual effects of spatial fluidity in alleviating spatial constraints, enhancing residential quality, and strengthening the emotional connections between occupants and their dwellings. The study synthesizes the characteristics of spatial fluidity and examines how it can be integrated with architectural elements. It also analyzes the impacts on modern residential users and the value for future housing trends. By extending the notion of fluidity from public spaces to the residential realm, the study reinterprets and identifies the optimal expressions of spatial fluidity within the residential context, ultimately constructing a unique form of spatial fluidity in housing design.

Biography

Yuan-Zhen Li is a graduate student in the Graduate School of Architecture at Da-Yeh University, Taiwan. She specializes in spatial design, with a strong interest in the adaptive reuse of existing buildings. Yuan-Zhen is also skilled in engaging in relevant discussions and contemplations within her field, reflecting her deep commitment to architectural innovation and sustainability.



Exploring the spatial implications of minimalist architecture in residential spaces

Tzu-Wei Tu², Bih-Chuan Lin¹ and Han-Jui Kao³

¹Assistant Professor, Graduate School of Architecture, DaYeh University, Taiwan

²Master Student, Graduate School of Architecture, DaYeh University, Taiwan

³Project Assistant Professor-level professional technic, Department of Architecture and Interior Design, DaYeh University, Taiwan

As society rapidly evolves and lifestyles accelerate, contemporary expectations for living spaces are shifting towards simplicity, functionality, and spiritual tranquility. Traditional complex designs and decorations are increasingly viewed unfavorably, as people seek maximal spatial utilization and emotional comfort through minimalist architecture. However, achieving a balance between simplicity and aesthetic appeal, while retaining essential functionality, poses a significant challenge for modern designers. The challenge lies in the potential for minimalist designs to appear stark or sterile, lacking the warmth and character of more traditional designs. Excessive ornamentation not only wastes resources but also disrupts spatial harmony, diverging from modern life rhythms and aesthetic preferences. In this context, minimalism has emerged as a design philosophy that emphasizes eliminating excess and returning to essentials, while still maintaining a sense of beauty and comfort.

This study explores minimalist architecture from the perspective of residential spaces, focusing on principles such as simplicity, openness, functionality, materials, and balance. For instance, simplicity is achieved through pillarless structures and a white color palette, creating spacious and pristine atmospheres like the works of Ludwig Mies van der Rohe. Openness is fostered by removing partitions and carefully planning circulation, enhancing spatial flow and coherence, as seen in the open floor plans of Frank Lloyd Wright's Prairie School. Functionality is maximized through rational layout and minimalist design approaches, as exemplified by the compact yet efficient designs of Le Corbusier. Material selection emphasizes natural beauty and contrasts, as showcased in the use of raw concrete and glass in the works of Tadao Ando. Balance is attained through careful consideration of spatial proportions and openings to achieve harmonious integration of interior and exterior environments, as demonstrated in the works of Alvar Aalto.

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Minimalist architecture demonstrates significant value and potential in contemporary society by offering serene, comfortable, and efficient living environments. The findings of this study contribute to a deeper understanding and practical application for architects, interior designers, and readers interested in minimalist lifestyles.

Biography

Tzu-Wei Tu is a graduate student in the Graduate School of Architecture at Da-Yeh University, Taiwan. He specializes in spatial design and has a profound interest in contemplating living environments and their essence. Tzu-Wei is skilled in discussing and delving into various issues related to spatial design, reflecting his deep commitment to understanding and enhancing the living environments we inhabit.



**‘From Protests to Wall Art!’:
Introducing Environmental Issues in
Three Master Theses (Department
of English, College of Arts,
University of Mosul, Nineveh, Iraq)**

Huda Halawachy

University of Mosul, Iraq

The challenges and threats that biodiversities face today are embraced under environmental issues that are no longer fringe subjects. Although these issues result from integrating natural causes and human negative acts, the subject has covered the pages of scientific and academic publications. The current report attempts to bring environmental crises to the forefront in the Postgraduates Programme at the Department of English, in the College of Arts, at the University of Mosul, Mosul, Nineveh, Iraq. The report is cut into three major sections; each of which covers Master Thesis that I supervised in the academic years (2021-present). Section 1, Section 2 and Section 3 covered three Master Theses titled “WHEN HUMOUR GOES WITH CIVILIZATION: A CALL FOR ECOLINGUISTIC APPROACH TO HUMOROUS ENVIRONMENTAL PROTEST”, “Environmental Awareness in English Textbooks for Iraqis at Pre-University Level: An Eco linguistic Approach”, and “ ‘ Murals transform communities!’ The Artists’ Murals in Mosul and Erbil: A Thematic –semiotic Approach”, respectively. The report is built on one exploratory research question which echoes: How could the Iraqi supervisor motivate his/her MA candidates (in English Language and Linguistics) to investigate little-known areas of a particular topic i.e., environmental issues? The report also evaluated the corpus collected from different sources: environmental protests, English textbooks for Iraqi pre-university students, and mural arts in two Iraqi cities. Mosul and Erbil. For the approaches, the mixed-methods approach and qualitative approach which match the goals of each study in the three theses were adopted. The report ended up with some significant conclusions that hinted at a variety of environmental issues, whether global or local.

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Section 1: Master Thesis 1



Section 2: Master Thesis 2



Section3: Master Thesis 3



Biography

Huda HALAWACHY is an Assistant Professor at the Department of English in the College of Arts at the University of Mosul, Mosul, Nineveh, Iraq. She was awarded her PhD working on her dissertation titled: "A Synthetic Approach to the Study of Avoidance in Language Production" in English Language and Linguistics in 2008 from the University of Mosul. Huda packs a lot of information into the Master Theses and Dissertations she is supervising and her publications. Serving as a peer-reviewer for Scopus-indexed journals adds to her career a lot. Huda participated in conferences – in Iraq, Jordan, France, Denmark, England, the USA, Italy, Georgia, Germany, India, and Turkey. She has been also nominated as the Chairperson of the Local Organizing Committee for the Nigeria Eco Linguistics Association (NEA) Conference held in collaboration with the International Eco Linguistics Association IEA (8th-10th September 2021). She is so keen to write more about the environment in her academic works.



"Murals Transform Communities" The Social Identity of the Artists' Murals in Mosul and Erbil: A Thematic Approach

Shamal Taher and Huda Halawachy

University of Mosul, Iraq

The widespread presence of mural arts in modern society has established them as versatile platforms for communication. By analyzing the visual and textual components of murals, researchers can gain valuable insights into societal, ethical, and environmental issues. The researchers gathered a total of 210 murals from public spaces and categorized them into Mixed Mural Art (MMA) and Visual Mural Art (VMA), to investigate the thematic content of mural art in Mosul and Erbil. Thematic Analysis Approach (TAA) by Braun and Clarke (2006), was adopted to identify environmental themes within the MMA corpus, while Semiotic Analysis (SA), based on Pierce's triadic sign, was also utilized to reinforce environmental themes in the VMA corpus. Additional interpretive depth was provided via the Model of Colour Psychology (Black, 2000-2002). After applying the six phases of the TAA, the researchers made a report about themes i.e., they interpreted the extracts. For Instance, in Mosul, Figure (1) highlights the theme of water preservation. Water is not just essential for life; it is a lifeblood for all living entities. The Arabic expression "قطرتنا", (Lit.: Our drop) is a potent symbol of the shared nature of water resources in Mosul. In this way, the Mosuli Artists call Mosuli residents to be responsible and take action to preserve water and further, the expression indicates that water is امانة (Lit.: be not excessive or extravagant) advocating Mosuli citizens to use water economically. The findings revealed both shared and distinct environmental themes across the two cities, reflecting shared and unique cultural and social contexts. Notably, environmental sustainability emerged as a prominent shared MMA and VMA theme, conveyed through various artistic representations such as water conservation, energy efficiency, deforestation, renewable energy promotion, wildlife conservation, recycling, and eco-civilization. In conclusion, murals in the two cities served as compelling calls to action, urging residents to prioritize environmental love and care.

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Figure 1: MMA Showing the Theme of Environmental Sustainability

Biography

Shamal Taher holds a Bachelor of Arts in English Language and Literature from the University of Duhok, Iraq, earned with distinction in 2012. Following graduation, Shamal gained eight years of experience as a high school teacher at Grdapan Co-Ed School from 2014 to 2022. Currently, Shamal is pursuing a Master of Arts in English Language and Linguistics at the Department of English College of Arts, University of Mosul, Mosul, Nineveh, Iraq. Under the supervision of Dr. Huda Halawachy, Shamal focuses on the thematic and semiotic analysis of mural arts in Mosul and Erbil.



Data-driven AI (Artificial Intelligence) detection furnishes economic pathways for microplastics

Shefali Arora

Department of Chemistry, University of Petroleum and Energy Studies (UPES), India

Microplastics pollution is killing human life, contaminating our oceans, and lasting for longer in the environment than it is used. Microplastics have contaminated the geochemistry and turned the water system into trash barrels. Its detection in water is easier compared to soil and air so the attention of researchers is focused on it for now. Being very small in size, microplastics can easily cross the water filtration system and end up in the ocean or lakes and become a prospective challenge to aquatic life. The present paper aims to focus on the investigation of the detection and classification of microplastics in the aqueous environment via AI. It proves to be an innovative technique for the restoration of contaminated sites of microplastics in water. It also gives assistance in developing mathematical models and various analysis techniques viz. holographic fingerprint technique, machine learning based models, deep learning methods, human machine teaming, etc. for understanding and managing microplastics in water and ultimately contributes to solving the issue of water contamination. In this regard, this review paper drops light on the sources, impact, and detection of microplastics with AI, described as *Microplastics free world is the commitment towards cleaner hydrology*.

Biography

Dr. Shefali Arora working as an Associate Professor, Department of chemistry, University of Petroleum and Energy Studies, Dehradun (UK), India. She did her Ph.D. From IIT, Roorkee in 2003. Dr. Shefali Arora has around 21 years of experience in both teaching and research. She has been engaged in research work since July 1999. She has published 70 research papers in international journals and 45 papers were presented in various national and international conferences. She has published five books, two manuals and two patents. Her research area is natural product chemistry, synthesis of heterocyclic compounds and their biological activity. She is working on the minor projects of essential oil. She is the reviewer of more than 10 journals and Editorial board Member of Mintage Journal of Pharmaceutical and Medical Sciences, Journal of Analgesic and Journal of Plant Sciences. Dr. Arora's scholarly impact is evident from her notable Citations-1445, h-index-18, and i10-index-20.



Targeting mineral resources with remote sensing and field techniques: A case study from South Purulia Shear Zone

Pankajini Mahanta

Fakir Mohan University, India

The South Purulia Shear Zone, located at the intersection of NSMB and CGGC within the East Indian Craton, presents a promising region for polymetallic mineralization. Covering a vast area, the highly deformed and altered rock assemblage forms an East-west trending arcuate belt, stretching over 120 km in length and 4 to 5 km in width. Mineralization in this area is intricately tied to the shear zone and locally developed hydrothermal systems. To gain a comprehensive understanding of the region, ASTER satellite imagery is employed for a regional overview, aiding in the delineation of alteration halos. Further detailed information is extracted from Worldview-3. Various remote mapping techniques, including BR & RBD, FCC, S.D classification, PLSR, SPCA, DPCA, and SAM, are utilized for alteration mapping. Notably, DPCA and SPCA demonstrate efficacy in mapping alterations in vegetated terrains by mitigating the impact of vegetation. Alteration proxies derived from PLSR (IAI, CCPI, SI, HAI), SPCA (Al-OH, Fe-OH, Mg-OH, Fe²⁺, and Fe³⁺ anomaly zones), and SAM classification are integrated to map the dominant alteration processes. Hydrothermal alterations within the South Purulia Shear Zone manifest as isolated lensoidal bodies trending parallel to the shear zone boundary. Dominant alteration types, including argillization, ferruginisation, and silicification, are identified, with occasional occurrences of chloritization and sericitization, all of which are validated through field inspections. Spectroscopic analysis and X-ray diffraction studies support the remote sensing results by confirming the presence of various alteration mineral phases and their diverse assemblages in the study area. A comprehensive laboratory study, involving petrological microscopy, X-ray Fluorescence, and Scanning Electron Microscopy, leads to the discovery of Cu and Au mineralization, along with U & REE. The methodologies employed prove particularly useful for targeting small-scale hydrothermal-type mineral resources in the sparsely vegetated regions of the South Purulia Shear Zone. In conclusion, the systematic approach integrating remote sensing, field study, and laboratory analysis holds great potential for unveiling new mineral deposits in unexplored, sparsely vegetated terrains. This research aims to contribute valuable insights and findings to the scientific community.

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Biography

Dr. Pankajini Mahanta is an Assistant Professor in the P.G. Department of Geology at Fakir Mohan University, Balasore, Odisha.

She earned her Ph.D. in Remote Sensing and Earth Sciences from IIT Kharagpur in 2020, with a thesis on integrating fieldwork, remote sensing, and GIS for hydrothermal alteration mapping in the South Purulia Shear Zone. Dr. Mahanta holds a M.Sc. Tech in Applied Geology from the Indian School of Mines, Dhanbad, and a B.Sc. in Geology Honors from D.D. Autonomous College, Keonjhar.

Her research expertise includes mineral exploration, reflectance spectroscopy, and applying machine learning to geological problem-solving. She has achieved recognition through qualifications in CSIR-UGC NET, GATE, and JAM, and has made significant contributions through research publications and presentations at national and international conferences.

Dr. Mahanta has made significant contributions to the field of Remote Sensing and Earth Sciences, as evidenced by the publication of research papers and presentations at both national and international conferences. Her expertise in integrating fieldwork, Remote sensing, and GIS for hydrothermal alteration mapping has practical implications for mineral exploration.



The role of magnetism in the origin of Saturn's visible dense rings

Vladimir Tchernyi¹ and Sergey Kapranov²

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We show that Saturn's magnetism makes an important contribution to the origin and stability of visible dense rings, and explain some of their observed features, such as the equilibrium separation of pieces of ice in dense rings, which has not explained yet, and others. Many features of dense rings were observed and measured by the Cassini probe, but could not be explained within the framework of known gravitational theories. There are number of gravitational models of the origin of Saturn rings: a moon of the planet could have been disrupted by a passing celestial body; the rings could have been generated by the pieces separated from moons of the outer planets by collision with comets or meteorites; the ice pieces of rings can be debris of a large comet tidally broken by the planet; the rings can be the relic of a protosatellite disk [Charnoz, S., et al. *Icarus*. 2009, 199: 413; Canup R. *Nature*. 2010, 468: 943; Cuzzi, J., et al. 2010, *Science*, 327, 5972, 1470; Esposito, L. 2010, *AREPS*, 38(1): 383; Porco, C. 2017, *SciAm*, 317, 78]. Unfortunately, no theory has provided a convincing explanation for the observed features and peculiarities of Saturn's dense rings among the bodies of the Solar System [Crida, A., Charnoz, S. 2010, *Nature*, 468, 903]. Cassini measured that the pieces of ice in the rings 90-95% consist of water ice [Poulet, F., Cuzzi, J.N. 2002, *Icarus*, 160, 350; Cuzzi, J.N., et al. 2010, *Science*, 327, 5972, 1470]. Cassini found the ratio of deuterium and hydrogen isotopes for the ice of Saturn's dense rings is the same as for the Earth's ice [R. Clark et al. 2019, *Icarus*, 321, 791]. This fact indicates the similarity of ice in the rings and Earth's ice. The science of ice is complicated. About 20 types of ice known on Earth. Ice XI is more suitable for Saturn's dense rings [Hemley, R.J. 2000, *Ann. Rev. Phys. Chem.*, 51, 763]. It has stable parameters below 73K and it is diamagnetic ice [Tchernyi, V., Kapranov, S. 2021, *RNAAS*, 5, 255]. With these data, we have found a solution to the problem of the interaction of gravitational field and magnetic field of Saturn with diamagnetic ice pieces moving in Kepler's orbits around Saturn in a protoplanetary cloud [Tchernyi, V., Kapranov, S. 2020, *ApJ*, 894, 1]. An interesting fact is that accounts the action of magnetic field of Saturn in addition to the action of gravitational field explains the transformation of a protoplanetary

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cloud filled with the ice pieces into a disk of stable dense rings system as well as it accounts for strong planar structure of rings located at the magnetic equator of Saturn. Cassini discovered that Saturn's magnetic equator almost coincides with the geographical one [Dougherty, M., et al. 2018. *Science*, 362: 6410]. Saturn's magnetic field is almost perfectly symmetrical around its rotation axis. In the quasi-dipolar region of dense rings ($<3R_s$), the magnetic field of Saturn appears very steady and is dominated by the dipolar component B [André N., et al. 2008. *Rev. Geophys.*, 46: 4]. Finally we are coming to conclusion that Saturn could create its dense rings by itself from the ice pieces of the protoplanetary cloud with the help its own magnetic field due to the action of an additional third force of diamagnetic expulsion and the mechanism of magnetic anisotropic accretion [Tchernyi, V., Kapranov, S. 2021, arxiv:2104.03967]. An interesting feature is that under the influence of the planet's magnetic field, the ice pieces of dense rings remain separated; otherwise, if they will stick together because of their own gravity and they can form another satellite. [Tchernyi, V., Kapranov, S. arXiv: 2204.03414]. J.C. Maxwell proved that for their stability, the rings along the orbit are not continuous, but consist of separate pieces of matter [1859. *MNRAS*, 19: 297]. Unfortunately, at his time, there was no knowledge that rings consist of pieces of ice and this is diamagnetic ice. It becomes to be clear only after measurements of Cassini probe in 2004-2017. The Newtonian dynamics for a single ice piece differs from the dynamics for ice pieces assembled in the rings. Pieces repel each other under the influence of magnetic force and are attracted to each other under the influence of gravity. From the balance of the forces of gravitational attraction and magnetic repulsion, we have derived the expression for the calculation of equilibrium and stable distance between the ice pieces in the rings. This presentation supported by observations from Cassini probe, 2004-2017. [Tchernyi V.V., Kapranov S.V. *Space Research Today*. April 2024. Letter to Editor. P. 80-85].

Biography

Vladimir V. Tchernyi, Ph.D. & Dr.Sci. Professor. He used to work at the IRE RAS & IGPh RAS in Moscow. He was a Research scientist at UC Berkeley. He organized & headed Radiophysics Dept., Volgograd State University. He doing research in applied physics and astrophysics He published more than 200 articles and made more than 100 presentations over the world.



Vulnerability assessment of springflow using groundwater aquifer storage-discharge model in Indian middle Himalaya

Soukhin Tarafdar^{1,2} and Subhashis Dutta²

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In the mountainous region of the Indian Himalaya, rural and urban water supply demand is partly or completely met through the availability of spring outflow from the sloping landscapes. The springflow over the past many decades is reported to have declined significantly. The factors responsible could be the declining trend in monsoon and winter rainfall as well as recurrent drought, landuse change, forest degradation and anthropogenic alterations making the rural and urban population vulnerable.

To assess the inherent vulnerability of springflow-dependent water supply systems in rainfall-dependent middle Himalayan catchments, daily spring outflow volume from a north-facing catchment which is a part of microwatershed having an area of 8 km² was measured over nearly five years (2012-2017) using volumetric methods. Declining spring hydrograph after the monsoonal influx were extracted and fitted in two linear exponential, nonlinear, and power-law storage models using baseflow recession curve analysis technique.

Normalized daily discharge data of spring outflow was plotted in $-dQ/dt$ vs Q . The linear regression of fitted data in log-log space were used to estimate exponent (B) indicative of linearity or non-linearity of the storage-discharge relationship whereas coefficient (A) in a power-law relation with unit $T^{-1}(L/T)^{1-B}$ indicates the rate of recession or recession timescale of decline curve. The calculated annual baseflow recession exponent (B) and coefficient (A) were used to estimate the storage sensitivity (ϵ_s) which is dependent on the flow rate.

The results indicate significant susceptibility of the hardrock aquifers to groundwater storage change sustaining the widespread low-yield springflow falling in the middle Himalaya. The control of variability of annual monsoon rainfall influx is reflected in $-dQ/dt$ vs Q plot with overall nonlinearity of the system at the catchment scale. Strengthening the storage of springflow and low-order streamflow could be one of the viable water management strategies to mitigate the lean period water scarcity in the middle Himalaya.

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Biography

Dr. Soukhin Tarafdar is presently working as a senior scientist in an autonomous Institute of GBP National Institute of Himalayan Environment (GBPNIHE) under the Ministry of Environment and Forest and Climate Change (MoEF&CC). He obtained his M.Tech degree in Earth Sciences from IIT Roorkee and PhD degree in Water Resource Management from IIT Guwahati, Assam, India. He has authored more than 7 papers in International Peer Reviewed Journals and seven book chapters and many peer reviewed reports. He is professionally trained in Remote Sensing, GIS, Groundwater modelling and Stable Isotope application from Department of Space, National Institute of Hydrology and IIT, Roorkee, India. He also participated in international training course on “Karst Hydrogeology and Karst Ecosystem for Developing countries” organized by international Research Centre on Karst under the Auspices of UNESCO in Guilin, the people’s Republic of China. He has executed many projects including funding from National Institutes (Space Application Centre, Ahmedabad; National Mission for Himalayan Studies, MoEF&CC) and International Agencies (South Asian Water Initiative) and being a part of committee on short term assessment of environment impacts of Hydropower on Himalayan Rivers and several assignment under the National Green Tribunal.



Siberian traps and Permian-Triassic mass-extinction: Do they link?

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The Siberian large igneous province (SLIP) is an enormous continental province on Earth. It attracts geologists due to (1) huge volume of magmatic rocks, (2) extra-large PGE-Cu-Ni deposits, and (3) its formation proximity to the mass extinction of life at the Permian-Triassic boundary. It is believed that the P-T extinction occurred due to gas flux (mostly, CO₂) during the Siberian basalts' eruption. However, evidences for this influence are rarely presented. There are two aspects of this problem: synchronization of mass extinction and basalt formation, and volatile volume released during the eruption. Firstly, there is no clear P-T boundary at the Siberian Platform, because the same species are related or to Permian or to Triassic system by palaeontologists, and there is no dramatic reduction in species here as in the marine Meishan section. Secondly, the gas volume is dramatically exaggerated due to its estimation on rift basalts, no platform basalts forming the main volume of the province. We measured volatiles contents in the platform (trap) magmas on the basis of melt inclusions in pyroxenes in gabbrodolerites of the South-Maslovsky intrusion in the Norilsk area. They are low and correspond to gas concentrations in within plate basalts. Estimated volume of volatiles in Siberian magmas is not catastrophic and it could be compared with the volume of island-arc magmatism. So, it has not been proved that the P-T mass extinction was caused by the Siberian traps. Mass extinctions of species occur continuously in the geological history of Earth, although on a smaller scale. Their causes require further study.

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Biography

Nadezhda Krivolutskaya was born in Moscow, Russia, and graduated from Moscow State University with a degree in geology of ore deposits. She worked at the Chita Institute of Natural Resources of the Siberian Branch of Russian Academy of Sciences (Transbaikalia, Chita city, Russia) and Vernadsky Institute of Geochemistry and Analytical Chemistry of RAS (Moscow, Russia). She studied different ore deposits, mostly, magmatic deposits. She defended her PhD thesis in 1989 (candidate in geological-mineralogical sciences, Russian degree) and doctor theses in 2012 (doctor in geological-mineralogical sciences). The main interest is study of the PGE-Cu-Ni Norilsk deposits and magmatic rocks of the Siberian Large Igneous Province, i. e., their geology, geochemistry, mineralogy. She published 6 books (personally and in co-authored) and around 300 articles and abstracts. She was awarded the S. Smirnov Prize of the Russian Academy of Sciences and the «Excellence in Subsoil Exploration» Badge of the Russian Ministry of Natural Resources.



A climate health policy: Will it be a better approach to overcome the greatest global challenge of the 21st century? A review to explore public and public health officials' perceptions towards policy development

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³Ministry of Health, Sri Lanka

Background: Climate change is predicted to be one of the most substantial influences on future global public health. Addressing this urgent problem requires substantive public and professional engagement in developing public health policy and its implementation and adherence. This paper explores the current perceptions of the public and public health officers and their willingness to engage in a climate health policy.

Methods: A systematic integrative review was conducted, drawing on an established framework. This incorporated systematic searching, quality appraisal, data extraction and synthesis of findings from qualitative and quantitative studies.

Results: Only 13 studies were included in the review, indicating a scarcity of knowledge. However, a growth in the number of studies during the recent decade was observed. Significant concerns identified were the belief that public health wasn't sufficiently engaged in the climate debate or associated policies, a felt lack of expertise among public health experts regarding their ability to influence policy in this area (knowledge, resources and influence), and a small but significant proportion of professionals and the public denying the reality of climate change.

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Summary of study findings	
Perceptions of the public	Perceptions of the public health officials
<ul style="list-style-type: none"> • The public feels climate change to be an increase in heat. • Studies depicts that knowledge on climate change is better among males and with those having a higher education. • The relationship between socioeconomic factors to knowledge on climate change varies. • The morbidity and mortality, risk perception and education strongly correlate with the knowledge on climate change. • The public perceives that the health cost and burden due to climate change events have increased in comparison to what it was five to ten years ago. • Studies show that there is a positive impact in communicating climate change within a health frame. • Risk perception and knowledge have shown a significant correlation to public willingness to act. • Risk perception and willingness to act very strongly correlate with support to policy. 	<ul style="list-style-type: none"> • A significant proportion of public health officials believe that they have not in the recent past and will not in the next 20 years' experience climate change. • Among the majority who believe climate change poses impacts on health, perceives it to be related to heat related condition. • As perceived by the public health officials, the engagement of public health in climate change was found to be limited. • In exploring the self-knowledge on climate change differences were identified in self-perception on adequacy on knowledge. • The public health officials perceived that there is a significant gap in knowledge among other officials in their department as well as other relevant stakeholders on climate change and health. • Public health officers perceive that their department lacks the expertise and resources to support effective mitigation and adaptation. • Knowledge, capacity, perceptions on climate change, politics, culture, finance, communication and institution were some of the barriers to public health engagement in climate change that were discussed by the participants. • The public health officials perceived that their opportunities to engage public health in climate change.

Discussion: The study's findings depict public understanding and support for policy when climate change is considered within a health context. Further, the study shows gaps in the

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required knowledge, attitudes, resources, and political and administrative support for effective public health engagement.

Conclusion: The findings point to the need for strategic involvement and empowerment of public health officials at the national and local levels and the development of a robust evidence base to support resultant policies.

Biography

Dr. Lilanga Hasini Fernando Batawalage is a distinguished medical doctor and public health specialist with a focus on the intersection of climate change and health. Her work emphasizes building community resilience to the adverse impacts of climate change by exploring its effects on population health and broader determinants of health. Serving as the Regional Co-Lead for Climate Resource and Health Education in the Global Consortium for Climate Health Education, Dr. Batawalage is dedicated to advancing climate health education and community engagement. Her efforts include leading community-based projects on climate health risk communication, empowering communities to understand climate change better and actively participate in resilience-building efforts. Dr. Batawalage's holistic approach integrates her expertise in climate change, gender health, and health development, making significant contributions to both academic knowledge and real-world impact.



Modelling and tracing green house gases rupturing stratopause rate of the earth using radionuclides curium rutherfordium inter atomic nuclear chain reaction in space with helium nuclide

Niranjana Kumar

Kumar International R&D Consultant Pvt Ltd, India

A nuclear noble research were carried out to know and estimates the generation and contribution of ghgs CH_4 ; CO_2 & CFC in two different type of settlement a city with agriculture land in surrounding and a forest area by curium rutherfordium interatomic nuclear chain reaction. For this the generation of O^{18} in water were measured using gas chromatograph and its nuclear association with ^{248}Cm were modelled in the soil and further by its half-life 18.1 yrs the di-decadal input were estimated ;while the maximum input in both ecosystem were CO_2 and CFC. The contribution of CFC gases is found higher in city agriculture land 766 while the total average input were in order of 1×10^9 million tons of ghgs. The modelled metal concentration were in the range of 0.88 to 4.76 ppm ^{248}Cm and rutherfordium and gas O^{18} values were 64 & 410 ppm in forest and city agriculture land water respectively. The concept behind modelling is that the water heavy nuclides of oxygen is the result of spark nuclear reaction of nitrogen and the same heavy water pour down from the tropopause layer of atmosphere reaches earth surfaces and the ^{248}Cm . Percent in the soil combines to generate ^{261}Rf and the portion of curium get dissolved with surface and ground water as lechate and the water laden O^{18} combines with ghgs and from the equivalence law in chemistry and nuclear decay chemistry the decadal input of the ghgs especially carbon methane and CFC were modelled and the captured carbon in two different ecosystem is finally modelled and the productivity estimation by classical methods for estimation is checked by sampling herbaceous layer grasses(stored carbon) for both type of ecosystem and result suggests that the Cfc contribution is higher in city land but overall forest area contributes much in emission of CO_2 and it's capturing. And di-decadal estimated input is 1.3 and 6.5 million tons of ghgs carbon in Meghalaya and Kiul khagour respectively. And total ghgs rate of input is almost 5 times higher in Kiul Khagour, in comparisons with Meghalaya and for validation of the modelled data for both the ecosystem the productivity (P) were estimated and found 2.5 & 2.1 respectively. Which validate the Modelling approaches and sustained $ghgs = k \times (1/P)$ and $ghgs = k \times P$ and $C_{crop} = k \times (1/P)$

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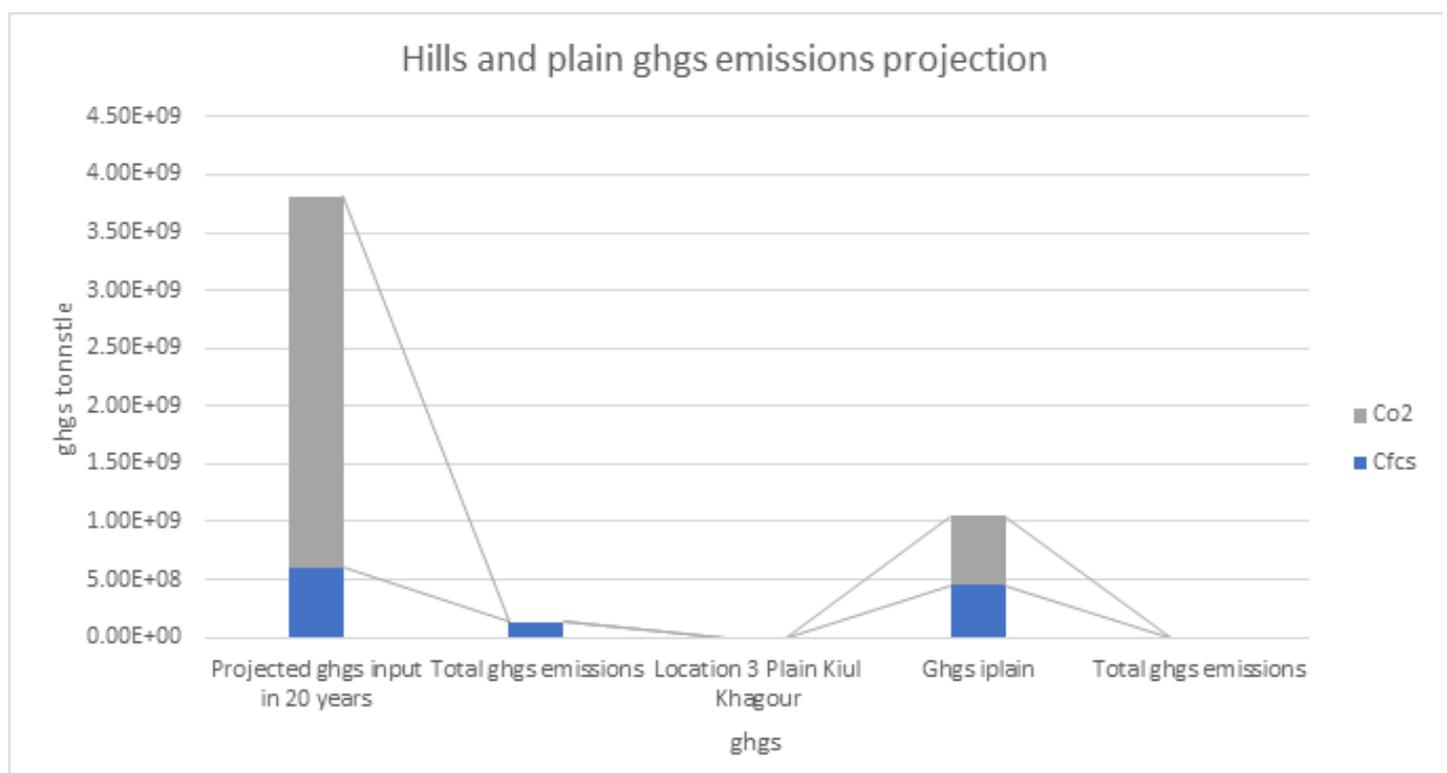
${}^7\text{N} + {}^4\text{He} = {}^{18}\text{O}$1

${}^{248}\text{Cm} + {}^{18}\text{O} = {}^{261}\text{Rf} + 5\text{n}$eqn2

Location Hill Meghalaya	Ghgs concentration input rate in stratopause	Location 3 Plain Kiul Khagour	Ghgs concentration input rate in stratopause
*		CH4	180.4
CH4 Atmosphere	0.28 gram		
Cfcs	0.16gram	Cfcs	766.7
Co ₂	0.021 gram	Co2	136..6
BM ratio productivity	2.5	BM Ratio	2.1
Terresterial Sink carbon OM		Terresterial Carbon Sink OM	
Moisture content		Runoff	NA
Runoff soil carbon	19×10E+6 tone/yr	Moisture content Herbaceous	0.6

Table: Modelled Metal concentration of two different type of ecosystem Forest and plain

Figure: projected 20 years concentration of ghgs past and future trends of two different area plain and Forest.



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Biography

Prof. Niranjan Kumar is a free-lance researcher in Science and Technology and travelled several nations for study and research purposes authored Several books and scientific research manuscripts in international journal and credited several international patent in his name ;chaired as distinguished speakers in international conferences and Editorial board member of American journal Earth Science. His area of interest is technological development and environment science and computing software; and nuclear; chemical; hydrological and environmental engineering radiation and radioecology. He pioneered many scientific works credited for establishing research Department of Advance study in studying radiation and radioecology in foremost scientific disciplines in Asian region and he owned a consultant company named Kumar International R&D Consultant Pvt.Ltd. He is the recipient of several international prestigious awards. He works for Ministry of Defence India.



Rethinking Green Infrastructure as a Multifunctional Approach

Mosissa Samuel Tsegaye, Shen Zhongwei and Tekelemariam Eden

Southwest Jiaotong University, China

This study explores the multifunctionality of green infrastructure (GI) as a critical approach to enhancing urban sustainability and livability. The study begins by introducing the concept of GI, emphasizing its ability to provide a wide range of ecological, social, and economic benefits when integrated into urban landscapes. The methodology involves a comprehensive review of existing literature, case studies, and empirical data on GI applications across various cities. This review categorizes 24 distinct benefits of GI, including improved air quality, enhanced biodiversity, increased property values, and better mental health outcomes. The results indicate that effective GI implementation can significantly contribute to urban resilience by addressing challenges such as climate change, pollution, and social inequities. Specifically, the findings highlight that well-planned GI not only enhances aesthetic appeal but also fosters community cohesion and promotes physical activity among residents. Furthermore, the study underscores the importance of integrating GI into urban planning processes to maximize its multifunctional benefits. Ultimately, this research emphasizes that adopting a multifaceted approach to GI can lead to more sustainable, equitable, and vibrant urban environments. The study calls for policymakers and urban planners to prioritize GI in their development strategies to harness its full potential for improving urban quality of life and ecological health.

Biography

Mosissa Samuel has accumulated more than 15 years of experience in the fields of urban planning, design, and research. He is a PhD candidate in Environmental Engineering from Southwest Jiaotong University, an MSc in Urban Design and Development from Addis Ababa University, and a BSc in Urban and Regional Planning. Samuel's research interests include urban conservation, green infrastructure planning, sustainable urban development, and transit-oriented development. He has authored and co-authored more than a dozen articles that address these subjects.

Samuel has conducted a significant amount of research that has focused on the integration of green infrastructure into the land use planning process. In his doctoral dissertation, he suggested a framework for evaluating the multifunctionality of green infrastructure initiatives by employing measurable indicators. Additionally, he has investigated the function of green infrastructure in the development of sustainability through case studies. Furthermore, Samuel has conducted applied research to assess the baseline green coverage conditions and policy documents of specific cities in order to identify opportunities to enhance their green infrastructure networks. In general, his research aims to advance the theory and practical solutions for the integration of multifunctional green infrastructure into urban planning and development.

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Multiscale geological modelling to enhance conceptual understanding in complex environments

H. Chihi

Georesources Laboratory, Centre for Water Research and Technologies, Tunisia

Regional aquifers play a crucial role in addressing freshwater demands, particularly in intricate arid environments where resource management poses significant challenges exacerbated by the impacts of climate change. The multiscale heterogeneity of these aquifers, involving factors such as lithology, faulting, fracturation, and karstification, makes their characterization particularly challenging, especially in regions with limited outcrops and scarce data.

Recent strides in 3D geological modeling have significantly advanced integration procedures incorporating geological concepts, ancillary data, outcrop information, and geophysical and hydrogeological investigations. These advances play an essential role in the development of more robust models of reservoir systems, enabling a finer and more detailed characterization of their heterogeneity, thus contributing to a better understanding and more precise conceptualization of these reservoir systems.

In this talk, we present tangible case studies that illustrate the practical implementation of these advanced geological modeling techniques, leveraging geostatistical algorithms and machine-learning models. These case studies address diverse scales and complexities in geological environments. The outcomes underscore the development of more realistic geological models, enabling a more effective handling and quantification of uncertainties at every stage of the modeling workflow.

Our research findings make a valuable contribution by illuminating the intricate dynamics of regional aquifers; particularly those exhibiting faulted and/or folded systems. The insights gained from these studies hold significance for researchers, policymakers, and practitioners involved in the sustainable management of groundwater resources in challenging environments.

Biography

Professor Hayet CHIH

Centre for Water Research and Technologies

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3D Geomodeling/Geostatistics, Reservoir characterization

Professor Hayet Chihi is a PhD-Eng graduated from Sorbonne University conjointly with the French Institute of Petroleum "IFP Energies Nouvelles". She is an expert in water and petroleum reservoir systems characterization constrained by geological heterogeneities and multi-source data. She has been in charge of several collaborative research projects dealing with water management, mining, and environmental issues. Her research interests include integration of multi-scale 3D geomodels with hydrogeochemical process, to achieve comprehensive investigations of spatial distribution of reservoir heterogeneity and connectivity for dynamic modeling. She has been teaching geostatistics, reservoir characterization and modelling in several Tunisian engineering schools and faculties.

She serves as Associate Editor at Hydrogeology Journal, Springer Nature. A founding member and president of Tunisian Association of GeoResources (ATGr), a board member of Tunisian Association of Women Geoscientists (Tu-AWG), an active member of both the International Association for Mathematical Geosciences (IAMG) and International Association of Hydrogeologists (IAH).



Leveraging energy-efficient high-performance computing with Flamingo Search Algorithm for sustainable precision agriculture in the context of climate change adaptation

Paul Rodrigues, Zahra Sheekheen, Mohammad Alhefdi and Ayman Qahmash

Department of Computer Engineering, College of Computer Science, King Khalid University, Abha, Saudi Arabia

The integration of high-performance computing (HPC) with bio-inspired optimization algorithms offers a promising pathway for addressing critical challenges at the intersection of Earth science, climate change, and sustainable agriculture. This research investigates the application of HPC techniques in conjunction with the Flamingo Search Algorithm (FSA) to enhance energy efficiency and computational performance in precision agriculture—a sector increasingly vital for climate adaptation and resilience.

As climate change intensifies, precision agriculture, powered by advanced technologies such as sensors, drones, and big data analytics, plays a crucial role in optimizing crop production, conserving water, and maintaining soil health. However, the substantial computational demands of these technologies necessitate energy-efficient solutions, especially as agriculture adapts to changing environmental conditions. Addressing these challenges is essential not only for sustainable land management but also for mitigating the broader impacts of climate change on food security and resource conservation.

In this study, the GEM5 simulator and OpenMP are employed to model and enhance the performance of parallel computing processes tailored for precision agriculture. By leveraging these HPC tools, the research develops an energy-efficient algorithm, HPC-FSA, that demonstrates superior resource allocation and energy savings, outperforming current state-of-the-art techniques. This advancement supports the goals of sustainable development by aligning agricultural practices with environmental conservation and climate change mitigation.

The findings contribute to both Earth science and climate change discourse by showcasing how computational advancements can facilitate adaptive strategies in agriculture. By integrating HPC and bio-inspired algorithms, this study offers scalable solutions for sustaining agricultural productivity in the face of global environmental changes, reinforcing the importance of interdisciplinary approaches in the fight against climate-related challenges.

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Biography

Paul Rodrigues is a Professor in the Department of Computer Engineering (ABET and NCAAA accredited) at King Khalid University, Saudi Arabia. He holds a Ph.D. in Computer Science and Engineering from Pondicherry University, India. With 32 years of experience spanning teaching, research, and industry, his expertise includes delivery management, ISO, CMMI, quality assurance & management, software engineering, product development, budget management, and business development. He has extensive experience in administration and has been instrumental in the end-to-end development and implementation of ABET and NCAAA processes. Widely traveled, he has delivered over 32 lectures at international conferences and has published more than 168 peer-reviewed papers in international and national journals, and conference proceedings. His research interests include software engineering, hardware security, artificial intelligence, Optimizing Energy Efficiency and high-performance computing.



Brain re-engineering and the use of information systems (Mobile Phone App) for enhancing smallholder farmers' productivity in South Africa

Ikechi Kelechi Agbugba^{1,4,5,6}, Lelethu Mdoda² and Mzuyanda Christian³

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²University of KwaZulu-Natal, South Africa

³Nelson Mandela University South Campus, South Africa

⁴Rivers State University, Nigeria

⁵York St. John University, UK

⁶Rome Business School, Nigeria

Information systems in the form of mobile phone applications in developing countries is increasingly advancing and several benefits compared to other choices in relation to costs, environmental exposure, and simplicity of usage are quite glaring. However, brain re-engineering strategy which specifically, borders on creating awareness and providing education to young individuals and youths on adopting information systems as means of driving efficiency and productivity for smallholder farmers. In the study, smallholder farmers fail to meet the soaring demand for food and other agro commodities in time, and dodging market overflows is an extreme encounter among communal farmers due to a deficiency of information and unacquainted administration. The study analyzed the factors influencing the use of information systems for enhancing smallholder production in the Eastern Cape Province of South Africa. The study applied a descriptive survey research design. A multi-stage simple random technique was used to collect data from 220 emerging growers using a semi-structured survey. Data collected were analyzed using descriptive statistics and a logistic regression model. The study indicated that most smallholder growers in the mentioned study area use information systems (IS) for their agricultural activities and agribusinesses and have further changed the farming landscape. Interestingly, agricultural productivity has been enhanced, as well as improved the food security status among rural households. Smallholder farmers have experienced problems in using information systems on their farms. Empirical results reveal that socio-economic factors influence the use of mass media for agricultural purposes by smallholder farmers. Therefore, the study recommends the government should embark on brain re-engineering or re-education to create more awareness and training for farmers in the usage of information

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systems to enhance farmers' productivity.

Table 2: Frequency Distribution showing Extent of Mobile Phones App Usage for Agricultural Information

Categories	Frequency	Percentage (%)
WhatsApp	120	54
Facebook	60	27
Newspapers	30	14
Twitter	10	5

Table 4: Frequency of Mobile Phones Usage for Agricultural Information

50 mm	Frequency	Percentage (%)	Rank
Farmers using mobile phone for extension advice and internet	10	5	8
Farmers using mobile phone for agriculture business	30	13.64	3
Farmers using mobile phone for traceability	20	9	6
Farmer groups and money transfer	10	5	10
Pasture management and livestock distribution	5	2.27	12
Weather updates	10	5	9
Fertilizer application rates	22	10	5
Improved crop varieties and market information	15	6.82	7
Access training and improved product marketing	28	12.73	4
Reminders on farm management activities	40	18	1
Soil fertility Management and agricultural prices	32	14.55	2
Irrigation practices	8	3.64	11

Source: Mdoda et al., 2023

Note: Multiple response results. Frequencies and percentages presented were based on the total number of farmers (N = 220) using mobile phones

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Table 5: Benefits of using Mobile by Smallholder Farmers

Variable	Frequency	Percentage (%)
High-yielding seeds	170	77
Fertilizer use	110	50
Market information and pricing	160	73
Crop and livestock production techniques	130	59
Pesticides and herbicides use	80	37
Training from Agricultural extension services	90	45
General agricultural news	90	45

Table 5: Benefits of using Mobile by Smallholder Farmers

Variable	Frequency	Percentage (%)
High-yielding seeds	170	77
Fertilizer use	110	50
Market information and pricing	160	73
Crop and livestock production techniques	130	59
Pesticides and herbicides use	80	37
Training from Agricultural extension services	90	45
General agricultural news	90	45

Source: Mdoda et al., 2023

Table 6: Problem faced by Smallholder Farmers in using Mobile Phones

Problem	Frequency	Percentage (%)	Rank
Expensive	145	66	1
Mobile phone operating problem	115	52	2
Network coverage problems	110	50	3
The high cost of repairing	95	43	4
Technical problems	90	41	5
Difficulty in using mobile phones	88	40	6
Number of observers = 220 -2 Log Likelihood 148.569 Prob (Chi-square)= 0.000 Pseudo R2 = 0.72 Adjusted R Square = 0.70 DF = 8.00			

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Table 7. Factors influencing use of Media by Smallholder Farmers

Variable	Coefficient	Std. Error	Significance	dy/dx
intercept	-1.948	0.613	0.002***	0.2123
Age	-0.287	0.651	0.043 **	0.2242
Years spent in school	0.163	0.058	0.004***	0.1903
Family size	0.163	0.058	0.004***	0.2003
Farming experience	-0.681	0.425	0.023**	0.153
Total income level	0.423	0.145	0.038***	0.2156

Number of observers = 220 -2 Log Likelihood 148.569 Prob (Chi-square)= 0.000
Pseudo R2 = 0.72 Adjusted R Square = 0.70 DF = 8.00

Pillars of Brain Re-Engineering



Source: Agbugba (2023)

Biography

Dr. Ikechi Agbugba is a profound food & agro economist with PhD in Agribusiness & Marketing. He has a wide experience in virtually every aspect of food & agricultural systems especially in technology in agriculture, climate change, entrepreneurship, among other areas. He has wide experiences as University Professor. His Postdoc experience was on a collaborative study between the ARC & University of Fort Hare. As an EUTECH advocate & Board Member, Food, Farming & Fisheries Alliance of the EUTECH, he participates in different work streams as either expert, consultant or speaker. He is the originator & advocator of the "Brain Re-Engineering Concept and Re-imagination (Strategy for actualising the SDGs agenda of the UN). More so, he is a Co-founder of the Africa Organisation of Technology in Agriculture (AOTA), 4iAfrica and AgriEn. He has earned the following excellence awards: 'Agro-Economist of the Year' by the Pan African Agricultural Journalists (PAAJ, 2017), Global Mentor of Change Award (GCPIT, 2022).



On the values of deformation area and location of strong earthquake aftershocks on the earth's surface

E. Y. Khachiyani^{1,2}

¹Institute of Geological Sciences, National Academy of Sciences of the Republic of Armenia, Armenia

²National University of Architecture and Construction of Armenia, Armenia

Aftershocks following a large earthquake are an inevitable part of the preparation and occurrence of large earthquakes. Depending on the location of the epicenter, tectonic–structural conditions of the epicentral zone, and earthquake intensity on the Earth’s surface, an aftershock cluster can cover different surface areas. Establishing the quantitative relationships between the aftershock zone and the main parameters of the earthquake (magnitude, rupture length, and slip value) can contribute to improving the model of an earthquake as a natural physical phenomenon. The extents of aftershock and deformation zones, as well as macroseismic changes on the Earth’s surface, indirectly indicate the intensity of the mainshock and the presence of portions with different degrees of weakening of rocks in the epicentral zone. This paper proposes a method to determine the area of such an aftershock zone using a deformational model of earthquake preparation and nucleation proposed earlier by the author. A new expression is obtained for determining the area of an aftershock zone depending on (i) the length of the rupture formed during the earthquake and (ii) the average slip along the rupture; expressions for the logarithmic and linear dependences of this area on the earthquake magnitude are also obtained. It is shown that the areas of aftershocks and deformations around the source and the formulas for determining their value obtained by K. Kasakhara, T. Damabara and the author are identical.

The presentation also provides quantitative relationships between the dependence of earthquake energy (deformation) on the conditional volume of the earthquake source (total volume of spatial deformation of the environment during the period of earthquake preparation), the area and length of the rupture and the seismic moment of the earthquake. The volume of the source during earthquakes with a magnitude $M > 8.0$ can reach more than 500.000 km^3 , and the value of the rupture area on the earth's surface is 6000 km^2 .

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Biography

Eduard Y. Khachiyan is affiliated with the National University of Architecture and Construction of Armenia and the Institute of Geological Sciences at the National Academy of Sciences, Armenia.

His extensive academic and research career includes roles at the Armenian Earthquake Engineering Research Institute (1956-2002), the American University of Armenia (1992-1997), and since 1997, he has served as head of the Chair of Building Mechanics at Yerevan State University of Architecture and Construction and chief scientist at the Institute of Geological Sciences of Armenia.

His research focuses on applied seismology, earthquake engineering, dynamics of structures, and building mechanics. Khachiyan has authored over 290 scientific papers and received numerous accolades, including the Order of the Badge of Honour (USSR) in 1976, the RA President's Prize for Applied Seismology in 2005, and the Gold Medal from CNIISK in 2009. His recent works include publications in Seismic Instruments and Novel Perspectives of Engineering Research.



Mitigation measures of mining waste impact on the environment by reprocessing for sustainable development

Chiraz Abdelmalak Babbou and Fredj Chaabani

Laboratory of Mineral Resources and Environment/ Department of Geology, Faculty of Sciences of Tunis, University of Tunis El Manar, Tunisia

The earth's surface is suffering nowadays from pollution by heavy metals generated by the old mining operations. The latter, in the last 50 years, didn't take into account the environmental impact of trace metal elements such as Pb, Zn, Cd unsightly abandoned on the surface in huge quantities all over the world. It becomes a major problem that affects air, water, soil, and habitants. Therefore, it is necessary to find solutions in order to preserve a healthy environment on the earth for future generations.

In this context, this research paper fits, which aims to minimize the impact of mining waste on the environment through reprocessing of tailings of an abandoned mine site. The mineralurgical process adapted to Lakhouat tailings (NW of Tunisia) began with a mineralogical study of the representative samples using X-ray diffraction, metallographic microscopy and chemical analyses. Mechanical preparation was undertaken by grinding steps and particle size analysis to determine the mineral release mesh (d80). After optimization of all operating parameters (milling time, conditioning with the specific collector, activators, depressants, pH regulators), global flotation process were applied in laboratory Denver stainless steel cell.

Mine waste is composed of zinc, lead sulfides and their oxides: sphalerite, galena, schalenblende, smithsonite and anglesite in a carbonate gangue. Chemical analysis showed zinc level of 1.48% (14800ppm Zn) and lead level of 0.29% (2900 ppm Pb).

After several global flotation tests, the final treated product shows a content of 0.09% Pb (900 ppm) and 1% Zn (10000ppm). This is a very significant mitigation for Pb. Zinc content has decreased considerably and it requires selective flotation steps later. This final product will be recycled in the industrial sector such as ceramics or cement.

Thus, Pb-Zn tailings can be treated to reduce their impact on the environment, with the possibility of subsequent valorization in the industrial sector.

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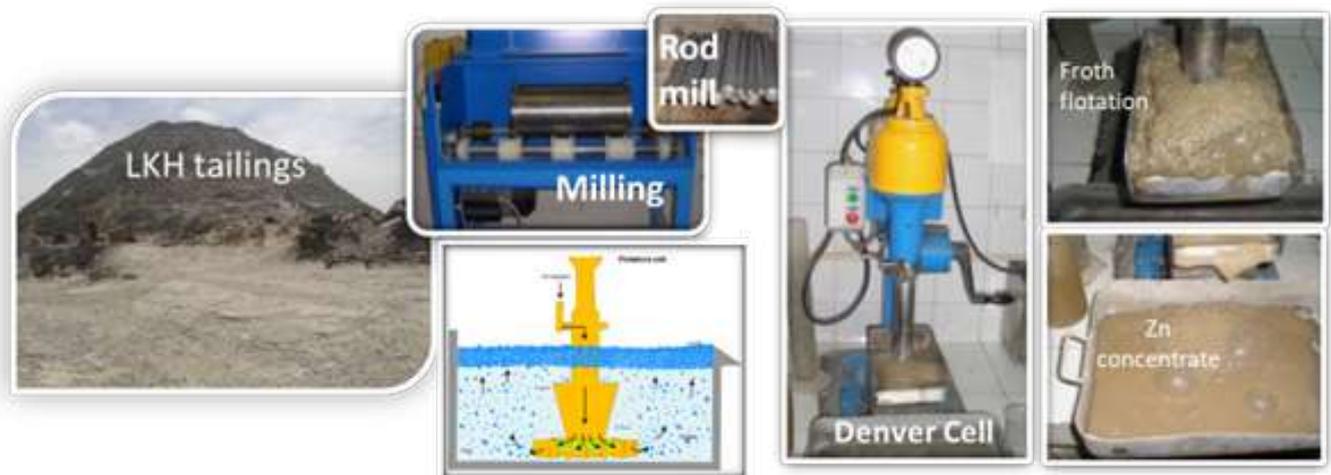


Fig-1: Reprocessing of tailings in abandoned mine site using Froth flotation process

Biography

Dr. Chiraz Abdelmalak Babbou, born on March 12, 1978, in Sfax, Tunisia, is a dedicated teacher-researcher specializing in Geology and Environmental Science. She earned her Bachelor's degree in Natural Sciences in 2000 from the Faculty of Sciences of Tunis (FST) and completed her Master's degree in Environmental Applied Geology in 2004. In 2012, she obtained her Ph.D. from the University of Tunis El Manar, focusing on the environmental characterization of the Fedj Lahdoum mining site and decontamination of mining waste by flotation.

Dr. Babbou has extensive experience in waste management and mineral processing, particularly through the development of flotation processes for abandoned mine sites. She has worked as a Contractual Assistant at ISEP-BG Soukra from 2008-2012 and as an Assistant Professor at FST from 2012-2024. Her research aims to reduce heavy metal contamination and recycle mining tailings for industrial use, with her work being presented at both national and international levels.



**A tale of two cities: Report on
a comparison of air pollution
governance in the Los Angeles
area of the USA and the Beijing-
Tianjin-Hebei area of China**



Xi WANG¹ and Richard Ottinger²

¹Shanghai Jiao Tong University, PRC, China

²Pace University, USA

This presentation reports the result of a comparative case study on the legal experience of air pollution control in the two areas. Based on a Model of Environmental Governance (EG Model), the experience of the air pollution control processes of the two areas is analyzed and compared. The study finds that, firstly, faced with serious health problems caused by air pollution, the mainstream value of the societies of the two areas changed dramatically. Secondly, the changed value of the societies had caused the establishment of a relatively sound legal and ethical framework in the two areas. Thirdly, under the legal and ethical frameworks, there were mainly three political relations in the air pollution governance processes of the two areas. These relations are: (1) regulatory relation between the regulators and the regulated communities; (2) supervisory relation between the supervisors such as legislatures and residents and the public in general on one side, and the governmental regulators on the other side; and (3) another supervisory relation between the legislatures, news media and civil society on one side and the polluters on the other side. Fourthly, by comparing the “legal formants” and the three political relations in the air pollution governance processes of the two areas, as well as the numerous and various measures applied in the processes, the study finds that the political profiles of the two countries are not determinative factors for the success of air pollution control. Instead, the substantive capabilities of a state are the determinative factors. The substantive capabilities demonstrated by the two areas are: (1) the capability of environmental ethical support; (2) the capability of legal framework building; (3) the capability of good governance. These findings possibly are useful enlighteners to other countries that suffered air pollution and engaged in combats against air pollution problems.

Biography

Professor Xi Wang is a retired Professor of the School of Law, Shanghai Jiao Tong University. He served as the Director of the Environmental and Resources Law Institute, Law School, Shanghai Jiao Tong University, from 2002 to 2019. He was professor and Vice Director of the Environmental Law Institute, Wuhan University from 1987 to 2002. He received a BA from Wuhan Normal College in 1981 and graduated from the Law School of Wuhan University in 1984 (ML). He has an MJS from Washington University Law School (1987) and a PhD in Law from Wuhan University Law School (2000).

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Richard Ottinger is Dean Emeritus and Professor of Law at Pace University's Law School where he has taught environmental law since 1985 and was Dean from 1994-1999. He founded the Pace Center for Energy and the Environment. He is a member of the IUCN World Commission on Environmental Law and its Climate Change Specialty Group. He served for 16 years in the U.S. Congress, chairing a House Subcommittee on Energy. He was a founding staff member of the U.S. Peace Corps. He was a founder and is Chair Emeritus of the Environmental and Energy Study Institute. A graduate of Harvard Law School and Cornell University, he was co-author and chief editor of the UNEP Guide to Energy Efficiency and Renewable Energy Laws, one of 12 published books and book chapters and more than 100 published articles on environmental, energy and climate change law.

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Complex slab geometry beneath the Colombian eastern cordillera revealed by high-precision earthquake relocation

Carlos Andrés Vergara Espinosa

Universidad Industrial de Santander, Colombia

Constraining the architecture of the subduction system beneath the Colombian Andes remains a formidable challenge. Limitations in data collection have considerably slowed down progress compared to other regions of active tectonism. As Colombia is located at a triple junction of the South American, Nazca, and Caribbean plates, the subsurface geometry in this region of South America remains unclear. There are various hypotheses attempting to explain the interaction of these three plates and their influence on the occurrence of the Bucaramanga Nest, but it is still unclear. In this context, an extremely compact and active volume of seismicity, at a depth of about 140 km, known as the Bucaramanga Nest (BN), emerges as the most puzzling feature. We leverage recent improvements in quality and coverage of the Colombian Seismic Network and advances in deep-learning for robust determination of phase arrival times to construct a high precision local seismicity catalog of an area surrounding the BN, for the period 2016-2021. We perform relative event location using cross-correlation derived differential times, with initial hypocentral parameters obtained by carefully curating multiple catalogs that aggregate information for the region of interest. We successfully relocated 32,000 earthquakes with relative depth errors of less than 210 meters and depths between 0 and 200 km. Careful analysis of seismicity and a sudden change in strike at about 6.6°N strongly support the existence of two distinct slab segments underlying the eastern cordillera. A northern segment strikes E-W with two large intermediate-depth earthquake clusters having roughly the same b-value. The southern segment hosts two additional clusters at depths of about 120 km. Onset of seismic activity in the BN coincides with the beginning of the northern slab segment and an abrupt change in the slab dip, where a clear aseismic gap of a few hundred meters separates a shallower intermediate-depth cluster from the more active BN.

Biography

Mr. Carlos Andrés Vergara Espinosa is a geologist from Bogotá, Colombia, currently pursuing a master's degree in Geophysics at the Industrial University of Santander. He has experience in the hydrocarbons sector, primarily in the area of development, and has researched and applied data science in seismology and geophysics.

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**Advanced sustainable urban
infrastructure methodology using LiDAR,
depth estimation, and environmental
monitoring**

Mojtaba Pournakht

Department of Environmental and Urban Engineering, Kansai University, Japan

This study focuses on the monitoring of the environment, the use of 3D mapping technology, and the estimation of depth for sustainable urban infrastructure. The study discusses the application of modern LiDAR techniques for accurate terrain mapping and structural analysis, which are crucial for infrastructure construction and geotechnical engineering assessments.

The integration of photogrammetry with computer vision algorithms enables the generation of accurate and complete 3D models of urban environments, mostly for environmental purposes. An essential challenge in any large-scale sustainable project is the seamless integration and fusion of Geographic Information Systems (GIS) with remote sensing data to monitor critical factors such as alterations in land cover and the influence of the urban heat island phenomenon. Furthermore, applications of depth estimate in geotechnical engineering

enables the urban planners and engineers to make better decisions regarding the composition of the earth below and assessing any potential disasters such as tsunamis. By this method, the complex problems of urbanization and the promotion of sustainability goals are more technically and precisely addressed.

Biography

Dr. Mojtaba Pournakht is an experienced scholar and researcher in architecture who focuses especially on sustainability and the use of cutting-edge technology. Particularly in the areas of depth estimation, 3D mapping, and color constancy algorithms, his extensive expertise in remote sensing and augmented reality has greatly advanced image processing technology. His enthusiasm for environmental monitoring with remote sensing methods has advanced resource management and disaster response significantly.

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A new methodology for a better estimation of reserves / resources of minor metals on the example of selenium

Roman Stiftner¹, Leopold Weber² and Helmut Rechberger¹

¹TU Wien, Institute for Water Quality and Resource Management, Austria

²Austrian Geological Society, EurGeol, Austria

Mineral raw materials have always been of great importance in human history and have been the cause of numerous military conflicts. In addition, new technologies to mitigate climate change, sustainable energy production and mobility, as well as digitalisation, make particular chemical elements indispensable. Some of these raw materials are not mined from their own deposits but are minor constituents of basic raw material deposits such as copper, zinc, aluminium and nickel and can only be produced together with them. Since geological resources and reserves of minor metals are generally not included in classification codes - such as JORC - their reserves or resources are not sufficiently documented. Consequently, no reliable assessment of their criticality is possible.

Different types of copper deposits show characteristic Se-concentrations and are linked and extrapolated with our own database of copper deposits, which is precisely structured by tectonic setting, age of mineralisation, copper grades, reserves and resources, and geographic location. The result is a tabular listing of selenium's geological reserves and resources according to the relevant countries, type of deposit, tectonic setting, and regions. These findings show the average Se-content and size of copper deposits. The calculated resources of around 25 million tonnes are well over two hundred times higher than previously documented and are available to accommodate increasing demand for selenium.

The methodology presented is suitable for estimating the reserves and resources of minor metals such as platinum, cobalt, bismuth, molybdenum and tantalum as they are constituents of primary mineralisations.

Biography

Dr Roman Stiftner, CSE, is Managing Director of the Austrian Non-Ferrous Metals Federation and the Austrian Mining and Steel Association, as well as Director-General of EUMICON. He is President of the Austrian Logistic Association (BVL), President of the European Shippers' Council (ESC), Vice President of Euromines, and a member of the Executive Committee of European Aluminium and Eurometaux.

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Roman was CEO of the logistics automation company Dematic GmbH and Senior Vice President of Siemens AG Austria. He represented as a spokesman the transport, infrastructure, environmental and energy affairs as a member of the Vienna State Parliament from 2005 to 2015.

Roman studied at the Technical University Vienna and at the Vienna University of Economics and Business and graduated in 1994. He holds an academic doctorate degree from the Technical University Vienna. Since 2018 Roman has been a Certified Supervisory Expert (CSE) and is a lecturer at the University of Applied Science in Vienna.



Climatic variation along the distributional range in Cuban Anolis lizards: Species and ecomorphs under future scenarios of climate change

Anaisa Cajigas Gandia¹, Roberto Alonso Bosch², Carlos A. Mancina³ and Anthony Herrel⁴

¹*Institut für Zoologie, Stiftung Tierärztliche Hochschule Hannover, Germany*

²*Museo de Historia Natural "Felipe Poey", Facultad de Biología, Universidad de La Habana, Cuba*

³*Centro Nacional de Biodiversidad, Instituto de Ecología y Sistemática, Cuba*

⁴*Département Adaptations du Vivant, Batiment d'Anatomie Compareé, France*

Geographical ranges and physiological tolerances of species are correlated, and it can be expected that widespread species encounter higher climatic variation across their distributions than restricted species. Widespread species should consequently be more tolerant to extreme or variable weather conditions, and may have the ability to better conserve their current geographical ranges under future climate change scenarios. We tested this hypothesis by studying the relationship between the climatic variation experienced by restricted and widespread Anolis lizards from different ecomorphs and regions of Cuba and the distributional shifts induced by climate change. We selected seven bioclimatic variables from WorldClim to characterize the realized climatic niche of 12 Cuban anoles, where the coefficients of variation of each variable were taken as a measure of climatic variation. We used niche modeling to predict changes in suitable habitats under future climatic scenarios. We found that species from Eastern Cuba occupy areas with the highest climatic variation, likely related to the topography of the region. Crown giant anoles experienced habitats with lower climatic variation in comparison with species from other ecomorphs, which together with their tree canopy habitat and large body size may represent a disadvantage to face changing climates. All species will experience a severe decrease in their habitat suitability, with the Western species being predicted to lose a higher proportion of suitable habitat. Additional results on Anoles climate niche modelling and Cuban biota are presented. Combining niche modeling with physiological data would better predict the effects of climate change on Cuban lizards and might allow taking management actions for species and habitats to mitigate the possible negative impacts of this phenomenon.

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Biography

Anaisa Cajigas Gandia got her Bachelor in Biology at the University of Havana, Cuba between 2013-2018. After graduation started working as researcher and specialist in Herpetology at the Institute of Ecology and Systematics (IES). She obtained a master degree on Conservation Biology, Behavioral Ecology and Wildlife Management (2019-2021) at the University of Dijon, France. For almost 10 years she has been working on systematics, ecology, diversity and climate change impacts on Cuban Herpetofauna. She has around 20 scientific publications including papers in peer reviewed journals and book chapters, and participated in various national and international meetings. Her work has earned her important national and international recognitions such as: the Scientific Merit Award, given for the Rector of the University of Havana to students with a relevant scientific career, and more recently: the International Young Scientific Awards. Nowadays, she is a PhD candidate in Evolutionary Biology at the Institute of Zoology, University of Veterinary Medicine of Hannover, Germany.

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Projections of heatwave-attributable mortality under climate change and future population scenarios in China

Huiqi Chen^{1,2}, Liang Zhao³, Liangliang Cheng², Yali Zhang², Huibin Wang², Kuiying Gu⁴, Junzhe Bao⁵, Jun Yang⁶, Zhao Liu⁷, Jianbin Huang⁸, Yidan Chen⁹, Xuejie Gao¹⁰, Ying Xu¹¹, Can Wang⁹, Wenjia Cai^{8,9}, Peng Gong^{8,12}, Yong Luo⁸, Wannian Liang^{4,13} and Cunrui Huang^{4,13}

¹London School of Hygiene and Tropical Medicine, UK

²School of Public Health, Sun Yat-sen University, China

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⁷School of Linkong Economics and Management, Beijing Institute of Economics and Management, China

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⁹State Key Joint Laboratory of Environment Simulation and Pollution Control (SKLESPC), School of Environment, Tsinghua University, China

¹⁰College of Earth and Planetary Sciences, University of Chinese Academy of Sciences, China; Climate Change Research Center, Institute of Atmospheric Physics, Chinese Academy of Sciences, China

¹¹National Climate Center, China Meteorological Administration, China

¹²Department of Earth Sciences and Geography, University of Hong Kong, China

¹³Institute of Healthy China, Tsinghua University, China

Background: In China, most previous projections of heat-related mortality have been based on modeling studies using global climate models (GCMs), which can help to elucidate the risks of extreme heat events in a changing climate. However, spatiotemporal changes in the health effects of climate change considering specific regional characteristics remain poorly understood. We aimed to use credible climate and population projections to estimate future heatwave-attributable deaths under different emission scenarios and to explore the drivers underlying these patterns of changes.

Methods: We derived climate data from a regional climate model driven by three CMIP5 GCM models and calculated future heatwaves in China under Representative Concentration Pathway (RCP) 2.6, RCP4.5, and RCP8.5. The future gridded population data were based on SSP2 assumption with different fertility rates. By applying climate zone-specific exposure-response functions to mortality during heatwave events, we projected the scale of heatwave-attributable deaths under each RCP scenario. We further analyzed the factors driving changes in heatwave-related deaths and main sources of uncertainty using a decomposition method.

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Findings: The number of heatwave-related deaths will increase continuously to the mid-century even under RCP2.6 and RCP4.5 scenarios, and will continue increasing throughout the century under RCP8.5. There will be 20,303 deaths caused by heatwaves in 2090 under RCP2.6, 35,025 under RCP4.5, and 72,260 under RCP8.5, with half of all heatwave-related deaths in any scenario concentrated in east and central China. Climate effects are the main driver for the increase in attributable deaths in the near future till 2060, explaining 78% of the total change. Subsequent population decline cannot offset the losses caused by higher incidence of heatwaves and an aging population under RCP8.5. Although health loss under the 1.5 °C warming scenario is 1.6-fold higher than the baseline period 1986–2005, limiting the temperature rise to 1.5 °C can reduce the annual mortality burden in China by 3,534 deaths in 2090 compared with RCP2.6 scenarios.

Interpretation: With accelerating climate change and population aging, the effects of future heatwaves on human health in China are likely to increase continuously even under a low emission scenario. Significant health benefits are expected if the optimistic 1.5 °C goal is achieved, suggesting that carbon neutrality by mid-century is a critical target for China’s sustainable development. Policymakers need to tighten climate mitigation policies tailored to local conditions while enhancing climate resilience technically and infrastructurally, especially for vulnerable elderly people.

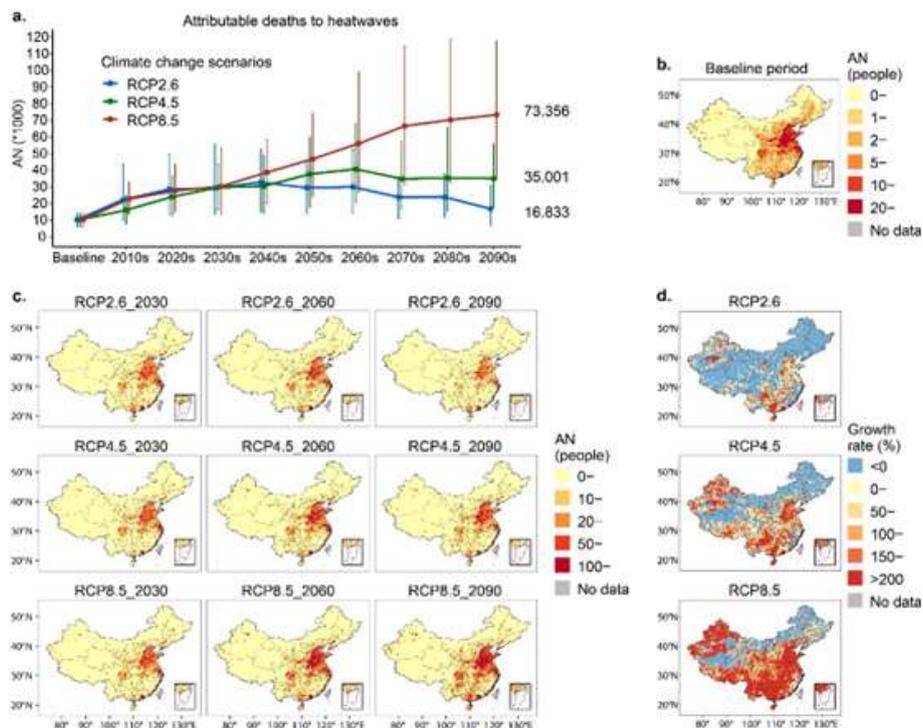


Figure: Projections of decade-average deaths attributable to heatwaves in China.

a: Temporal trends of national decade-average heatwave-attributed deaths under three RCP scenarios from 1986 to 2100 with middle-fertility assumption. Solid broken lines denote the estimated mean decade-average attributed deaths across the three climate models. The solid

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vertical line represents the 95% empirical confidence interval (CI) of the ensemble of models. Baseline refers to the baseline period (1986–2005). The number marked on the right is the average attributable deaths from 2090 to 2099. Monte Carlo simulations generating 1,000 samples were computed to produce the empirical CI.

b: Spatial differentiation of multi-years-average attributed deaths in 0.5-degrees grid during the baseline period.

c: Spatial differentiation of multi-years-average attributed deaths in grid in 2030 (2021–2040), 2060 (2051–2070), 2090 (2081–2100).

d: Changes in attributable deaths to heatwaves in 2090 (2081–2100) relative to the baseline period. Growth rate (%) = $(AN_{2090} - AN_{baseline}) / AN_{baseline} \times 100\%$. RCP, representative concentration perspectives; AN, number of deaths attributable to heatwaves.

Biography

Huiqi Chen is a Ph.D. candidate at the London School of Hygiene and Tropical Medicine and Sun Yat-sen University. She is involved in teaching several courses at LSHTM including Health Data Management, Thinking like a Health Data Scientist - a teaching practicum course for Health Data Science graduate students. Her research focuses on quantitative assessment of the health impacts of climate change, extreme heat events and air pollution, especially on more vulnerable groups like maternal and child health. She is also broadly interested in the economic burden related to health from climate change. She received her M.B. in Preventive Medicine from Zhejiang University in 2020.



Impacts of climate change on paddy irrigation system in equatorial region

Kelvin Kuok King Kuok

University Malaysia Sarawak, Malaysia

Climate change has become an integral issue in human society, and its global influence is paramount. The primary food source in Asian countries is paddy rice, and cultivating paddy plantations requires plenty of water. In the past, Malaysia depended on imported rice even though many empty lands were available for paddy plantation. Due to the recently restricted rice export from nearby countries, the Malaysia Agriculture and Food Security Ministry is initiating the Large-Scale Smart Paddy Field program in Sri Aman Division, Sarawak, Malaysia, to increase Sarawak's rice production and the nation's self-sufficiency. However, the water crop requirement for paddy plantations is challenging to determine, especially with the impact of climate change. The software freely available for predicting crop and water requirements is FASSET, CROPWAT 8.0, DSSAT, and WOFORST. In this study, CROPWAT 8.0 is used to determine appropriate irrigation scheduling for farmers in identifying the optimum amount of water for paddy plantation in Sarawak. The typical input data for the models are soil type, crop type, weather condition, evapotranspiration and effective rainfall obtained from the Penman-Monteith method and the USDA Soil Conservation Services method. Statistical Downscaling Model (SDSM) is used to forecast the future climate. The future climate estimated through SDSM will be input into CROPWAT 8.0 to develop the future optimum irrigation schedules of the paddy yield production under different management strategies and water supply schemes to achieve minimum crop yield reduction and maximize rainfall efficiency. Results revealed that future droughts will be prolonged and more severe during the drought season. Hence, the severe drought conditions and reduced relative humidity, combined with high temperatures, require higher irrigation needs for paddy plantations in the future. The result demonstrated that efficient water management for paddy irrigation will be highly crucial in the future. The outcome of this project can be a reference for the Department of Agriculture Sarawak and the Department of Irrigation and Drainage Sarawak for future paddy crop irrigation planning and management.

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Biography

Assoc. Prof. Ts. Ir. Dr. KUOK KING KUOK received his BEng (Honours) and Ph.D. from Universiti Teknologi Malaysia (UTM), as well as MEng from Universiti Malaysia Sarawak (UNIMAS). He has published more than 65 indexed journal research papers, more than 25 conference proceedings, and 25 book chapters. His research includes flood forecasting using ANNs, imputation of missing data using AI, filter membrane development, impact of climate change, derivation of equatorial soil loss equation, low impact development, sustainable water supply, stormwater module, etc. His second area of research interest is building information modeling, 3D printing, and project management. He has collaborations worldwide (e.g., USA, Australia, New Zealand, Russia, UAE, the Czech Republic, Bangladesh, and Malaysia). Dr Kuok had involved in organizing 18 conferences in different roles. He is also a member of the Editorial Board of the Journal Modern Management Forum, Singapore since 2019, Expert Scientific Editor for Academic Exchange Information Center (AEIC) since 2021, Green Building & Construction Economics since 2022, Tropical Aquatic and Soil Pollution since 2022. He is a qualified Chartered Professional Engineer in Malaysia, ASEAN, and APEC countries, and a Professional Technologist registered with the Malaysia Board of Technologists (MBOT). Meanwhile, Dr Kuok brings with him ten years industry experience before joining the academic career.

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Radiohormetic effect on the germination of *Pinus pseudostrobus* Lindl. seeds irradiated with linear accelerator

Laura Yasmin Flores-López¹, Lourdes Georgina Iglesias-Andreu¹, María de Lourdes Palafox-Chávez² and César Valenzuela Encinas³

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³Instituto de Estudios Ambientales, Universidad de la Sierra Juárez, México

Pinus pseudostrobus Lindl. is one of the most widely propagated species in Mexico for reforestation, agroforestry, and commercial timber plantations because of the quality of its wood and its rapid growth. Among the physical and chemical methods to improve the effectiveness of germination, stimulation with radiation has shown positive effects on seed germination and seedling growth in several species. However, there are not many studies that have explored the radiohormetic effect on germination, survival, and seedling quality in conifers. Therefore, the present study was carried out with the objective of evaluating the radiohormetic effects of the use of low doses of linear accelerator on the germination capacity, growth, and quality of seedlings as well as the chlorophyll content of *P. pseudostrobus* for the purpose of reforestation and the establishment of forest plantations. A total of 720 seeds were taken to be irradiated with doses of 0, 0.5, 1.5, 1.5, 3, 5, and 7.5 Gy, in the linear accelerator Elekta Synergy Platform. For each dose, four replicates of 30 seeds each were used. It was determined that all the doses used increased the number of germinated seeds and showed an increase in seedling growth with respect to the control. The plant quality indexes showed that the doses of 0.5, 1.5, and 3.0 Gy contributed most to obtaining plants with larger aerial and root parts, but with a balanced conformation and a great capacity for the formation of new roots, which will help to present better levels of survival.

Biography

Laura Flores is a Forest Engineer (2019) from the Universidad de la Sierra Juárez (UNSIJ), Oaxaca, Mexico, where she graduated with honors; She graduated from the Master of Science in Ecology and Biotechnology (2022) from the Institute of Biotechnology and Applied Ecology, of the Universidad Veracruzana. She was selected as "Forest Delegate" by Reforestamos México A.C. She has participated in projects and volunteered at the Mexican Youth Institute to care for the environment. During her master's degree she generated *in vitro* culture propagation protocols in *Pinus*. In addition, she has participated in different national and international conferences related to the forestry sector, genetic diversity, mutagenesis, *in vitro* culture and the application of ionizing radiation. She has items published in the area, the one with the greatest impact titled "Hormetic effect of Gamma rays on *Pinus pseudostrobus* Lindl. seed". She is currently studying the Doctorate in Sciences in Ecology and Biotechnology.



Ratiometric fluorescence and chromogenic probe for trace detection of selected transition metals

Abrar Hussain^{3,4}, Muhammad Saleem^{1,2}, Muhammad Rauf⁵, Salah Uddin Khan⁶, Sajjad Haider⁷, Muhammad Hanif⁸, Muhammad Rafiq⁹ and Sang Hyun Park^{3,4}

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²Department of Chemistry, University of Sargodha, Pakistan

³Advanced Radiation Technology Institute (ARTI), Korea Atomic Energy Research Institute, Republic of Korea

⁴Radiation Science, University of Science and Technology, Republic of Korea

⁵Shanxi University, School of Chemistry and Chemical Engineering, China

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⁸Department of Chemistry, GC University Faisalabad, Pakistan

⁹Department of Physiology and Biochemistry, Cholistan University of Veterinary and Animal Sciences, Pakistan

The design and development of a fluorescence sensor aimed at detecting and quantifying trace amounts of toxic transition metal ions within environmental, biological, and aquatic samples has garnered significant attention from diagnostic and testing laboratories, driven by the imperative to mitigate the health risks associated with these contaminants. In this context, we present the utilization of a heterocyclic symmetrical Schiff Base derivative for the purpose of fluorogenic and chromogenic detection of Co^{2+} , Cu^{2+} and Hg^{2+} ions. The characterization of the ligand involved a comprehensive array of techniques, including physical assessments, optical analyses, NMR, FT-IR, and mass spectrometric examinations. The mechanism of ligand-metal complexation was elucidated through the utilization of photophysical parameters and FT-IR spectroscopic analysis, both before and after the interaction between the ligand and the metal salt solution. The pronounced alterations observed in absorption and fluorescence spectra, along with the distinctive chromogenic changes, following treatment with Co^{2+} , Cu^{2+} and Hg^{2+} , affirm the successful formation of complexes between the ligands and the treated metal ions. Notably, the receptor's complexation response exhibited selectivity towards Co(II) , Cu(II) , and Hg(II) , with no observed chromogenic changes, spectral variations, or band shifts for the various tested metal ions, including Na^+ , Ag^+ , Ni^{2+} , Mn^{2+} , Pd^{2+} , Pb^{2+} , Cd^{2+} , Zn^{2+} , Sn^{2+} , Fe^{2+} , Fe^{3+} , Cr^{3+} and Al^{3+} . This absence of interaction between these metal ions and the ligand could be attributed to their compact or inadequately conducive conduction bands for complexation with the ligand's structural composition. To quantify the sensor's efficacy, fluorescence titration spectra were employed to determine the detection limits for Co^{2+} , Cu^{2+} and Hg^{2+} , yielding values of 2.92×10^{-8} , 8.91×10^{-8} , and 4.39×10^{-3} M, respectively. The Benesi-Hildebrand plots provided

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association constant values for the ligand-cobalt, ligand-copper, and ligand-mercury complexes as 0.74, 2.52, and 13.89 M^{-1} , respectively.

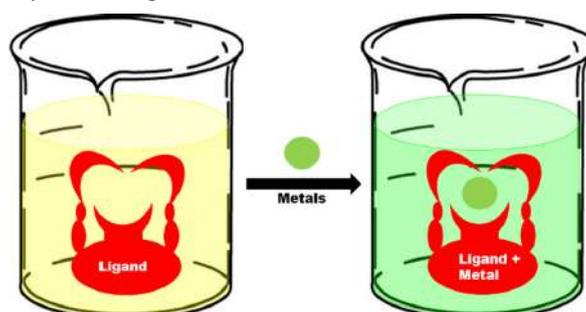


Fig. 1. Graphical representation of the symmetrical ligands, chromogenic response of receptor solution both prior to and following the introduction of a metal, and the subsequent interaction between the ligands and the metal.

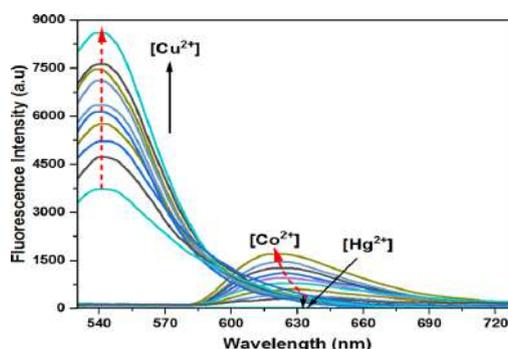


Fig. 2. Fluorescence titration analysis of probe alone and after incremental induction of Co^{2+} , Cu^{2+} and Hg^{2+} salt solution.

Biography

Abrar Hussain, born on July 2, 1997, in Pakistan. He completed his early education in Bhakkar District, Punjab Province. Passionate about chemistry, he pursued a Bachelor of Science in Chemistry, achieving a GPA of 3.74 (93.5%). He continued his studies at NUST which is a top ranked institute in Pakistan, where he completed a Master of Science in Chemistry with a GPA of 3.45/4.00 (86%) and received an "A" grade on his research thesis.

During his Master's research, he synthesized biologically active derivatives of heterocyclic compounds and performed molecular docking studies and biological evaluations. Additionally, he synthesized and utilized heterocyclic symmetrical compounds for the fluorogenic and chromogenic detection of heavy transition metal ions. Currently, he is a Research Assistant at the Korea Atomic Energy Research Institute (KAERI), focusing on synthesizing sensing materials for detecting heavy metals and micro/nanoplastics.

His research experience includes advanced synthesis, molecular docking studies, and various analytical techniques like SEM, EDS, XPS, TEM, TGA, CV, FT-IR, UV/Vis, NMR spectroscopy, and fluorescence spectrometry. He is passionate to contribute in preserving the living organisms as well as protecting our environment from the harmful effects of heavy metals and nanoplastics.

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Identification and assessment of sustainability performance indicators for construction projects

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³Associate Dean for Graduate Affairs and Research, Professor of Mechanical Engineering, American University of Sharjah, UAE

Several researches investigated the integration of sustainability in construction. However, there is a gap in addressing the performance measurement and evaluation during the construction phase. Traditional project performance evaluation methods are used to assess time, cost, and scope performance. The main goal of this dissertation is to develop a new project controls model for sustainable construction projects by integrating time, cost, and sustainability. The proposed methods enhance the planning and controlling of sustainable construction projects. Twenty-two sustainability indicators under two groups environmental and socio-economic were identified based on a comprehensive literature review. The importance of indicators was then evaluated through a survey in the United Arab Emirates (UAE) using pair-wise comparison and the Analytic Hierarchy Process (AHP). The results highlighted that the use of renewable energy indicator was ranked as the most important with a global weight of 0.164 (environmental group). The construction site safety indicator was the most important, with a global weight of 0.093, in the socio-economic group. Three time-cost-sustainability optimization models are then developed for project planning. Model A introduces sustainability as a constraint, where the cost of the project is minimized while ensuring a minimum value of sustainability for the project. In Model B the objective function is formulated as a combination of the cost of the project and the equivalent cost of sustainability. These two optimization problems were solved using Linear Programming (LP) and the Genetic Algorithms (GA). For Model C, the problem is formulated as a multi-objective optimization problem, where the objective is to find the best compromise that minimizes the cost of the project while ensuring the highest value of sustainability. A case study is presented to demonstrate the application of the proposed models. A Sustainable Earned Value Management (SEVM) model was developed to monitor the attainment of sustainability objectives in construction projects in addition to the traditional objectives. The research is valuable as it encourages contractors to consider sustainability as a key objective resulting in more a sustainable construction industry. The research fills a recognized gap in the literature and proposes a set of sustainability indicators and project control models.

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Biography

Sareh Rajabi was born on 1986, in Tehran, Iran. She was educated in a private school, The International School of Zakkieh, and was granted her high school diploma in June 2004 with honors. She then joined the American University of Sharjah and from which she graduated with a Bachelor of Science in Civil Engineering in June 2009.

Upon graduation, Ms. Sareh worked as a planning engineer in a multinational contracting organization, Al Rajhi Construction Company (ARC). She was responsible for successfully completing many critical tasks in high-profile infrastructure projects undertaken in the UAE. She held the position of Sr. Planning Engineer at the end of her career with ARC.

In 2010, She began a master's program in Engineering Systems Management at the American University of Sharjah and graduated in May 2012.

In 2015, She joined DX Contracting LLC, another contracting organization in UAE, holding the position of Project Control Manager. She has professional experience in project control in initiating, planning, executing, controlling, and closing large and complex projects.

In 2018, She began a PhD program in Engineering Systems Management at the American University of Sharjah and graduated in May 2022.



Examining vertical profile of rain structure for different rain types utilizing GPM-DPR data

Seda Ermis

Osmaniye Korkut Ata University, Turkey

Measurement of the dynamic evolution of vertical rain profile plays a pivotal role in advancing our understanding of the hydrological cycle, with significant scientific applications in radar meteorology, microwave communication, remote sensing, cloud physics, and other related fields. The vertical variations of rain parameters such as drop size distribution, drop concentration, rain rate or reflectivity factor can be obtained by space-borne radars (TRMM/PR and GPM/DPR), radiometers and ground-based radars. In tropical regions, satellite observations are particularly essential for the spatial and temporal estimation of rain parameters across various precipitation regimes. This is especially significant for regions characterized by unique features, including the presence of large raindrops and intense rainfall.

This study examines two selected test datasets from the Dual-frequency Precipitation Radar (DPR) aboard the Global Precipitation Measurement (GPM) Core Observatory. The GPM-DPR datasets describe the vertical structure of DSD using two gamma distribution parameters: mass-weighted mean diameter and total raindrop concentration. These parameters are compared for different rain rates, specifically for stratiform or convective types of rain. Additionally, the relationship between DSD parameters and vertical profiles of radar reflectivity is examined.

It is concluded that the vertical structure of DSD derived from GPM-DPR measurements may differ between stratiform and convective rain types, even at similar rain rates. This discrepancy arises from the significant growth of raindrops in convective rain, leading to a larger mean drop diameter but a smaller total number of drops compared to stratiform rain, despite the similarity in rain rates. Generally, convective rain is expected to result in increased radar reflectivity, particularly at higher rain rates. However, at the bright band height, stratiform rain exhibits a peak value in reflectivity due to the melting process.

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Biography

Seda Ermis received the B.S. and M.S.E. degrees from the Department of Electrical and Electronic Engineering, Mersin University, Mersin, Turkey, in 2006 and 2009, respectively. During her master degree, she worked as a Research Assistant under the Department of Electrical and Electronics Engineering, Mersin University between 2008-2009. Afterwards, she was awarded by the scholarship of the Ministry of Education in Turkey to continue her Ph.D. In 2015, she received her Ph.D. degree from the Department of Electrical Engineering, University of Texas at Arlington, USA. Also, she worked as a teaching assistant during 2013-2015 while she pursued her doctorate degree. Currently, as an assistant professor, she is working for Osmaniye Korkut Ata University, Osmaniye, Turkey at the department of Electrical and Electronics Engineering. Her research area involves wave scattering and emission from random media, and radar back-scatter modelling in microwave and millimeter-wave remote sensing.



Nitrates in Turkish waters: Sources, mechanisms, impacts, and mitigation

Sabit Erşahin¹ and Bayram C. Bilgili²

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²Department of Landscape Planning, Faculty of Forestry, Çankırı Karatekin University, Turkey

The rapid technological advancement, coupled with growing population and urbanization, alongside the extensive utilization of nitrogen-based fertilizers, has led to significant nitrate (NO₃) contamination of water resources in Türkiye. Addressing this issue demands a comprehensive evaluation of available data to raise nationwide awareness of the problem and to formulate effective mitigation strategies. This study aims to underscore the critical importance of NO₃ contamination and to explore feasible measures for combating this issue on a national scale. Agriculture, particularly the use of chemical fertilizers in irrigated farming, was as the primary contributor to NO₃ pollution in groundwater. Additionally, industrial and domestic sources significantly contributed NO₃ levels in both groundwater and surface water bodies in numerous instances. The most alarming instances of NO₃ contamination have been observed in regions characterized by intensive agriculture, industrial growth, and rapid urban expansion. Notable examples include excessively high NO₃ concentrations in groundwater, such as 344 mg NO₃ L⁻¹ in İzmir, 476 mg L⁻¹ in Afyon, 477 mg L⁻¹ in Antalya, and 948.0 mg L⁻¹ in Konya. Similarly, surface water bodies exhibit considerable levels of contamination, exemplified by 293.8 mg NO₃ L⁻¹ in İzmir, 63.3 mg L⁻¹ in Eskişehir, 89.8 mg L⁻¹ in Edirne, and 90.6 mg L⁻¹ in Sakarya. Effective management strategies, including meticulous irrigation and fertilizer plans, are indispensable for reducing fertilizer-related NO₃ contamination in irrigated agriculture. Special attention should be paid to areas where intensive industry and agriculture come together with crowded residential areas. Moreover, stringent measures are imperative to prevent the discharge of wastewater into streams, creeks, rivers, and lakes. Furthermore, comprehensive studies are warranted to assess potential health ramifications, including the risk of cancer, associated with NO₃ exposure through drinking water. Such endeavors are essential for safeguarding public health and promoting sustainable water management practices in Türkiye.

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Biography

Professor Sabit Erşahin is an expert at soil science, specializing in soil physics and its multifaceted applications. Throughout his career, Professor Erşahin has delved deep into the mechanisms governing solute transport in layered soils in his PhD study. Professor Erşahin's research extends beyond soil physics to encompass a wide range of topics within soil science. He is particularly renowned for his expertise in employing geostatistics to analyze soil variability. Additionally, his research has contributed significantly to understanding and predicting land degradation, desertification, and nitrate leaching across different scales, essential for effective environmental conservation and resource management. Moreover, Professor Erşahin's research extended to hydro pedology, a recent research area bridging hydrology to pedology. His research on evaluating forest responses to environmental changes studies the complex dynamics between forests and climate variability. Professor Erşahin inspires the next generation of soil scientists through his dynamic teaching style and dedication to academic excellence. Outside academia, Professor Erşahin is actively engaged in interdisciplinary collaborations, bridging the gap between scientific research and real-world applications. His work has profound implications for global sustainability efforts, contributing to the preservation of natural resources and the resilience of ecosystems in the face of environmental change.



Diversity of Silurian coelenterates of Podillia (Ukraine)

Volodymyr Grytsenko

National Museum of Natural History, Ukraine

Main goal to show diversity of coelenterate as result of thirty years of researching Silurian succession in Dniester River valley and Western Slope of Ukrainian Shield. There was collected huge collection, which consist from thousands of samples. The work methods included fieldwork and laboratory investigation thin sections under optical and digital microscope. There were studied outcrops and boreholes cores and collected samples Silurian coelenterates of Podillia.

The conclusion was that Silurian Coelenterata of Podillia lived in a relatively shallow shelf sea in a tropical climate. Some of them were able to build bioherms in symbiosis with algae. Bioherms distributed on the shelf in more or less elongated bands and individual structures. They are adapted mainly to open sea conditions with normal salinity.

From the point of taxonomy view, the phylum Coelenterata and the subphylum Cnidaria unite groups that belong to the classes: Anthozoa, Scyphozoa and Hydrozoa. The Anthozoa class, in turn, is divided into: 1 – Rugoses (single and colonial), 2 – Tabulates (exclusively colonial), 3 – Heliolithoidea (all colonial), 4 – Stromatoporoidea (colonial, according to some researchers, they belong to sponges). Modern and fossil coelenterates are characteristic for the relatively shallow waters of the tropical climate zone.

There are so-called hermatypic corals capable of building organogenic structures (bioherms and reefs). They all vary widely in size from small singles to large colonials.

Single Rugosa vary in size from small 3-5 mm to large 20-30 cm in height (*Phaulactis cyathophylloides* Ryder). *Mucophyllum crasteroides* Etheridge (fig. 1) has a diameter up to 10 cm and is adapted to existence on a soft substrate. Branched colonies of Rugosa reach a height of 150 cm (*Entelophyllum articulatum* (Wahlenberg)). The diameter of the Tabulata colony can reach 100 cm (*Favosites gothlandicus* Lamark).

Among Silurian corals, there were long-lived species (*Favosites gothlandicus* Lamark) and relatively short-lived species (*Syringolites kuntianus* Lindstroem (fig. 2), *Syringoheliolites contrarius* Bondarenko and others).

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Corals have stratigraphic significance and can be indicators of facies conditions. Depending on the substrate, coelenterates: 1 – lie freely on the soil, 2 – are attached to solid objects on the bottom by a skeleton or roots, 3 – “pontoon” (with a wide base and/or inserted by roots into soft sediment), 4 – form isometric balls rolling on the bottom, etc.

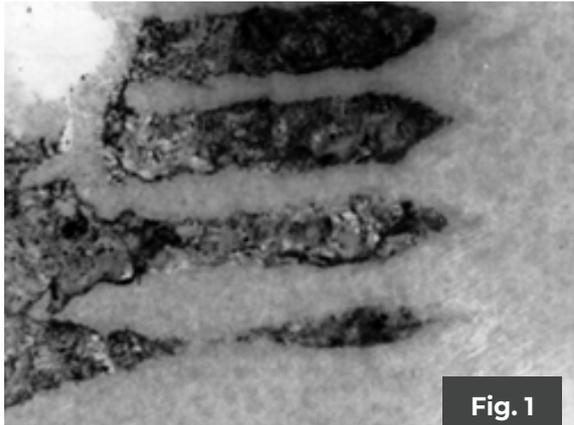


Fig. 1

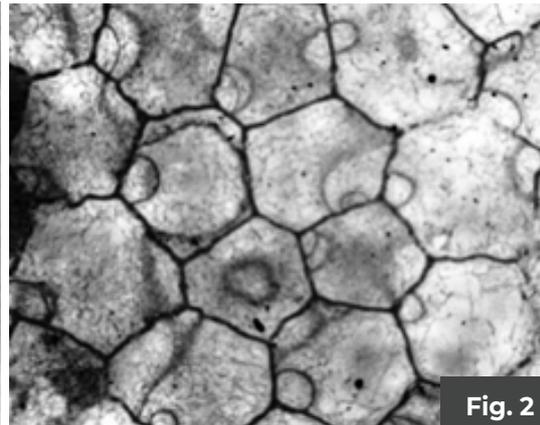


Fig. 2

Fig. 1. The structure of septa *Mucophyllum crateroides*

Fig. 2. Thin section of *Syringolites kuntianus*

Biography

Grytsenko Volodymyr, born in 1947, graduated Kyiv State University named after Taras Shevchenko, the Faculty of Geology in 1970.

Since 1997, he invited to the Faculty of Geology of Taras Shevchenko Kyiv National University. He received the title of associate professor on April 21, 2005.

Since 2016, he has held the position of Head of the Department of Geology of the National Natural Science Museum of the National Academy of Sciences of Ukraine, published more than 160 scientific and methodical works.

Together with colleagues he carried out research on the Dniester River valley in the area flooded by the reservoir of the Dniester HPP and the international project "Ecostratigraphy" (scientific leader and project coordinator, Academician of the Academy of Sciences of Estonia D.L. Kaljo).

Studies of the Vendian (Ediacaran) section of Podillia carried out since 2010 under the project of the British NERC together with D.V. Grazhdankin.



Activatable fluorescent probes for imaging and diagnosis of rheumatoid arthritis

P. Luo

Peking union medical college, China

Rheumatoid arthritis (RA) is a systemic autoimmune disease that is primarily manifested as synovitis and polyarticular opacity and typically leads to serious joint damage and irreversible disability, thus adversely affecting locomotion ability and life quality. Consequently, good prognosis heavily relies on the early diagnosis and effective therapeutic monitoring of RA. Activatable fluorescent probes play vital roles in the detection and imaging of biomarkers for disease diagnosis and in vivo imaging. Herein, we review the fluorescent probes developed for the detection and imaging of RA biomarkers, namely reactive oxygen/nitrogen species (hypochlorous acid, peroxynitrite, hydroxyl radical, nitroxyl), pH, and cysteine, and address the related challenges and prospects to inspire the design of novel fluorescent probes and the improvement of their performance in RA studies.

Biography

Pan Luo is studying for a doctorate in Peking Union Medical College and has published 20 articles. He devoted himself to the study of biosensors and materials in medicine. And he serves as a reviewer for many well-known magazines.

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Romans' strategies for hydrogeological risk prevention: Technique and law

Laretta Maganzani

Università Cattolica del Sacro Cuore di Milano, Italy

The prevention of hydrogeological risks and the protection of both human life and property against climate-related events, which are of primary interest today, can be supported by both historical-legal and archaeological-topographical studies. On the one hand, the Romans were masters in the art of prevention: the extraordinary efforts of the centuriation technicians to drain surface waters and regulate rivers are well documented, especially in rural areas. On the other hand, it is important to note that in classical Rome, the legal system was designed to create a kind of 'collective consciousness' to prevent floods and preserve the 'commons'. There were both socio-economic and legal reasons for this: 1) watercourses were exploited and managed by local communities and, as Nobel Prize-winning economist Elinor Ostrom has admirably shown (*Governing the commons. The evolution of institutions for collective actions*, Cambridge, 1990), the conditions for successful management of common resources are that the rights are designed and implemented by local communities: in such contexts, conflicts are more easily resolved and each member of the community has an equal interest in preserving the commons for his or her own private benefit.

2) Legal instruments existed to enable individuals to defend themselves and their land against irresponsible interventions by others (either private individuals or communities). Thus, in the event of serious disasters, both individuals and local communities were fully capable of recovering and restoring the territory to its pre-existing state (today we use the term "resilience"), not only because they had the technology, but also because they had a set of legal rules designed to help farmers maintain continuous and constant control over the territory.

Biography

Laretta Maganzani was born in Rho (Milan) on 20.8.1966.

She lives in Lecco, via Valsassina 13. She is married, she has two children.

She is Full Professor of Roman Law at the Università Cattolica del Sacro Cuore, Milan.

In December 2020 she was appointed director of the open access journal "JusOnline".

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She is a member of the scientific committee of several academic journals (Erga/Logoi;; Legal Roots; Riparia; Revista General de Derecho Romano; Tesseræ Iuris; Specula iuris) and book series (Minima Epigraphica et Papyrologica; Radices; Quaderni dell'Archivio giuridico sassarese; Immagini Diritto e Storia).

In November 2021, she was awarded the PRIN 2020 with a research project entitled 'Law and good practices in land management between Roman antiquity and today's reality'.

She has over 110 publications, including seven monographs.

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Climate change in Brazil: Forecast study for 2031

Lopes, L. F. D.¹, Menegassi, S. R. O.², Morais, H.³, Alencar, A. P.⁴, Lopes, F. G.⁵, Lopes, E. G.¹, and Barca Junior, F.A.⁶

¹Federal University of Santa Maria, Brazil

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³Paraná Rural Development Institute, Brazil

⁴University of São Paulo, Brazil

⁵Ernesto Dornelles Hospital, Brazil

⁶Animal College of Veterinary Medicine, Brazil

Brazil has one of the most important ecosystems in the world, composed of five different terrestrial biomes that have undergone transformations due to human activities. The objective of the present study was to evaluate the thermal changes that occurred in the capitals of the five Brazilian regions in the last 60 years and elaborate a forecast model up to 2031. We proposed time series models with a linear trend, trigonometric functions (sine and cosine functions) and autoregressive errors for the monthly mean temperatures of each region and calculated the forecasts intervals for 2031. The average temperature increase were significant for all the five regions. In the last 50 years, the largest mean increases of 2.2oC occurred in the tropical savanna with the largest increase of 2.2oC, followed by the humid oceanic region with 1.7oC and the other regions presented an increase of 1.1oC. Perhaps one of the clearest and most significant changes that man has caused in the environment is the process of urbanization. A large number of effects on atmospheric patterns linked to this process have been identified at different time and space scales. One of the best known is the establishment of urban heat islands, which are defined through temperature gradients observed between urban centers and adjacent rural areas. Global greenhouse gas (GHG) emissions are difficult to predict, as the physical and chemical processes of the global atmosphere are chaotic in nature. The ability to model the global climate system is a major challenge for the scientific community. Environmental and climate change is a huge challenge for humanity, just as humanity challenges the resilience of the environment through intense and frequent impacts.

Biography

Full professor from the Federal University of Santa Maria, PhD in Production and Systems Engineering from de the Federal University of Santa Catarina (UFSC), Florianópolis, Santa Catarina, Brazil. Productivity researcher at CNPq and FAPERGS in quantitative methods, people management, entrepreneurship and technological innovation. Member of the Scientific Committee of FAPERGS, CAPES and CNPq in the area of Administration and Statistics. Leader of the Innovative Behavior, Stress and Work research group.



Evaluating the influence of financial technology on sustainable finance: A comprehensive global analysis

Muhammad Kashif¹ and **Shama Urooj²**

Huazhong University of Science and Technology (HUST), China

This paper aims to investigate the influence of financial technology (FinTech) on sustainable finance. The sample for this study spans from 2010 to 2021, encompassing data from 89 countries. The study employed a two-stage least squares regression approach with the instrumental variables and confirmed the findings using a two-step system Generalized Method of Moments. The findings show that FinTech has a significant favourable impact on sustainable finance. Other factors such as institutional quality, socioeconomic condition, and renewable energy have a significant and beneficial influence on the trajectory of sustainable finance, except the impact of globalization, which is positive but insignificant. Furthermore, FinTech is crucial to driving the transition toward a sustainable future distinguished by a lower carbon economy. The study found that FinTech has extensive application across various sectors of sustainable finance and has substantial potential to create long-term positive effects in this regard. FinTech can further integrate with other technologies to facilitate diversified growth in sustainable finance. Additionally, this study highlights FinTech-related trends and research opportunities in sustainable finance, demonstrating how they can help each other advance worldwide with significant policy implications for countries seeking to advance sustainable finance through technology.

Biography

Muhammad Kashif, PhD research Scholar School of Management, Huazhong University of Science and Technology (HUST), Wuhan, China. Research Interest in finance and public finance topics, sustainable finance, financial stability, financial technology (FinTech), economic freedom, globalization, risk management, sustainable development, <https://orcid.org/0009-0002-2848-0969>.

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Fluid-solid coupling modelling and simulation for carbon dioxide storage in coal

HAO Shu-Qing

Key Laboratory of CBM Resources and Reservoir Formation Process Ministry of Education of China, School of Resource and Geosciences, China University of Mining and Technology, China

At present, lots of obstacles still exist when using hydrates formation method to store CO₂ in coal seam in large-scale engineering application since lacking of the physical and chemical parameters of the coal formation which can be used to judge the targeted formation for CO₂ storage and sequestration.

As the direct and effective method, drilling and coring technique can be used to solve this problem through the samples analysis of the coal's key parameters. However, a significant aporia existing in this process is the deep drilling borehole stability. As the complexity of the coal formation used for CO₂ storage and the high temperature, which results in the hardness to keep the borehole stability all the time when exploring for getting the cores. Moreover, the fundamental reason is the principle coupling the thermal-fluid-solid when drilling in the coal seam formation remains unclear.

The objective of this investigation is to establish the coupling models to explain and calculate the thermal-fluid-solid coupling principle when drilling in the coal formation for CO₂ gas storage and sequestration using hydrates formation method especially considering the drilling fluid seepage into the borehole. Through experimental tests and theory analysis, the mathematical models coupling the high temperature, high pressure, drilling fluid seepage dynamic pressure, and time effects were established. Further, simulation results show that the numerical models established coupling the thermal-fluid-solid can be used to evaluate the borehole stability and the effectiveness of the optimal drilling fluid when considering the formation as the CO₂ storage and sequestration formation.

Biography

HAO Shu-qing has completed her PhD major in Geology Engineering from Jilin University and finished her postdoctoral studies at Department of Geotechnical Engineering of Tongji University. Nowadays she is a professor at China University of Mining and Technology. The main research focus on carbon dioxide (CO₂) storage and sequestration, natural gas hydrates and unconventional energy exploitation, drilling fluid and techniques development as well as modelling and simulation technology. She has completed more than 10 scientific foundations and published more than 25 papers in the reputed journals and has been serving as an editorial board member of reputation.

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Investment strategies of duopoly firms with asymmetric time-to-build under a jump-diffusion model

Yanyun Liu and **Baiqing Sun**

Harbin Institute of Technology, Harbin, China

This paper employs a two-factor jump-diffusion model to investigate the optimal investment timing and capacity choice of the duopoly firms in the presence of uncertain and asymmetric time-to-build. By assuming that both the market demand and investment cost follow the jump-diffusion process, we show that the impacts of uncertainty of time-to-build on duopoly firms' the optimal investment decisions depend on the directions of jumps in demand and investment cost. Moreover, the asymmetry of time-to-build makes it possible for the dominated firm to preempt the market successfully and becomes the leader. The leader's capacity level increases with the dominated firm's time-to-build and the follower's decreases, even if the dominated firm is the leader. We also apply numerical simulation to compare the main results between two-factor diffusion model and two-factor jump-diffusion model.

Biography

Yanyun Liu is a Ph.D. candidate at the School of Economics and Management at Harbin Institute of Technology (HIT), China, specializing in Management Science and Engineering. Her research is centered on developing optimal investment strategies and applying real options theory, with a strong focus on mathematical modeling to enhance decision-making in economics and management. Yanyun is particularly passionate about addressing challenges in environmental and energy economics through the use of mathematical models, aiming to create innovative solutions for sustainable economic practices.

Currently, her research at HIT delves into the integration of mathematical optimization and real options theory, providing robust decision support for complex economic scenarios. Yanyun is committed to advancing the field through her work and is excited to engage with fellow scholars to exchange insights and foster meaningful discussions at upcoming conferences.

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Artificial intelligence for cyber security applications

Farah JEMILI

MARS LAB., ISITCOM, UNIVERSITY OF SOUSSE, TUNISIA

The recent report from the White House underscores the significance of Artificial intelligence (AI) and emphasizes the need for a well-defined roadmap and investment in this field. As AI transcends the realm of science fiction and takes center stage as a transformative technology, there is an immediate imperative to systematically develop and implement AI to witness its tangible impact across diverse fields of study.

This presentation makes a valuable contribution to the utilization of AI in cybersecurity applications. While intrusion detection has been extensively studied in both industry and academia, cybersecurity analysts still seek enhanced accuracy and a comprehensive threat analysis to effectively safeguard their systems in the cyberspace. To achieve improvements in intrusion detection, a more comprehensive approach is recommended, involving the monitoring of security events from heterogeneous sources. By merging security events from diverse sources and leveraging data-driven learning, a more holistic perspective and a deeper understanding of the cyber threat landscape can be attained. However, a challenge arises when dealing with the sheer volume of data, as even a single event source faces significant big data challenges when considered in isolation. Incorporating more heterogeneous data sources poses even greater difficulties. Fortunately, the integration of AI and big data analysis can provide solutions to these challenges associated with heterogeneous data.

The proposed approach encompasses data pre-processing and learning stages. The experimental results validate the effectiveness of this approach in terms of accuracy and detection rate, establishing that AI can indeed yield superior outcomes within the realm of cybersecurity.

Biography

Farah JEMILI has completed her Ph.D. in 2010, from the National School of Computer Sciences (ENSI), Tunisia. Since 2010, she is an Assistant Professor at the Higher Institute of Computer Science and Telecom of Hammam Sousse (ISITCOM), Tunisia. She has been member of the Scientific Council of ISITCOM for 3 years (2011-2014), and Head of the Department of Computer Science at ISITCOM for 3 years (2017-2020). Her research interests include Artificial Intelligence, Cyber Security and Big Data Analysis. She has over 40 publications in reputed international journals and conferences and has presented many invited and contributed talks at international conferences.



Key structural criteria for hydrocarbon exploration in the Egyptian Red Sea

Ahmed M. Noureldin, Walid M. Mabrouk, Ahmed Metwally and Mohamed S. Radwan

Geophysics Department, Faculty of Science, Cairo University, Egypt

More exploration investigations are still needed in the Northern Egyptian Red Sea (NERS) because of the limited borehole penetrations, sparse case studies, and poor seismic data. This article aims to review the petroleum system, the regional structural concept, and the transitional style between outcrops, the Egyptian Red Sea subsurface, and the Southern Gulf of Suez (SGOS) to unlock the hydrocarbon potential of the NERS. Therefore, this article reviewed the petroleum system elements related to the NERS, integrates two geo-seismic cross-sections/schemes combining field geology work (Gebel Duwi GD) area) and offshore subsurface geology (near the RSO wells area), and composed a regional schematic cross-section linking the SGOS (Shoaib Ali area) and the NERS (near the RSO wells area). This study highlighted that both the syn-, and sy-rift rich source units can yield mature hydrocarbons of types II/III to both capped reservoirs/plays (syn-, and pre-rift) copying the (SGOS) region. This study concluded that the SGOS and NERS are divided by the Levant-Aqaba structure and have southwest strata dipping copying the Northern Gulf of Suez structural style. Moreover, the article concluded that the rotated basement faulted blocks extended from the shoreline to the axial trough due to rifting, exhibiting wedged sedimentary sections. Most Offshore Red Sea boreholes bottomed in the Precambrian, straight below the Upper Miocene. Our review presumes that these wells were off-structure, capturing the most up-dip of the basement, as a similar correspondent to the Gulf of Suez (e.g., Ashrafi area), where sidetracked wells have succeeded in capturing the thick syn- and pre-rift sediments. Furthermore, this work displays the outcomes of reinterpreting the basement relief based on magnetic and gravity data by delineating expected thick sedimentary basins, the review results suggest a potential uplift for hydrocarbon figures in the NERS region.

Biography

Ahmed Mamdouh Noureldin Abdallah is a highly skilled Senior Geophysicist and Subsurface Data Management Specialist with over 12 years of experience in the field. She holds both an MSc and PhD in Geophysics, and has extensive expertise in upstream studies and subsurface data management. Throughout her career, Ahmed has honed her abilities in utilizing geoscience platforms and managing complex databases, making her an invaluable asset in the industry.

In her previous roles, she has worked with International Oil Companies (IOCs) and has gained valuable experience collaborating in multi-cultural and multidisciplinary teams. Ahmed's technical proficiency and dedication to advancing geophysical solutions have positioned her as a key contributor to the field. She is committed to applying her knowledge and experience to drive impactful results in geoscience and subsurface data management.

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A ptolemaic approach improving the conjunction analysis pipeline for LEO

P. De Marchi

AIKO space, Italy

Low-Earth-Orbit (LEO) region congestion is becoming one of the big issues of the modern space era. To avoid the Kessler syndrome, now more than ever it is needed to improve awareness about space traffic, and upgrade the entire monitoring process. Extensive literature is available covering the topics of orbital conjunction filtering techniques and computation of the Minimum Orbital Intersection Distance (MOID). The present paper investigates Funding and/or Conflicts of interests/ Conflict of interest. An alternative filtering method exploits the near-circularity of certain orbits (a condition often verified in LEO), to improve conjunction analysis performance. Elliptical orbits are reshaped through an auxiliary deferent model, inspired by C. Ptolemy's orbital theory, replacing the real motion along conjunction analysis. To recover satellites' averaged mean orbital elements, CelesTrack LEO catalogue was considered and propagated. Based on averaged parameters, off-centric circular orbits are considered instead of elliptical ones. The resulting deferents (off-centric circles) are not far from osculating orbits due to LEOs low eccentricities, becoming the basis for the conjunction analysis algorithm. The algorithm is conceived as a sequence of pre-filters and a final MOID computation. Performances are inspected through an all-vs-all analysis, taking as reference a combination of Hoots' and Gronchi's algorithms. This method achieves good performance as compared with these traditional benchmarks. Adopting this approach could reduce the time needed for a preliminary conjunction inspection during the first phases of the Collision Avoidance (CA) process, especially in LEO, where pre-filtering aims to reduce the number of orbit couples where precise MOID computation is needed.

Biography

Pietro De Marchi is a dedicated Space Systems Engineer with a strong academic background and international experience. He holds degrees from both Politecnico di Milano in Italy and École Centrale de Lyon in France, which have provided him with a solid foundation in engineering principles and space technologies. Pietro has gained valuable working experience in both Europe and the United States, further enhancing his expertise in the space industry.

Beyond his professional pursuits, Pietro is deeply passionate about space exploration and innovation. He is also an avid mountain enthusiast, reflecting his love for nature and adventure. His diverse experiences and passion for space systems make him a dynamic engineer, committed to advancing the future of space exploration.



Assessing the impact of erosion voids on corrugated steel culverts: A study on soil damage and structural performance in service life in flood-prone environments

E. Nakhostin

Carleton University, Canada

Flooding washout is a common phenomenon frequently occurring due to climate change. Embankments with buried culverts for drainage purposes are vulnerable infrastructures affected by flooding, considering the topography and drainage function of the culverts. In flooding cases, the backfill soil of the culvert becomes the primary infrastructure and is susceptible to damage in the early stages of the disaster during its service life. Created erosion voids can impact the bearing capacity, leading to post-flooding failure. This study evaluates the soil damage state, defined by the location and volume of soil erosion voids adjacent to the Corrugated Steel Culvert (CSC). Voids located in the upper half of the culvert have more noticeable effects on the load-transferring mechanism and internal force responses. Numerical predictions demonstrate that erosion voids significantly impact soil/structure load transfer mechanisms, the development of internal forces and moments, and CSC mechanical performance. The increase in internal force responses due to introduced erosion voids greatly influences performance, leading to the culvert not satisfying the combined bending moment and local force requirements that exceed the section's capacity in this case. A portion of the circumferential area is approaching the yield stress due to local force and bending moment in this structural system, but the local force has a greater proportion compared to the bending moment. This results in undesirable deformation, stress concentration, and eventual failure of the load-carrying system.

Biography

Dr. Elham Nakhostin is a postdoctoral fellow currently affiliated with Carleton University. With a stellar academic background, she holds a Ph.D. in geotechnical engineering. Elham's professional journey has been marked by a profound commitment to advancing research and development projects focusing on the resilience of civil infrastructures throughout their service life. Elham is highly skilled in programming and adept at conducting risk assessment within complex systems. Her analytical expertise includes the evaluation of linearity and nonlinearity, all while accounting for deterioration that may arise during the operation of these systems. She seamlessly integrates on-site field data collection with advanced numerical simulations, employing a dynamic methodology to conduct comprehensive evaluation. This approach provides valuable insights into the long-term durability of infrastructure. Her work not only contributes to academic discourse but also holds practical implications for the future of civil engineering, emphasizing adaptability and sustainability.

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Assessment of prospective geopark Siwa's Tangible and intangible sites

Enas A. Ahmed

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Egypt is one of the most historic nations among the "cradles of civilization" worldwide. It possesses an extensive and attractive record, as well as plenty of unique cultural inheritances, encompassing both tangible and intangible aspects. Serving as a remarkable link between intangible and tangible heritages, facilitating by its geodiversity, the insufficiently explored deserts, which attract thousands of adventure-seeking tourists annually, are always home to it. The impacts of Paleoclimate were evident in the creation of geodiversity, which encompasses the stunning geological and geomorphological features, as well as the diverse paleoecology and palaeontology of the Egyptian deserts. These factors contributed to the recognition of their significance. The Siwa Oasis in northern Egypt is a perfect location to observe this phenomenon while promoting geotourism and individual efforts to enhance awareness of the region's geological importance. The Siwa oasis in Egypt possesses geological, geomorphological, geohazards, and paleontological characteristics that have been substantiated by published research and evaluated through quantitative analysis of the geosites. A matrix is designed to incorporate geodiversity, safeguards, geo-conservation, and geotourism aspects, resulting in a revised ranking of the geosites, with the highest valued geosites being prioritized. The methodological considerations varied from 1 to 10 in the comparative analysis of the most representative geosites in the oasis. The Siwa oasis has rich geodiversity with over 150 remarkable geosites and has great potential in developing into a geopark. Analyse and assess 15 representative geosites in this aspiring geopark have been evaluated based on the criteria put forth by Brilha (2016) and the geosites assessment methodology (GAM) (Vujicic et al. 2011) in a comparative analysis for a better understanding of their potential and uniqueness.

Biography

Lecturer of paleontology and stratigraphy, Faculty of Petroleum and Mining Sciences-Matrouh University, MSc and Ph.D., in the field of vertebrate paleontology, are the first done by a female in that field in Egypt and the Middle East, and the first Egyptian and African lady to be a member of the UNESCO Global Geoparks Council.

Egyptian Academic Lecturer @ Matrouh University; International Associated Trainer @ International Board of Certified Trainers (IBCT) and Ambassador @ GIRAF (Geoscience Information in Africa) organization, former member @ UNESCO Global Geoparks council; former vice president of YES.

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Her expertise in Egypt and Africa over 15 years of professional teaching, training, and research with the main interest in Vertebrate paleontology- Sustainable development – EIA- Heritage- Geopark- Geotourism Conservation–Climate change - Vertebrate Paleontology- Environmental geohazards in Egypt and Africa.

She worked very hard to promote awareness of the intangible heritage and tangible heritage, geopark, Geotourism, and sustainable development goals in a bottom-up approach through her face-to-face with local communities, guide tours, universities, and cultural centers and online workshops with the Egyptian national research center to the Arabic speakers.



An examination of white light (or other) emission efficiency in singly and co-doped Dy³⁺ ions across varied host materials (Phosphate, Silicate, Aluminate)

Leelakrishna Reddy

University of Johannesburg, South Africa

This review will examine several research papers related to white (or other) emission from phosphor materials doped and undoped with Dy³⁺. The pursuit of a single-phased phosphor material capable of producing high-quality white light under UV or near UV excitation is an active area of research with commercial implications. Among all rare earth elements, Dy³⁺ is the sole ion capable of simultaneously emitting blue and yellow light under UV excitation. Achieving optimal Yellow/Blue emission intensity ratios allows for the realization of white light emission. Dy³⁺ (4f⁹) exhibits approximately four emission peaks around 480 nm, 575 nm, 670 nm, and 758 nm, corresponding to transitions from the metastable 4F_{9/2} state to various lower states, including 6H_{15/2} (blue), 6H_{13/2} (yellow), 6H_{11/2} (red), and 6H_{9/2} (brownish red), respectively. Generally, the hypersensitive transition at 6H_{13/2} (yellow) is electric dipole in nature and becomes prominent only when Dy³⁺ ions are positioned at low symmetric sites without inversion symmetry in the host matrix. In contrast, the blue magnetic dipole transition at 6H_{15/2} becomes prominent only when Dy³⁺ ions are positioned at highly symmetric sites in the host material with inversion symmetry. Despite the white colour emission from Dy³⁺ ions, these transitions are primarily associated with parity forbidden 4f-4f transitions, and the white light produced may be diminished at times. Therefore, there is a need to include a sensitizer to enhance the forbidden transitions experienced by Dy³⁺ ions. This review will specifically focus on examining the variability of Yellow/Blue emission intensities in different host materials (phosphates, silicates, and aluminates) from Dy³⁺ ions, whether doped or undoped. This will be accomplished by studying their photoluminescent properties (PL), CIE chromaticity coordinates, and correlated colour temperature (CCT) values for white colour emissions adaptable to various environmental conditions.

Biography

Prof. L Reddy, a distinguished scholar, earned his prestigious PhD in Physics from the esteemed University of Johannesburg in South Africa. With a profound expertise in condensed matter physics, he has consistently demonstrated a fervent passion for research and exploration. Initially delving into the magnetic properties of bulk materials, Prof. Reddy has since shifted his focus towards the captivating realm of luminescent properties in phosphor materials. This captivating field opens exciting avenues in diverse applications such as phototherapy, energy storage in battery cells, light-emitting devices, and cutting-edge display lighting systems. As a visionary leader, Prof. Reddy leads a dedicated research team

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that explores magnetic properties at the nanoscale level, pushing the boundaries of scientific understanding in this domain. His contributions to the scientific community are invaluable, with a prolific publication record in esteemed peer-reviewed journals. Recognized for his expertise, he is frequently invited to deliver keynotes and invited lectures at prestigious conferences worldwide, illuminating current topics in nanotechnology. Prof. Reddy's mentorship has played a pivotal role in nurturing future talent, as he has successfully supervised numerous MSc and PhD students, leaving an enduring impact on the scientific landscape. In South Africa, he is esteemed as an NRF-rated scientist, a testament to his remarkable contributions and dedication to advancing the field of nanotechnology. He envisions nanotechnology as the vanguard of solving contemporary challenges in medicine, health, battery technology, lighting devices, communication technology, and solar cells, making him a catalyst for innovative solutions that benefit humanity.



Effect of rains and farmers practices on soils salt decreasing in irrigated areas of the north of Tunisia

Hedi DAGHARI², Charles Muanda Binda¹, Issam DAGHARI²

¹INBTP, Democratic Republic of the Congo

²INAT, Carthage University, Tunisia

In the north of Tunisia, irrigated water is coming mainly from dams but its salinity is more than 2 g/l. Irrigated Soil salinity is always more than 3.5 g/l and reaches even 8 g/l during the peak of the irrigated season in summer. The main consequences of these situations are (1) limiting crops choices, (2) reducing effectively irrigated areas, (3) keeping an important part of the irrigated areas under fallow or using rainfall crops, (4) blending salt and fresh water, (5) introducing desalinated water even if it costs very high. The perimeter of Kalâat El Andalous subject of this work covers an area of 2905 ha fully developed with an irrigation network, a drainage network and a network of agricultural tracks. The effectively irrigated area is approximately 700 ha.

The evaluation of the water and salt balance showed an annual trend towards desalination. In fact, the quantities of salts evacuated by drainage water are greater than those supplied by irrigation water for a hydrological year. On a seasonal scale, we noticed that there was an accumulation of salts of 2804 tonnes and 9071 tonnes respectively for the irrigation seasons of the two campaigns 2006/2007 and 2007/2008.

The average soil salinity increased from 3.27dS/m to 3.87dS/m between April 26 and August 31, 2008. Two salinity distribution maps were developed.

The percentage of land occupation with a salinity greater than 3dS/cm increased from 28% to 57% between April 26 and August 31, 2008. The areas located in the south-eastern part of the perimeter showed vulnerability to a higher salinity risk.

During the May – August irrigation period, an accumulation of salts in the 0-60 cm layer was observed and stocks were 8.21 and 16.4 t/ha respectively under melon and tomato crops.

High salt stocks may explain the low yields observed in this region. For example, the tomato yield is around 50 t/ha, a relatively low figure compared to the national average of over 80 t/ha.

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Biography

Professor Hedi Daghari has been a prominent figure in the field of water resources management since 2002. He holds two PhDs: one from the Catholic University of Louvain, Belgium, earned in 1990, where his research focused on the “Water and Thermal Budget under Weighable Lysimeter,” and another from a Tunisian university in 1986, with a dissertation on “Water Budget in Dry Lands: Importance of Deep and Surface Layers in Water Budget Evaluation.”

Over the years, Professor Daghari has led numerous national and international projects, including the UNDP project RAB 89/003, the EU Medcoastland project (INCO-MED program), and the EU QUAULIWATER project (INCO-CT-2005-015031). His leadership extended to multiple African projects, such as the Wilaiet Nile project in Sudan, and polder development projects in N'gouri and Lake Chad.

In addition to his academic and project leadership roles, Professor Daghari has served as a member of various commissions under the Tunisian Ministry of Agriculture and Water Resources, contributing to key initiatives in water harvesting, artificial water recharge, and sustainable water management. His extensive experience and contributions to the field have made him a leading expert in water resources management across diverse environments.

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A distinctive plasma surface modification approach for improving the functional features of carbon-based nanosheets for implementation in perovskite solar cells

M. Abdelhamid Shahat

PV Unit, Solar and Space Research Department, National Research Institute of Astronomy and Geophysics (NRIAG), Egypt

The basic concept for the future development of human society has become to reduce emissions of greenhouse gases such as carbon dioxide that cause climate change. As a result, one of the best sustainable and environmentally acceptable solutions to this challenge is to use perovskite solar cells (PSCs), which may be used as an efficient alternative for fossil fuels.

The main objective of this work is to design and improve the performance of carbon quantum dot-based PSCs. We presented a simple method for modifying the physicochemical properties of hole transport layer (HTL) and electron transport layer (ETL) as the most efficient components in solar cells, using in-situ plasma surface treatment. Following that, the effects of the treatment on the microstructure, active sites, surface area, optical, and electrical characteristics of these nanolayers were examined. Whereas, these treatments resulted in a considerable improvement in the chemical functionalization of the nanolayers, as well as a rapid increase in surface roughness, which reduced photons reflection and therefore increased the generation of charge carriers.

Biography

Dr. Mohamed Abdelhamid Mohamed Shahat is a Researcher at NRIAG, Egypt. He was born in April 1990. He holds a PhD in Physics of Material Science and Solar Energy, Feb. 2021. His expertise includes plasma applications in water treatment as well as photovoltaics (Perovskite, Dye-sensitized, and Organic cells). Recently,

- Efficient CO₂ capture and storage utilizing plasma modification of Carbon-based nanocomposite materials.
- Improved Thermophysical Properties of Nanocarbon-based Composite Clay Bricks for Sustainable Building and Construction Applications via Plasma Modification.
- A novel design for Energy, Hydrogen, and Water production utilizing Solar Energy for climate change mitigation.

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Does climate risk disclosure shape conservatism? The role of earnings quality in the Egyptian context

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The objectives of this study are to (i) examine the relationship between accounting conservatism and climate-related risk disclosure (CRRD) in the context of Egypt, and (ii) look into the moderating role of earnings quality (EQ) in such a relationship. To operationalize CRRD reported by Egyptian firms listed in the SP/EGX ESG index across the years

from 2018 to 2022, the study uses a manual content analysis as a base for analysis and employs two (OLS) regression models to test the study' hypotheses. EQ is measured using the cross-sectional modified Jones model, while accounting conservatism is gauged using the C-Score. Additionally, endogeneity checks in robustness tests are performed

using system GMM. The findings show no impact of CRRD on the conservative accounting practices of Egyptian firms. However, there is a sizable adverse effect when EQ is used to moderate this association. This finding is consistent with the notion that firms report high levels of climate impacts and have fewer information asymmetry issues. This paper extends disclosure indexes by highlighting the frequent keywords of CRRD used in the annual narrative reports of Egyptian firms. Hence, this study is among the first to explore the moderation impact of EQ on the relationship between CRRD and accounting conservatism in the Egyptian setting.

Biography

Tariq H. Ismail is a Professor of Accounting at the Faculty of Commerce, Cairo University, Egypt. He is currently the Dean of the Business School at the International Academy of Engineering and Media

Science, Egypt. He has published numerous articles in a number of high-ranked, peer-reviewed journals, and has many books which had worldwide audience. He had many research grants and excellence awards for the contributions he made in his field. He is the founder and the editor of the Academy Journal of Social Sciences, as well as, the associate editor of Journal of Humanities and Applied Social Sciences. He is on the editorial board of several reputable journals. His current research focuses on disclosure quality and financial reporting, accounting in emerging economies, and corporate governance.

Yousra R. Obiedallah is an Assistant Professor of accounting at the Faculty of Commerce, Sohag University, Egypt. Her research interests are related earnings management, risk disclosure quality, accounting standards and disclosure, in particular the impact of financial and non-financial factors on disclosure.

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DFT study of DGEBA epoxy resin nanocomposite with functionalized G, CNT, and C₆₀ with TiO₂ as corrosion inhibition

Hend A. Ezzat

Nano Unit, Space Lab, Solar and Space Research Department, National Research Institute of Astronomy and Geophysics (NRIAG), Egypt

The aerospace environment is well-known for its harsh conditions, such as high temperatures, vacuum, micrometeoroids, and space debris. Surfaces and materials exposed to this environment are suffering from corrosion. These properties have a significant impact on the design and construction of spacecraft and aircraft components. Accordingly, aerospace construction needs materials with high strength and stiffness to resist these conditions. As a result, it was proposed to improve the corrosion-resistance features of DGEBA epoxy resins via the addition of carbon-based nanomaterials such as fullerene (C₆₀), carbon nano tubes (CNT), and graphene (G) functionalized with titanium dioxide (TiO₂) to have a long lifetime in the aerospace environment. Molecular modelling was used to investigate the influence of nano composition on electrical and corrosion properties using the DFT:B3LYP/LanL2DZ model. For examining the improved characteristics, HOMO/LUMO, total dipole moment (TDM), band gap energy (ΔE), and molecular electrostatic potential (MESP) were used. The results showed that functionalized G with TiO₂ is the most impacted nanocomposite with DGEBA epoxy resins, as the electronic characteristics were reduced from 5.389 to 0.226eV while the corrosion parameters were improved. As a result, DGEBA epoxy resin/G/TiO₂ nanocomposite might be employed as a corrosion inhibitor in aerospace environment.

Biography

Dr. Hend Ezzat was born in 1988 and was completed her PhD in 2021 at Ain Shams University. She is the director of the Nano Unit, Space Lab, Solar and Space Research Department of the National Research Institute of Astronomy and Geophysics (NRIAG). She focuses on material science and spectroscopy, particularly nanomaterials. Her expertise covers nanotechnology in a variety of applications, including space applications. She has authored over 30 papers in prestigious publications and has worked as a recognized reviewer. According to Scopus, her h-index is 11.

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Value of adaptation of forest management decisions in *Pinus radiata* (D. Don) plantations under projected climate change scenarios in Chile. Productivity and forest fires

Rodrigo Labbé, Mario Niklistchek and Marco Contreras

Institute of Forest and Society, Faculty of Forest Science and Natural Resources, Universidad Austral de Chile, Chile

Climate change can severely affect forest plantation productivity and fire regimes in temperate regions. The economic evaluation of these impacts is challenging because of the spatially differentiated effects expected to occur across planted areas. We calculated the combined effect of projected climate change on the stochastic land expectation value (SLEV) for a random sample of stands covering the *Pinus radiata* plantations in central-southern Chile. To simplify the stochastic evaluation problem with changing productivity and fire frequencies over time, we divided rotations into stages, before and after commercial thinning, and assumed that reforestation is at the end of each stage. The SLEV was calculated through Monte Carlo simulations using the coefficients from previously estimated productivity and fire risk statistical models. The predicted combined effect on the SLEV is negative in most regions except those in the southern limit of the specie distribution. In the economically crucial coastal area of the central regions, the negative effect of more frequent fires outweighs faster growth. In the northern drier areas, the SLEV becomes negative due to a large drop in site productivity. Anticipatory reassignments of management regimes have a large adaptation value in these low-productivity sites. Our optimization-simulation results suggest that relative to prescribed management regimes, the optimal rotation age in most low-productivity sites is longer and in most high-productivity sites shorter. Shortening the rotation age by one to two years has an important adaptation value in highly productive coastal sites. Further work should consider variations in the timing and intensity of thinning jointly with the rotation age.

Biography

Rodrigo Labbé: Final year student of the doctoral program in Forest Ecosystems and Natural Resources from the Austral University of Chile (UACH). Forest Engineer, M.Sc. and Ph.D. His research has been focused on the development of economic and econometric models to incorporate fire risk and the expected effect of climate change on management decisions in forest plantations. He currently works as an associate researcher at the Institute of Forests and Society of the UACH and is responsible for the Forest Economics chair for Forest Engineering students. He has carried out specialization stays in the analysis of renewable energy and environmental systems at the Karlsruhe Institute of Technology (KIT), Institute of Industrial Production (IIP) (Germany, 2014) and at the University of Applied Sciences of Rottenburg am Neckar (Germany, 2018).



Modeling stand fire probabilities with unobserved heterogeneity. Estimating stand age and climate change effects in Chilean radiata pine plantations

Mario E. Niklitschek and **Rodrigo Labbé**

Faculty of Forest Sciences and Natural Resources, Institute of Forest and Society, Universidad Austral de Chile, Chile

Evenly managed forest plantations are potentially vulnerable to fires because of their high fuel load build-up in each rotation. The estimation of structural functions of the probability of stand ignition, and the partial effect of management interventions, is challenging with observational data because of the unobserved landscape heterogeneity. We use panel data analysis that considers the possible correlation between the observed covariates of interest with the unobserved heterogeneity. We assembled 5,122 randomly selected polygons, with size up to 25 hectares, during 2001-2017 with burned/unburned data and covariates on climate, site productivity, anthropogenic and physiographic characteristics. We compared two alternative approaches to estimate stand ignition probability function of the stand age: the average structural function (ASF) and the local average structural function (LASF). While our results show a significant positive effect of the stand age for the mature stage under both approaches, more differentiation in stand ignition probabilities is captured with the LASF. Also, under the LASF, the stand age functions are more sensitive to changes in site productivity. We predicted the burned area under the RCP 4.5 and RCP 8.5 climate scenarios considering adaptation in management regimes to site productivity changes. The largest impact is projected for the coastal areas where site productivity increases are combined with more suitable climate conditions for flammability. For the dryer hinterland, however, stand ignition probabilities and the burned area are predicted to decline in the second period and the RCP 8.5 because of the dominant negative effect resulting from the site productivity reduction.

Biography

Dr. Mario E. Niklitschek is an associate professor at the University of Southern Chile in the fields of economics, and forest and environmental economics. He has a Ph.D. from the University of Maryland in Agricultural and Resource Economics. He worked as a project economist and consultant for the Inter-American Development Bank in Washington D.C on agriculture and sanitation projects in Latin America, His publications have mostly focused on development economics, non-market valuation and program and policy evaluation. During the last three years he has been the director of the research project "Adaptation to climate change in the Chilean forest sector: productivity and environmental impacts" a multidisciplinary effort funded by the national government and the two main forest companies in Chile.

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The influence of environmental regulation on technological advancement in new emerging industrial zones in China

Sher Ali

China Three Gorges University, China

In the context of heightened attention to environmental protection in China, understanding the nexus between environmental regulations and technological innovation in new emerging industrial zones holds significant implications. This paper employs panel data spanning from 2011 to 2021, comprising 120 listed companies operating in new emerging industrial zones, to investigate the influence of environmental regulations on their technological innovation. Utilizing the Generalized Method of Moments (GMM) estimation technique, our analysis provides empirical evidence supporting the positive role of environmental regulations in fostering technological innovation within new emerging industrial zones. These findings underscore the importance of regulatory frameworks in driving innovation toward environmentally sustainable practices, thereby contributing to the evolution of China's industrial landscape.

Biography

Dr. Sher Ali is a dedicated researcher specializing in environmental protection and the impact of technological innovation on sustainability. He holds a bachelor's degree in Management Sciences from Agricultural University Peshawar, Pakistan, an MS degree from Hazara University, KPK, Pakistan, and a PhD from China Three Gorges University, Hubei Province, China. Dr. Ali's academic journey has equipped him with deep expertise in exploring the intersection between technology and environmental sustainability.

Currently, he is actively involved in multiple projects focused on safeguarding the environment and promoting sustainable practices. Through his research and initiatives, Dr. Ali is committed to leveraging his knowledge and experience to drive positive change, aiming to contribute to a more environmentally conscious and sustainable future. His work reflects a strong commitment to addressing pressing global environmental challenges through innovative solutions and technological advancements.



Social networking data useful for flood management

Shan-e-hyder Soomro¹, Muhammad Waseem Boota², Xiaotao Shi¹, Jiali Guo¹, Gul-e-Zehra Soomro³, Yinghai Li¹, Caihong Hu⁴ and Chengshuai Liu⁴

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⁴College of Water Conservancy and Transportation, Zhengzhou University, China

Social networking Twitter (X) platforms have emerged as a rapid information hub during natural calamities like urban floods globally. The retrospective assessment of this data becomes crucial post a flood catastrophe due to its severe impact on essential infrastructure, environment, and societal well-being. Traditional survey methods fall short in capturing the diverse and extensive public viewpoints, necessitating a novel approach for data collection, analysis, and assessment. This study introduces a novel framework aimed at amalgamating the chaotic online public sentiment. Utilizing a search engine, social media posts related to floods were gathered, followed by sentiment analysis towards the natural flood crisis. Twitter (X) currently stands as the most favoured microblogging platform globally. In line with the outlined methodology, an extensive analysis was conducted on all tweets discussing the floods in Pakistan from users worldwide. The findings of this evaluation unveiled distinct patterns in post intensities and emotional inclinations in response to the floods, shedding light on critical aspects with conflicting emotions and underlying strategic implications. Online public sentiment serves as a valuable complement to post-disaster assessments, aiding in the enhancement of projects like flood management, and public relocation, while offering insights for future flood mitigation strategies, particularly in managing public involvement.

Biography

Dr. Soomro was born in small town Daulatpur Saffan, district: Shaheed Benazirabad, Sindh Pakistan. He has Doctoral degree in (Hydrology and Water Resources) from Zhengzhou University China in Sept 2018- June 2022. Since, 15 July 2022 to up till now, he has been a Postdoctoral Research fellow. His main research direction is Climate change, Machine Learning, Flood forecasting, Rivers and Lakes, Hydrological modeling, Urban flood, and Climate change effect on fish ecology.

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Land use transitions impact on ecosystem services in Swat River Basin, Pakistan

Muhammad Waseem Boota¹, Shan-e-hyder Soomro², Haoming Xia¹, Yaochen Qin¹, Chaode Yan³, Luo Weiren¹ and Jikun Xu³

¹College of Geography and Environmental Science, Henan University, China

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³College of Water Conservancy and Transportation, Zhengzhou University, China

Rapid urbanization in Pakistan has significantly worsened the land use transitions (LUTRs), posing a serious threat to the ecosystem. The existing research lacks information on the spatiotemporal study of LUTRs, and the appraisal of ecosystem service variation remains inadequate. The information dearth may restrict the formation and execution of landscape plans and ecological-oriented strategies. Herein, this study aims to address this research gap by evaluating the geographic characteristics of LUTRs using the geo-informatic Tupu approach and investigating the impacts of ecosystem services on LUTRs. A novel modified benefit transfer approach that integrates the land use change data from Landsat Enhanced Thematic Mapper (ETM) in the Swat River Basin is used. The results show that: (1) Urban development and farmland preservation policies led to the conversion of farmland and forest into developed regions, while also converting woodland and grassland into farmland, which worsened the degradation of ecological quality. (2) Construction land area continued to increase, whereas the cultivated land area constantly decreased from 2005 to 2023. This expansion of the construction area primarily resulted from the conversion of cultivated areas. (3) In the LULC classification, total land (hectares) such as Crop Land ~ 80750 (2023) < 82778 (2005) and Settlements ~ 8453 (2005) < 10133 (2023), respectively. (4) In the Ecological quality map, total land (hectares), such as poorer ecological quality ~ 8 (2005) < 2606 (2023), as a result of increasingly serious agglomeration effects. This research can offer scientific evidence to support the ecological preservation and high standards, sustainable development of urban areas in the Swat River basin.

Biography

Dr. Boota is from Toba Tek Singh, Punjab, Pakistan. He has obtained his PhD Hydrology and Water Resources (2018-2023) from Zhengzhou University. He is working as Postdoctoral Researcher (November, 2023- Till date) from School of Geography and Environmental Science, Henan University, Kaifeng. Main research direction are Hydrological and Hydraulic modeling, River morphology, Sediment load, Remote sensing, Deep learning, Hydraulic structures and Aquatic ecosystems.

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Novel optimal structure design and testing of air-cooled open-cathode proton exchange membrane fuel cell

Xiaoyu Wu¹, Chen Zhao^{1,2} and Lu Zhang¹

¹The New Energy Automotive Technology Research Institute, Shenzhen Polytechnic University, China

²Shenzhen Institute for Advanced Study, University of Electronic Science and Technology of China, China

Air-cooled open-cathode proton exchange membrane fuel cells are miniature but effective energy conversion devices for both the mobile power station and unmanned equipment applications. However, the structure of the air-cooled open-cathode proton exchange membrane fuel cells still needs to be optimized to improve the system compactness and cell performance. In our study, an annular structure is designed, which offers a more uniform air velocity profile, higher air pressure difference, as well as more uniform temperature distribution with a minimum temperature gradient. Benefiting from the optimized annular structure, the assembly of the annular stack has an internal air duct, which could not only reduce the volume and weight of the stack, but also allocates the air more evenly. Results further indicate that the annular design increases the uniformity of velocity and temperature by around 3 times compared with traditional rectangular stack, it contributes significantly to the fuel cell performance by a 15% increase in power. Our study provides an efficient strategy to improve the performance and extend the system reliability for future engineering application.



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Biography

Dr. Xiaoyu Wu received his PhD degree in Materials Physics and Chemistry from Beihang University. As a visiting scholar, she studied in the University of Pittsburgh and Pacific Northwest National Laboratory in 2017-2019. From 2020 to 2022, she conducted postdoctoral research in the Southern University of Science and Technology. Now she is working at Shenzhen Polytechnic University as an associate research fellow. She has a multidisciplinary research background in materials, physics and chemistry. In recent years, she has been mainly committed to the design and modification of electrochemical energy storage materials and systems, as well as the related research on the microstructure characterization based on TEM. She has published more than 40 SCI papers in *Advanced Materials*, *Electrochemical Energy Reviews*, *Chemical Engineering Journal* and other academic journals. She chaired a National Natural Science Foundation Youth Project, China Postdoctoral Science Foundation Project, Guangdong Provincial Department of Education key projects, etc.



Energy dynamics affecting the US economy; Natural energy investments, carbon emissions, production, exports and GDP per capita

Ergin AKALPLER

Onbes Kasim Kibris University, Cyprus

The High level of urban and rural development and industrialization causes greenhouse gas release and environmental degradation in emerging economies. Economic growth and fossil energy usage in the industrial sector reduces clean environment and increases pollution around the world. The China, USA, India, Russia, Pakistan and Japan are assumed to be the most polluting countries. The highest carbon emissions around the globe reduce the effective usage of resources.

USA is one of the polluter countries in the world. Fossil fuel use is the primary source of CO₂. Carbon emissions cause also deforestation, environmental degradation of soils, air pollution, water stress which cause deterioration of fresh water, health deterioration results of urban pollutions etc. These environmental concerns cause serious problems to the global economical welfare.

In my latest study research explores the impact of multiple factors on the economic growth of the United States, with a specific focus on carbon dioxide emissions, energy consumption, energy investment, coal and crude oil production, exports, and RGDP per capita. The main objective is to identify the key drivers that shape the American economy by analyzing the interrelationships among these variables.

To achieve this goal, the study uses Vector Error Correction (VEC) approach and analyses annual data from 1993 to 2023. Co-integration analysis is performed to uncover long-term connections among the variables. Additionally, the short-term associations are evaluated using the Wald test.

The study reveals important findings regarding the relationships between independent variables and RGDP. The findings of this study draw attention to the importance of exports and energy investment in driving both short- and long-term economic growth in the USA, while emphasizing that carbon emissions and coal use interact with COIL.

It has been observed that the changes in NGAS and EXPO also affected INENG in the short term. COAL and EXPO have been shown to influence NGAS. The results provide valuable information about the dynamics of the American economy.

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These results contribute to our understanding of the complex interaction between various factors and their impact on the economy. Further research and policy implications can be derived from these findings to promote sustainable economic development.

In an attempt to achieve sustainable growth and a clean environment, it is necessary for the authorities to display a serious commitment to reducing carbon dioxide emissions. The adoption of alternative renewable energy sources seems to be deterred by the high costs associated with new technologies.

I therefore conclude that policies should have clear alternative renewable consumption targets so as to achieve energy efficiency and the sustainable growth of the economy, while simultaneously reducing carbon dioxide emissions.

Biography

Ergin Akalpler is a distinguished economist and faculty member, currently serving as the Dean of the Faculty of Economics and Administrative Sciences at Onbes Kasim Kibris and Cyprus Science Universities. He completed his undergraduate studies in Economics in Turkey and earned a master's degree in Foreign Economics and Politics from Vienna University of Economics, where he also pursued a PhD in European Research and International Economics.

Akalpler has held teaching and administrative roles at various universities in North Cyprus and Vienna. He has prepared numerous projects, published articles and books, and presented at international conferences. In 2004, he worked as an Educational Advisor for the TRNC Ministry of Education, managing EU education programs and scholarships. By 2010, he became an advisor to the TRNC President on economic matters, overseeing sectorial evaluations and representing the president in UNDP's Economic and Technical Committee. Fluent in English and German, Akalpler continues to contribute significantly to the field of economics.

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Animal by-products slaughter: Pathogen control, nutrient recovery, and carbon storage

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¹Bioeconomics Research Group—NEB, Interdisciplinary Center for Studies and Research in Agribusiness (CEPAN), Universidade Federal do Rio Grande do Sul, Brazil

²Research and Development Manager Brf ingredients, Universidade Estadual do Oeste do Paraná, Brazil

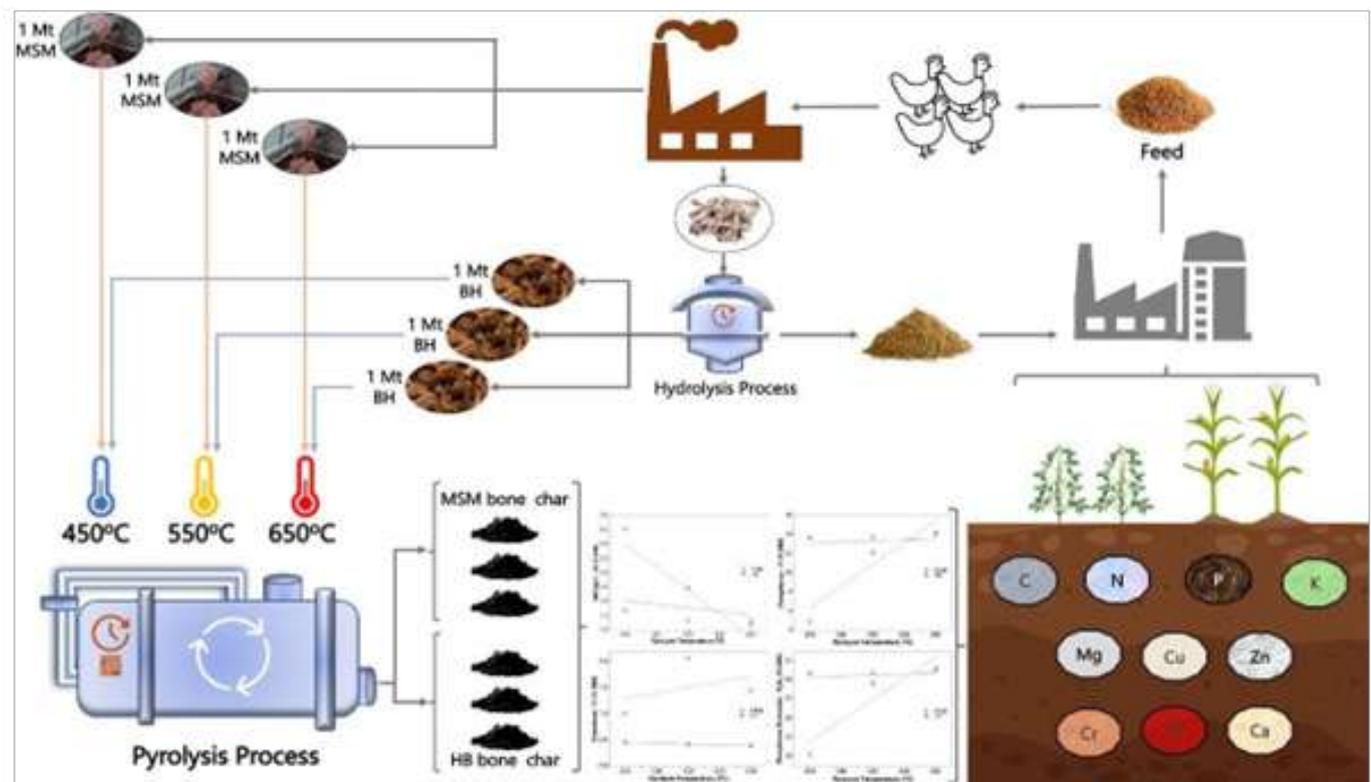
The depletion of nutrients available in the soil is related to the long-term unsustainability of the food production system. Planetary biophysical limits make it urgent to adopt circularity practices that recover nutrients from being reused in production systems. The animal protein production system demands high amounts of nutrients, reducing the natural availability in the soil, increasing extraction from natural stocks, and dispersing nutrients abroad. However, nutrients can be recovered from slaughtered chicken by-products, such as mechanically separated meat residues and pre-hydrolyzed chicken bone. The present study compared the nutrients recovered from mechanically separated meat residues and pre-hydrolyzed chicken bone char by fast pyrolysis at 450 °C, 550 °C, and 650 °C (Figure 1). Results indicate that nitrogen, carbon, and chromium reduce as the pyrolysis temperature increases, while phosphorus, calcium, and magnesium increase. Nutrient recovery is less sensitive to pyrolysis temperature in pre-hydrolyzed chicken bone char than in mechanically separated meat residues- bone char (Tukey $p < 0.05$). In the composition of Bone char, $10 \pm 0.8\%$ is carbon storage, molar ratio (H/C) 0.48, with stability in the soil for more than 100 years. In conclusion, the bone char production process can be fine-tuned regarding the pyrolysis temperature and the biomass loaded according to the nutrient targeted for recovery. Increasing the efficiency of nutrient cycling (soil–food–soil) can contribute to sustainable food security and reducing climate change.

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Figure 1: Methodological steps followed in the present study regarding the type of animal by-products, pyrolysis temperatures, and the bone char output.



Note. Animal by-products: MSM- mechanically separated meat residues from chicken bones and meat, and HB- chicken bone waste from previous hydrolysis process. Output: bone char (pyrolytic biomass). Samples: three replicates. Analysis: physical characteristics, chemical properties, nutrient concentrations, ANOVA, and Tukey test ($p < 0.05$). Source: (Ferrazza et al., 2023).

Biography

Adriana Cioato Ferrazza is a Biologist, financial manager, master's in technology and innovation management and Master in statistics, PhD in agribusiness, with research focused on Environmental, Social and Corporate Governance - ESG and agribusiness decarbonization credits.

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A data-driven approach for assessing in situ gas content using machine learning: Insights from logging data of deep coalbed methane reservoirs

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¹School of Energy Resources, China University of Geosciences, China

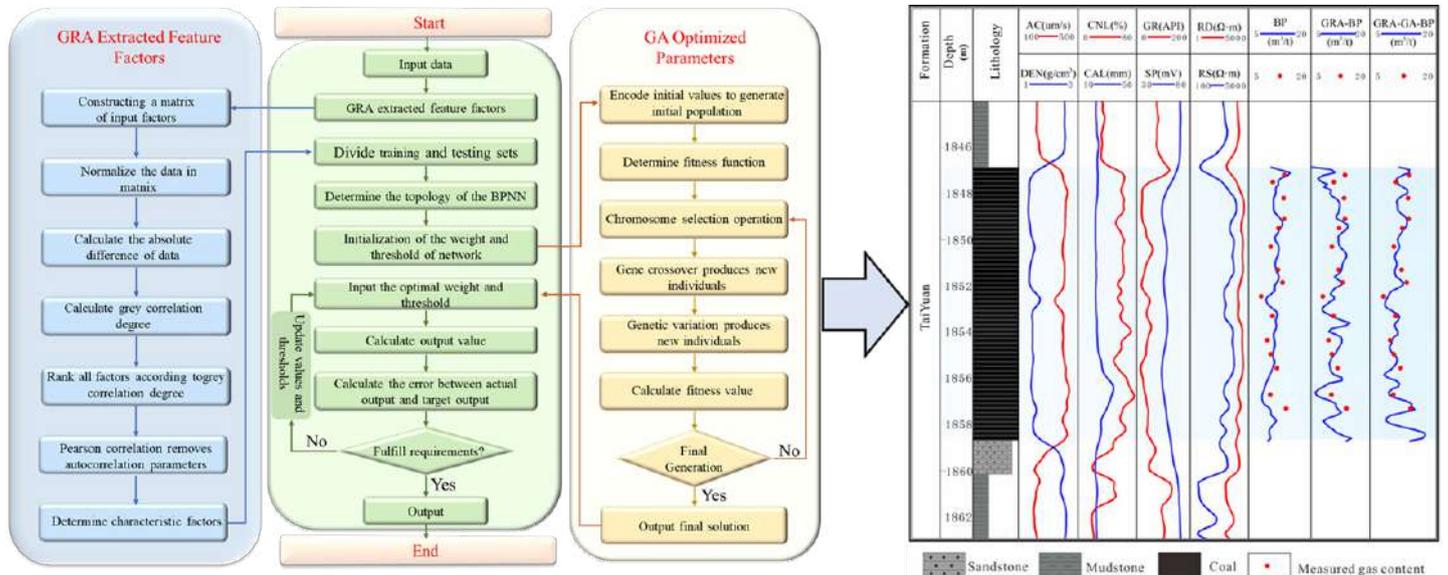
²Shanxi Coal Geology Investigation and Research Institute CO.LTD, China

The *in-situ* gas content is a critical determinant of the exploitation potential and recovery of coalbed methane (CBM) resources. It directly impacts the resource reserves, mining difficulty, and economic value of CBM. Deep CBM resources have enormous potential, but their intricate geological conditions hinder the acquisition of in situ gas content data. To enhance the efficiency and accuracy of acquiring in situ gas content data for deep CBM, this study integrates grey relational analysis (GRA) and genetic algorithm (GA) into the back propagation neural network (BPNN) model, establishing a novel prediction model for in situ gas content of deep CBM using logging data. The results demonstrate the effectiveness of the GRA method in identifying optimal input parameters for the BPNN model. The optimal prediction is attained when logging data with correlation coefficients exceeding 0.8 are chosen as input variables, which is also aligning with the geological significance of logging data. The GA method optimizes the initial weights and thresholds of the BPNN, thereby enhancing the prediction accuracy and stability of the model. The mean square error (MSE) of the GRA-GA-BPNN joint model decreases by 58.68% compared to the GRA-BPNN joint model and by 77.60% compared to the BPNN model. Moreover, the optimized model demonstrates significantly superior prediction accuracy to traditional prediction models. Using deep CBM well as a case study for model application, the GRA-GA-BPNN model predicts the in-situ gas content of deep CBM with an average relative error of only 4.62% compared to the measured value. Furthermore, the disparities in predictive performance between the GRA-GA-BPNN model and traditional machine learning algorithms such as RF, SVM, and MLR are discussed, demonstrating the superior performance of GRA-GA-BPNN in predicting deep CBM in situ gas content. The GRA-GA-BPNN model proposed in this study can achieve high-precision prediction of deep CBM in situ gas content, thereby holding significant practical application significance.

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Biography

Qian Zhang is a Ph.D. candidate at China University of Geoscience. He graduated with a master's degree in Petroleum and Natural Gas from China University of Geosciences (Beijing) in 2021. He is mainly engaged in research related to unconventional natural gas exploration and development, currently focusing on research on the occurrence and output characteristics of deep coalbed methane (CBM). He has published more than 10 peer-reviewed articles in professional journals and various academic conferences.



Measuring vulnerability to assess households resilience to flood risks in Karonga district, Malawi

Isaac Kadono Mwalwimba¹, Mtafu Manda² and Cosmo Ngongondo³

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²Department of Built Environment, Faculty of Environmental Sciences, Mzuzu University, Malawi

³Department of Geography, Earth Sciences and Environment School of Natural and Applied Sciences, University of Malawi, Malawi

Many parts of Malawi are prone to natural hazards with varying degrees of risk and vulnerability. This study aimed at obtaining baseline data for quantifying vulnerability of the households to flood risks in Karonga District in northern Malawi, specifically in Group Village Headman (GVH) Matani Mwakasangila of Traditional Authority Kilupula. The study used cross-sectional survey and data was collected using a structured questionnaire. This study applied Flood Vulnerability Index and statistical methods to quantify and analyse vulnerability of households in the aspects of exposure, susceptibility and resilience characteristics. Proportional Odds Model also known as Ordered Logistic Regression was used to identify factors that determine vulnerability of households to flood risks. The results show that households headed by females and elders of age (at least 61 years) were the most vulnerable to floods because of their limited social and livelihood capacities, resulting from being uneconomically active group. Households with houses built of mud, thatched and very old with no protective account for high vulnerability due to the fact that most of them are constructed using substandard materials. The level of vulnerability was increasing with an increase in the number of households exposed and susceptible to floods. With an increase in resilience to floods, vulnerability level was decreasing. The results further revealed a predictive margins of vulnerability levels which were not significantly different among the villages. However, villages with more exposed, susceptible and not resilience households were most vulnerable to floods. This study recommends that vulnerability assessment should be included in Disaster Risk Reduction (DRR) planning and implementation in order to make DRR more efficient and realistic. This would further strengthen the disaster risk management to be more proactive as well as increase resilience of households to flood risks.

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Biography

Dr. Isaac Kadono Mwalwimba is a Senior Lecturer in the Faculty of Science, Department of Geography and Environmental Studies at The Catholic University of Malawi (CUNIMA). He earned his Ph.D. (Water Resources Management) from the Faculty of Environmental Science, Department of Water and Sanitation at Mzuzu University, and his MSc (Water Resources Management) from the School of Science and Technology, University of Malawi (The Polytechnic). He is the current Manager and focal point of the Centre for Environmental Affairs at CUNIMA, and he spearheads efforts of the Centre to conduct research, consultancy, capacity building, and community outreach in environmental and natural resources management. His research focuses on scientific assessments of environmental management and resilience approaches to climate change in key areas of water resources, water sanitation and hygiene (WASH), food security, forestry, agricultural production, soil, and health, including vulnerability assessment and hydrological analysis of extreme events (floods & droughts).



Hybrid rice production: A worldwide review of floral traits and breeding technology, with special emphasis on China

Humera Ashraf^{1,2}, Fozia Ghouri^{1,2}, Faheem Shehzad Baloch³, Muhammad Azhar Nadeem⁴, Xuelin Fu^{1,2} and Muhammad Qasim Shahid^{1,2}

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²Guangdong Provincial Key Laboratory of Plant Molecular Breeding, College of Agriculture, South China Agricultural University, China

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Rice is an important diet source for the majority of the world's population, and meeting the growing need for rice requires significant improvements at the production level. Hybrid rice production has been a significant breakthrough in this regard, and the floral traits play a major role in the development of hybrid rice. In grass species, rice has structural units called florets and spikelets and contains different floret organs such as lemma, palea, style length, anther, and stigma exertion. These floral organs are crucial in enhancing rice production and uplifting rice cultivation at a broader level. Recent advances in breeding techniques also provide knowledge about different floral organs and how they can be improved by using biotechnological techniques for better production of rice. The rice flower holds immense significance and is the primary focal point for researchers working on rice molecular biology. Furthermore, the unique genetics of rice play a significant role in maintaining its floral structure. However, to improve rice varieties further, we need to identify the genomic regions through mapping of QTLs (quantitative trait loci) or by using GWAS (genome-wide association studies) and their validation should be performed by developing user-friendly molecular markers, such as Kompetitive allele-specific PCR (KASP). This review outlines the role of different floral traits and the benefits of using modern biotechnological approaches to improve hybrid rice production. It focuses on how floral traits are interrelated and their possible contribution to hybrid rice production to satisfy future rice demand. We discuss the significance of different floral traits, techniques, and breeding approaches in hybrid rice production. We provide a historical perspective of hybrid rice production and its current status and outline the challenges and opportunities in this field.

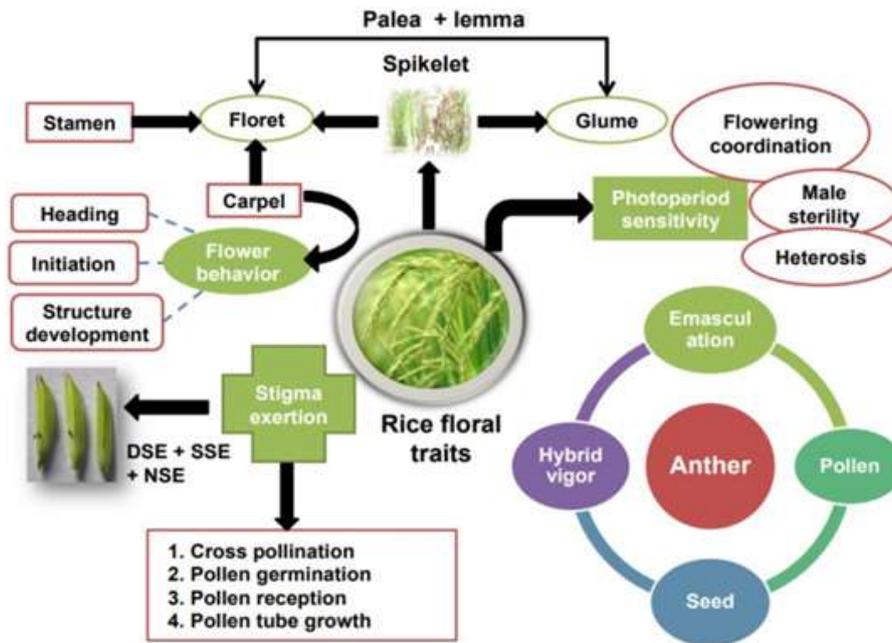


Figure 1. Rice floral and their related traits and their functions in hybrid rice production. DSE (double stigma exertion), SSE (single stigma exertion), NSE (no stigma exertion).

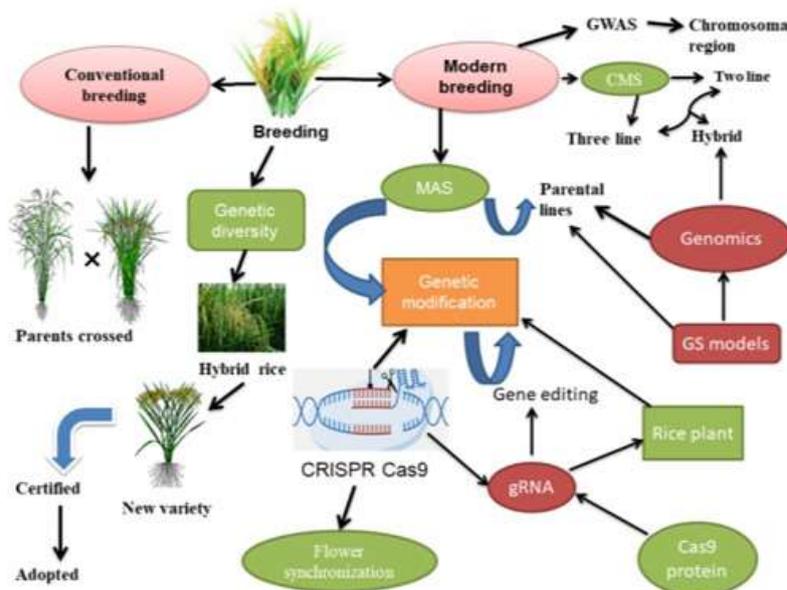


Figure. 2 Schematic illustration of conventional and modern breeding strategies for hybrid rice production. GS (Genomic Selection), CMS (Cytoplasmic Male Sterile lines), GWAS (Genome-wide Association Study), gRNA (guide RNA), CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats), MAS (Marker-assisted Selection)

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Biography

Humera Ashraf is a Ph.D. candidate at South China Agricultural University in Guangzhou, China, specializing in crop breeding and genetics. Currently working in the Crop Breeding and Genetics Lab, she focuses on studying heavy metal stress in rice crops. Collaborating closely with Professor Fu Xuelin and Dr. Qasim Shahid, Humera is involved in several projects aimed at enhancing rice production through advanced molecular techniques. Her work, alongside her esteemed colleagues, has contributed to significant advancements in hybrid rice production. Through their combined expertise in crop breeding, genetics, and physiological studies, they have achieved notable breakthroughs in improving rice resilience and yield, making substantial contributions to the field.

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Monitoring the drought in Southern Africa from space-borne GNSS-R and SMAP data

Edokossi Komi Ametowoyona

Department of Remote Sensing & Geomatics Engineering, Nanjing University of Information (NUIST), China

Drought, a highly detrimental natural disaster, poses significant threats to both human populations, wildlife, and vegetation. Traditional methods of monitoring soil moisture levels rely on ground-based measurements from meteorological stations. However, these stations often lack comprehensive coverage in certain agricultural areas, necessitating the use of alternative methods such as satellite remote sensing. This technique provides a reliable means of measuring soil moisture, a critical factor in effective agricultural management. This paper investigates variations in soil moisture and drought using data from the Cyclone Global Navigation Satellite System (CYGNSS) and the Soil Moisture Active and Passive (SMAP) system. To evaluate the accuracy of these data products, we compared both datasets with the Global Land Data Assimilation System (GLDAS) NOAH model from 2018 to 2019. Our findings reveal a strong correlation between the datasets and the model, with Pearson correlation coefficients (r) and Root Mean Square Errors (RMSE) of approximately $r = 0.98$ and $RMSE = 0.03$ for SMAP, and $r = 0.97$ and $RMSE = 0.02$ for CYGNSS, respectively. We further compared these measurement datasets with drought indicators such as the Standardized Precipitation Index over three months (SPI3), the Normalized Difference Vegetation Index (NDVI), and Total Water Storage (TWS). The correlation coefficients between SMAP and the three indicators (NDVI, SPI3, and TWS) were 0.93, 0.84, and 0.047, respectively, while the coefficients between CYGNSS and the same indicators were 0.86, 0.78, and 0.56, respectively. All the variables also exhibited significant p -values. Despite minor differences, the results demonstrate excellent agreement. Our findings underscore the sensitivity of space-based sensors to drought conditions, highlighting their effectiveness as tools for detecting and monitoring drought (e.g. agricultural drought), particularly in the short term.

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Biography

Edokossi Komi Ametowoyona is a PhD student in the Department of Remote Sensing & Geomatics Engineering at Nanjing University of Information Science & Technology (NUIST) in China. He earned his master's degree in Geography from the University of Lomé, Togo. At NUIST, he is a member of Shuanggen Jin's Lab, where he focuses on satellite image processing and analysis.

His research interests and skills encompass a range of areas including spatial analysis, GNSS-R soil moisture, drought monitoring, vegetation mapping, land-use management, and hydrometeorology. Edokossi is adept at working with digital terrain models and employing satellite imagery to address environmental and management challenges. His expertise contributes significantly to advancements in remote sensing and geomatics engineering.



Phosphorus' future insecurity, the horror of depletion, and sustainability measures

Daniel Tsingay Illakwahhi

Chemistry Department, College of Natural and Mathematical Sciences, University of Dodoma, Tanzania

Phosphorus is a critical and irreplaceable ingredient for fertilizer and food production, produced from phosphate rocks that are only found in few countries. Following phosphate-based fertilizer price surge of 2008, a number of articles were published, addressing the fear of phosphate rock reserve depletion between 50 to 100 years. The data for these studies were obtained from the United States Geological Survey (USGS), which do not collect data directly from mines or fertilizer plants. To determine peak and depletion time, the studies used Hubbert curve fitting as well as static and dynamic reserve to production ratio (R/P) models. The depletion outcry was loud enough to demand a study. Given its significance to food security and human survival, this study was conducted to support the rationale for the worries.

This study attempted to examine the veracity of phosphorus production peak and depletion fear presented between 2009 to 2013. It also examined data certainty and model applicability to challenge the authors' claims regarding peak, and the horrors of depletion. The study involves assessing the nature of data from the USGS, as well as critically scrutinizing articles related to the claims.

It was found that the confidence, reliability, and comparability of data from the USGS is questionable. The models' assumptions ignored important factors such as the discovery of new reserves, small mines, technological advancements in mining, mineral processing, good agro-practices, recycling, and recovery, all of which could have an impact on the outcome.

Due to a lack of first-hand extensive exploration data, and model flaws, the authors' fear of phosphorous reserve depletion in the nearby future concluded to be unfounded and an exaggeration of facts. And that before such conclusion is made, it is prudent to conduct extensive exploration and use a holistic model for forecast.

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Biography

Mr. Illakwahhi is currently an Assistant Lecturer in the Department of Chemistry, College of Natural and Mathematical Sciences, the University of Dodoma. He specialized in organic and environmental sciences. He is a graduate of Saint Augustine University of Tanzania and earned his MSc from University of Dodoma-Tanzania. He is currently pursuing his PhD in Chemistry by thesis at the University of Dodoma. Apart from optimizing methods for phosphorus recovery from waste water, he is also working on a comprehensive model that could better forecast phosphorus future reserve trends.

He served as a senator at the University of Dodoma (2018-2019), General Secretary for the University of Dodoma Academic Staff Association (UDOMASA) (2018-2019), and Deputy Secretary, UDOMASA (2017-2018).

He has six publications to his name, one of which being "Phosphorus' future insecurity, the horror of depletion, and sustainability measures". His publications are available through ORCID 0000-0001-7306-6762.



Bibliographic review on drought and water level articles

Kemal Adem Abdela^{1,2}

¹Nanjing University of information science and technology, China

²Agricultural ministry of Ethiopia, Ethiopia

This bibliographic article on Drought and Water Level examined the relationship between organizations, nations, institutions, authors, references, and publishers. It examined 742 papers from Web of Science at the Nanjing University of Information Science and Technology's. The total annual publication volume of articles was increased steadily from 2012 to 2021, with China and the United States ranking first and second in terms of publication volume and citations but in quality Switzerland and England were top-level. Institutional-partnership analyses indicated disparities in network density and connections, with the Chinese Academy of Sciences (2012) receiving the highest citations and degrees. The document co-citation analysis (DCA) network was created to improve understanding of the frequency and amplitude of bursts of various publications in separate clusters. The most cited work was J Hydrol (2012), with 302 citations. The analytical tool from CiteSpace collected high-frequency keywords and performed co-occurrence, grouping, and emerging word recognition. Gorges Dam is the most crowded cluster, followed by drought stress. The greatest burst duration and most significant phrase is reservoir (2019), followed by "water quality," which has a 5 year burst period. Estuaries perform important functions such as water purification and coastal. "Reservoir, water quality, restoration, phytoplankton, temperature, wetland, time series, diversity and carbon dioxide" are the most important terms, while "climate change, drought, water level, impact, growth, variability, response, dynamics, management and model" are the most frequently used keywords. In terms of citations, references, and academic influence, Zhang Q. (2012), the R Core team (2014), and Jappen E. (2015) were the top three contributors. Cook, ER (2013), and Allen, R.G. (2019) ranked first and second in terms of frequency, respectively. In this review work, significant information gaps were discovered in the areas of microbiological dynamics, environmental variables, fen peat incubation, lake water, drought risk reduction, biological ecology, lake acidification, salinity variations, and attribution. Future researchers should focus on these and similar topics, while Chinese and USA authors should concentrate on article quality rather than publishing numbers.

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Biography

Abdela Kemal Adem is a 35-year-old PhD student at Nanjing University of Science and Technology in the School of Hydrology and Water Resources, China, specializing in hydro-meteorology. His research focuses on the impact of water levels and drought on climate change and global warming. With six years of professional experience in small-scale irrigation and family nutritional well-being in rural Ethiopia, Abdela brings valuable insights into sustainable water management.

He has authored two published papers: a bibliographic review on drought and water level articles (doi.org/10.1007/s43832-023-00038-w), where he served as the first and corresponding author, and a study on the impacts of surface water interchange between urban rivers and fish ponds in the Chu River of Nanjing, China ([10.3389/fenvs.2022.1084623](https://doi.org/10.3389/fenvs.2022.1084623)), where he was the second author. Currently, he has one review and one research paper under review, further contributing to the field of hydrology and water resources.



Typology of farmers in dealing with climate change; Evidence from Iran

Mansour Ghanian¹ and **Azadeh Bakhshi²**

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Water scarcity is becoming a major challenge due to the increasing demand for population growth, accelerating economic growth, and modernization. On the other hand, the biophysical and ecological constraints on land expansion due to climate change have doubled the water scarcity problem. As research showed, agricultural activities consume nearly 70 percent of water in the world, which is even higher in developing countries. So, agricultural water management has been proposed as a major strategy for poverty alleviation and food security in many parts of the world. Water use and management behaviors are inherently complex, dynamic, and systematic. They are often based on habits, and the social and political context that has made it difficult to change thus identifying its types is very important in understanding the attitude of farmers. Attitude is about recognizing information. In other words, users shape their personal views of reality based on the direct information they receive from many mental and physical sources and interpret it based on various factors such as interests, local sociological background, and knowledge and experience. So they can shape their identity and express their behavior. Due to severe water scarcity in Iran, this study tries to determine the perception of agricultural groundwater operators regarding sustainable water management. The present research was conducted to identify the different mental categories between operators regarding climate change mitigation in the study area. The Q Methodology was used as a research method. Q methodology is a technique that identifies and classifies people's perceptions and beliefs. It also categorizes groups of people based on their perceptions. Usually, the Q method is a link between qualitative and quantitative methods. The participants consisted of 21 well-operators selected by the targeted sampling method. Forty phrases were extracted based on the interviews with the participants and the literature review. Then a Q discourse was designed with 40 Q cards. The data were analyzed by the Q exploratory factor. The results show the agricultural water users studied were categorized into four mental typologies. They included Egalitarian (10.16%) who believed that coping with climate change causes increased access to groundwater and better quality of life for all. The Fatalists (13%) It was believed that effectively dealing with climate change has nothing to do with sustainable livelihoods, as it is beyond human control. The third group was Science-Oriented who believed that dealing with climate change means sustainable

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human capital (14.35%), and the last group was Consumerists (22.77%) who believed that they needed more water to provide a better livelihood for their families.

Biography

Dr. Mansour Ghanian is a researcher in the Faculty of Art & Humanities at the University of Coimbra, Portugal. He earned his Ph.D. in Human Geography from the University of Tehran, Iran, in 2010. Dr. Ghanian has an extensive academic background, including a post-doctoral fellowship at the University of Minho, Lab2Pt, from July 2019 to June 2021. He served as a professor of Human Geography at the Agricultural Sciences & Natural Resources University of Khuzestan, Iran, from 2001 to 2022.

His research interests encompass human-environment geography, sustainable development, and regional governance and resilience. In addition to his tenure at the University of Minho, he was a visiting researcher at the University of Coimbra from November 2021 to June 2023. Dr. Ghanian's work contributes significantly to the understanding of geographic and environmental dynamics in both academic and practical contexts.

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Monitoring forest cover and land use change in the Congo basin under IPCC climate change scenarios

Y. G. Yuh^{1,2}, K. P. N'Goran², I. Herbing⁵, A. Kross¹, M. Heurich^{4,5}, H. D. Matthews¹ and S. E. Turner¹

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²World Wide Fund for Nature, Regional Office for Africa/Cameroon Country Program Office, Republic of Cameroon

³Faculty of Environment and Natural Resource, University of Freiburg, Germany

⁴Institute for Forest and Wildlife Management, Inland Norway University of Applied Sciences, Norway

⁵World Wide Fund for Nature Deutschland, Germany

The Congo Basin is a global hotspot for forest fragmentation and natural resource degradation. The region loses approximately 1 million hectares (Mha) of forest cover per year as a result of socioeconomic and climate change problems. However, very little has been done to map the long-term changes in forest cover and land use in this region, nor assess the contributions of climate change to forest cover and land use change problems. No information is available in the scientific literature on future land use projections, especially as human population (a partial indicator of socioeconomic or anthropogenic impacts) is predicted to double, and the effects of global warming predicted to increase. To fill these knowledge gaps, we applied the Random Forest (RF) supervised classification algorithm in Google Earth Engine (GEE) to map and quantify decadal changes in forest cover and land use patterns in the Congo Basin for the period 1990 – 2020. We cross validated our land use and cover (LULC) maps with existing global land cover products, and projected our validated results to the year 2050, using the Idrissi Land Change modeller from TerrSet, and under three human population change and climate change scenarios (SSP1, SSP2, and SSP5). We found that, over 5.2% (215938.3 km²), 1.2% (50045.5 km²), and a 2.1% (86658.2 km²) of dense forest cover were respectively lost in the Congo Basin between 1990 – 2000, 2000 – 2010, and 2010 – 2020, accounting for approximately 8.5% (352642 km²) loss in dense forest cover between 1990 - 2020. For the period 2020 – 2050, we predict a 3.7-4% (174859.6 - 204161 km²) loss in dense forest cover under all three population change and climate change scenarios, suggesting that approximately 12.3% (556802.9 km²) of forest cover will be lost in this region over a 60-year period (1990-2050). Our study area is also experiencing large scale expansions in croplands and built-up areas, owing to the continuous growth in human population density within this region. Our results fill a critical gap in knowledge about the current and predicted future state of forests and land use in this region and on the potential impacts of human activities and climate change. This information can be used within the United

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Nations Framework Convention on Climate Change (UNFCCC) REDD+ (Reduce Emissions from Deforestation and Forest Degradation) program, to design a long-term regional Strategy and action plan for monitoring deforestation, and urban expansion within Congo Basin countries.

Biography

Yisa Ginath Yuh is a postdoctoral fellow at the Department of Geography, Planning, and Environment, University of Concordia. He is carrying out a research project in partnership with the World Wide Fund Africa program, titled: Habitat fragmentation and climate change in the Congo Basin: Mapping and quantifying effects on single and multi-species distribution and behavioral diversity within Congo Basin landscapes and protected areas.

Yisa graduated with a PhD in Geography, Urban and Environmental studies from the University of Concordia in Canada, in September. In his dissertation, he compared the classification performance of several machine learning algorithms in assessing forest cover and deforestation hotspots within the Congo Basin, as well as applied Ecological Niche Models in mapping the suitable habitats for endangered large mammal species within highly threatened Protected Areas in this region.

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Founder's affective commitment, innovation ambidexterity, and new venture performance: The moderating role of performance-based national culture

Galina Shirokova¹, Tatiana Anisimova², Jan Weiss³, and Joshua V White⁴

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²Linnaeus University, Sweden

³Montpellier Business School, France

⁴The University of Dayton, USA

Entrepreneurship scholars have increasingly recognized the role of new venture founders' drive and motivation in the firm's venture development and performance (De Jong et al., 2013; Fragoso et al., 2023; Hensellek et al., 2023). The founder's engagement is inherently connected to their organization through their affective commitment and is instrumental for the sustainable growth of new ventures (Fragoso et al., 2023; Hensellek et al., 2023; Ruvio & Shoham, 2011). Affective commitment can have significant impact on performance outcomes (Mercurio, 2015; Solinger et al., 2008), and the effects of affective commitment have been shown to influence the relationship between innovation ambidexterity and small firms' performance (Fragoso et al., 2023).

To understand the mechanisms shaping the relationship between founder's affective commitment and new venture performance, we investigate innovation ambidexterity as a potential mediator. Moreover, previous studies have shown that the effect of leader personality can vary depending on the context. Thus, our moderator of interest is performance-oriented national culture.

We used a multilevel sample from Global University Entrepreneurial Spirit Students' Survey 2018 with 208,636 students from 54 countries and more than 3,000 universities participating (Sieger et al., 2019). Given the multi-level nature of our data, we conducted multilevel regression analysis. To test for mediation and moderated mediation effects, we used Hayes' PROCESS macro for SPSS.

We find empirical support for our baseline hypothesis, which postulates a positive relationship between a founder's affective commitment and new venture performance. We also find evidence that innovative ambidexterity mediates the link between affective commitment and performance. Finally, we find the above mediation relationship is moderated by PBC, such that the mediating influence of innovative ambidexterity on the relationship between affective commitment and performance becomes stronger in national cultures with low-performance

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orientation when compared with national cultures with high-performance orientation.

Biography

Galina Shirokova is a Professor of Management Department at HSE-University, St. Petersburg School of Economics and Management, Russia. Her research interests include entrepreneurship in emerging markets, strategic entrepreneurship, and student entrepreneurship. Her work has been presented internationally and published in Journal of Business Venturing, Strategic Entrepreneurship Journal, Entrepreneurship Theory and Practice, British Journal of Management, among others. She is an active member of the Academy of Management. Professor Shirokova has been a coordinator of 6 major projects supported by different Russian and international foundations. She is a member of editorial boards of international peer-reviewed journals like Entrepreneurship Theory and Practice, Academy of Management Perspectives, Journal of Developmental Entrepreneurship.

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Soil fertility and fertilization of the field crops on typical chernozem of Moldova

B. Boincean

Seletia Research Institute of Field Crops Calea Esilor, Republic of Moldova

The researches have been conducted in the long-term field experiment on Typical chernozem soil from the Balti steppe (Northern part of the Republic of Moldova) with different system of the soil fertilization in the crop rotation. The duration of the experiment is more than 50 years. The experiment includes twelve system of soil fertilization in four repetitions. Each plot is 242 sq.m (5,6 m *43,2). The systems of fertilization includes: unfertilized control, mineral fertilizers in three rates (NPK 75, NPK 130 and NPK 175 kg a.i. per ha of crop rotation); 10t/ha of composted manure with the same rates of mineral fertilizers; 15t/ha of composted manure with the same rates of mineral fertilizers; 15t/ha composted farmyard manure.

The yields of each crop in the six years crop rotation, are analyzed for 50 years. Nitrogen- use efficient was determined for different system of fertilization and the store of soil fertility in fertilization and the store of soil fertility in yield formation.

Conclusions:

1. The yields of crops are increasing medially, but in time they have the tendency to stabilize and to decrease during the last 20-25 years.
2. Nitrogen- use efficient NUE from mineral fertilizers is relatively low and differ according the crops in the crop rotation. The lowest NUE have been determined for corn, for grain and sunflower, but the highest for winter wheat and sugar beet.
3. The shore of soil fertility in yield formation (from the decomposition of soil organic matter) consists, depending on crops, from 60 up to 95%.

Biography

Agronomist. Head of the Department of Sustainable Farming Systems at Selectia Research Institute of Field Crops, Balti, Republic of Moldova since 1990. After graduation of Moscow Agricultural Academy by name of K.A. Timiriachev, he was recommended to continue studies as postgraduate student of the same academy. In 1982, the PHD thesis was defended on transformation of soil organic matter on non-chernozem soil. In 1998 the doctor habilitate thesis was defended on crop rotation and soil organic matter on Chernozem soil of Moldova. In 2023, Dr. Boincean was elected as member-correspondent of the Academy of Sciences of Moldova.



Geomagnetic field anomalies associated with natural and man-made phenomena

Valijon Yusupov Rustamovich

Seismology Institute of Sciences Academy of the Republic of Uzbekistan, Uzbekistan

In the article, "Anomalies of the geomagnetic field on micro-polygon Charvak associated with earthquakes" details the analysis of long-term observations of the geomagnetic field on the territory of the Charvak reservoir is conducted. Which revealed, that local anomalies geomagnetic field connected with a simultaneous and total manifestation of the processes, in accordance with change the volume of the water reservoir and change to activities local seismicity, considered questions of the use these result at forecasting of the earthquakes.

Introduction: Nowadays, one of the most important problems in the world considered to predict earthquakes and reduce their harmful results. In order to solve the problem it occurs to learn the apparent peculiarities of earthquake heralds in the special geodynamic fields. It demands that the observation would be carried for a long time. In this situation, making a model in natural condition during the process of earthquake preparation may give beneficial results. Technogen objects might be used as a natural model in order to learn connection between the process of earthquake preparation and the appearance of earthquake heralds. Since 1973 the staff of the laboratory "the variations of geophysics fields" at the Seismology institute of Sciences Academy of Republic of Uzbekistan has been holding the special investigation which is related to modeling on the natural way the process of earthquake preparation around the micro polygon Charvak. The same of investigation like this were observed in Talbingo reservoir, Australia (Davis P.M. Stasey F.D) [1], Nurek reservoir, Tajikistan (Karimov F.X, Proxorov A.A) [2], Tuxtagul reservoir, Kyrgyzstan (Shakirov E.Sh, Pogrebnoy V.N etc.) [3], Chirkey reservoir, Dagistan (Sulaymonov A.E) [4], Azat reservoir, Armenia (Oganesyanyan S.R) [5] and other places. Scientific investigation on the polygon of Charvak reservoir is superior with its size and continuation than other places. Monographs and articles, which based on scientific results between 1973 and 2001 years, were published By Abdullabekov Q.N, Berdaliyev E, Maqsudov S.X, Tuychiyev A. Yusupov V.R. and others [6-11].

The purpose of the investigation – to learn the peculiarities of local changes which is connected with the capacity and depth of reserved water in Charvak reservoir and to model the process of earthquake preparation on the natural condition, that is to say, changeable territory. By the time the changes of magnetic peculiarities in mountain chains which were under the pressure

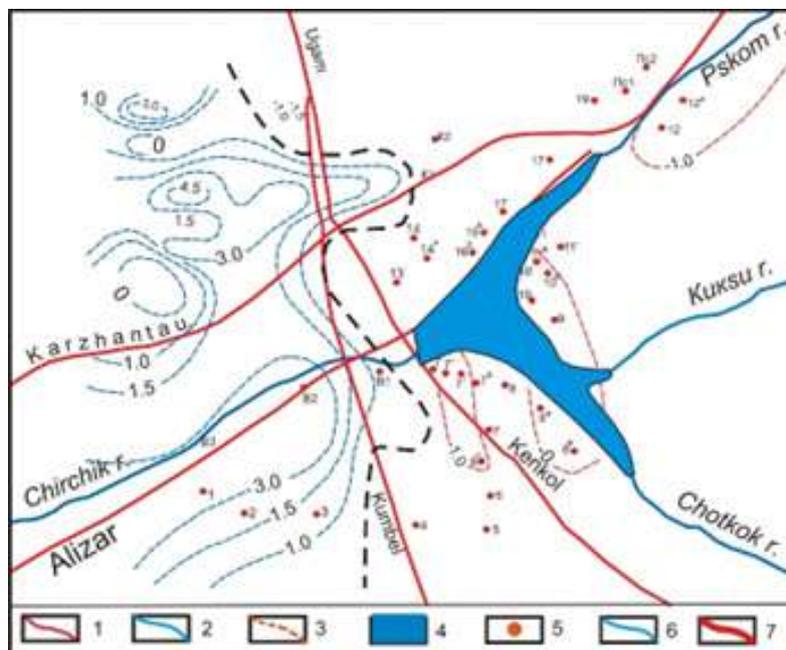
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and temperature. Afterwards the experiments were continued in technogen objects, which produced extra pressure, that is to say, in oil- gas pits, in the territory of gas and reservoirs, in different explosion zones. One of objects like this is considered as Charvak reservoir.

Since December 1973 Geomagnetic investigations in the territory of Charvak reservoir has been started. All investigation was carried in observation stations and re-observation stations, which are located in water basin (picture 1). The stationary points are located during 1973-2010 years in points of "Charvak", "Xumson", "Yusufxona". There are 25-40 re-observation stations, but now they are 22. Geomagnetic investigation is counted with the help of magnetometer TMP, APS, MV-01. The discreet measuring accuracy of magnetometers is equal to 0.1 nTl.



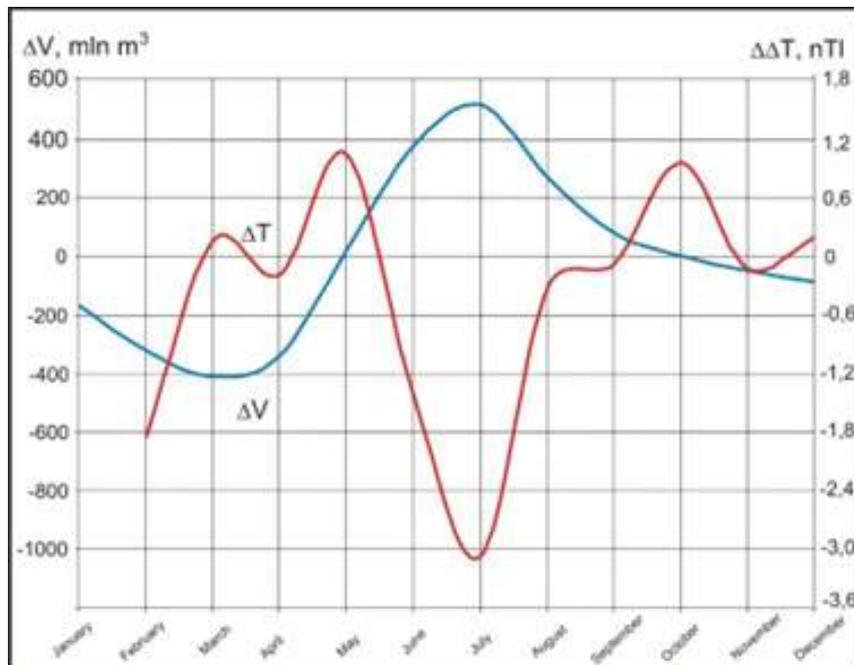
The picture 1. The schema of the polygon Charvak (N=41°38'12", E = 70°01'48").

1-3 - isolines of anomal magnetic field (1-positive, 2-negative, 3- zero); 4 - the contour of the reservoir, 5 - geomagnetic measurements stations, 6 - rivers, 7 -faults.

As now, 116 measurement cycles were carried out from 1973 to the end of 2011 year. Geomagnetic measurements results calculated as long years separated and systemized. The stations where were carried out short-time observations, were taken out of analyzing. The changes, which include systematic mistakes of supportive stations, which are identified by some observation cycles, were settled. The investigation results basically were calculated according to geomagnetic observing in a magnetic-ionosphere observatory of "Yangibazar". The investigation results in 33 re-observing stations where continuous observations were carried on during 1974-2011, were calculated according results in the first cycle of December 1973 based on the next equation.

$$T_a = \Delta T_i \text{ cycle} - \Delta T \text{ 1 cycle}$$

Based on certain data in 1974-2010 year average common changes, which are linked to the water of local geomagnetic field (the picture 2).



The picture 2. Anomalies versions related to seasonal changes of water volume of geomagnetic field in the territory of Charvak reservoir.

According to the changes of water volume and surface in the territory of Charvak reservoir, each time is a tangible changed magnetic field. In addition to this, according to the presented results not only water volume and surface, but also the seismotectonic processes around the territory have strong effects on the changes of magnetic field.

In below conducted the results, which study the direct effect of different magnitudes earthquake preparation's process to local magnetic field. Studied, on during 1973-2011 the connection between the result geomagnetic observations with local –regional seismological changes of the territory in the micro polygon Charvak. For this during the period in 33 re-measuring stations checked the results of measured 116 cycle observing, systemized. The earthquakes that happened in the territory of Charvak reservoir and $R=200$ km radius from the reservoir were chosen in order to compare observing local anomalies in the geomagnetic square. In the selection the earthquakes that satisfied the condition $R < P30$ [12] in accordance with V.I.Ulamov, were chosen, that is territory is larger until 30 times than that of the earthquakes.

The methods of research. The purpose of the investigation – to learn the peculiarities of local changes which is connected with the capacity and depth of reserved water in Charvak reservoir and to model the process of earthquake preparation on the natural condition, that is to say, changeable territory. By the time the changes of magnetic peculiarities in mountain chains which were under the pressure and temperature. One of objects like this is considered as Charvak reservoir.

Since December 1973 Geomagnetic investigations in the territory of Charvak reservoir has been started. All investigation was carried in observation stations and re-observation stations, which

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are located in water basin (picture 1). The stationary points are located during 1973-2010 years in points of "Charvak", "Xumson", "Yusufxona". There are 55 re-observation stations. Geomagnetic investigation is counted with the help of magnetometer TMP, APS, MV-01, GSM-19T. The discreet measuring accuracy of magnetometers is equal to 0.1 nTl.

In conclusion, it is defined that the local anomalies which were investigated in the geomagnetic field according to the result analysis of the long-term investigation in the geomagnetic field around the reservoir Charvak is displayed together with the changes of the water volume in the reservoir and the process of changing local seismic activity. The results of the research in the territory of the reservoir Charvak could be used not only in modeling the earthquake preparation process, but also in forecasting the earthquakes, in supervising the seismic activity in the near zones of the fault Karzhantau.

Biography

Valijon Yusupov Rustamovich, Senior Researcher, Doctor of Philosophy of Geological and Mineralogical Sciences (PhD); Worked at the laboratory of "Physics of seismogenic processes" Institute of Seismology AS RUz; Seismology Institute of Sciences, Academy of the Republic of Uzbekistan, 3, Zulfiyakhonim Str., 100128; Associate docent of University of Geological Sciences. Tashkent, Uzbekistan.

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Costs of living and real incomes in the Russian regions

Konstantin Gluschenko^{1,2}

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²*Institute of Economics and Industrial Engineering, Russia*

Comparisons of well-being indicators in monetary terms across regions of a country do not provide insights into actual differences in well-being. The reason is variability of price levels across regions, especially in large countries like Russia. Thus, the indicators should be adjusted to the regional price levels, which, in turn, poses a problem of estimating such levels. In Russia, official data on price levels (termed cost-of-living indices) are available; however, they are by city/town rather than by region, so being unsuitable for regional studies. This paper describes the methodology of aggregating the city cost-of-living indices to the regional ones and presents the results obtained for 2016–2020. These results serve as a mean for estimation of price-adjusted regional incomes per capita (regional real incomes). As can be expected, taking account of regional costs of living smooths to some extent the pattern of regional inequality. A comparison of the European and Asian parts of Russia suggests that real income per capita in the latter permanently remains lower than in the former.

Biography

Konstantin Gluschenko is a professor at the Economics Department of the Novosibirsk State University (NSU) and a chief researcher at the Institute of Economics and Industrial Engineering (IEIE), Novosibirsk, Russia. He also teaches a course on international economics at Heilongjiang University (Harbin, China). Konstantin graduated from the NSU Physics Department, received PhD degree in economics from the Central Economics and Mathematics Institute (Moscow), and received D.Sc. degree in economics from the IEIE. His research results has been published in Review of Development Economics, Spatial Economic Analysis, Empirical Economics, Economics of Transition, and other international journals.

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Assessment and mapping of SDG contribution of freshwater mangrove as a novel urban ecosystem against the 17 sustainable development goals

A. Gonzales¹ and **T. Tsusaka²**

¹Mariano Marcos State University, Philippines

²Asian Institute of Technology, Thailand

The outcomes projection was derived using the framework of the UN SDG Assessment Methodology of Projects with data support from experiments and secondary data and used to map among the targets and indicators of the SDG. Out of the 17 Goals, ten are directly and indirectly linked with the freshwater mangrove project in AIT. In addition, knowledge, attitude and perception of the stakeholders on freshwater mangroves were also determined. The results revealed that a high percentage of the respondents are new to the concept of NUE and freshwater mangrove. However, despite this early concept and limited knowledge of NUE, positive feedback was obtained from the majority of the respondents on the ecosystem services of freshwater mangroves for the AIT community. The extraction of potential outcomes from an innovation creates awareness and inspiration to find more solutions to emerging local and global problems. The case of freshwater mangrove, which involves the integration of an exotic (novel) species in an ecosystem for rehabilitation, leads to the identification of seven positive outcomes and is linked to the achievement of ten development goals. Although the solution's essential elements are not described in any technical or scientific literature, references, patents, implementations, or publicly available evidence used by a solution of this kind previously, the outcomes generated as a result of the projected ecosystem services were all agreed upon by immediate stakeholders at AIT. This means that radical approaches to solving social and environmental issues are already well-accepted by the society. In addition, the NbS have already been long recognized as sustainable solutions to different environmental challenges. However, the use of the non-traditional ecology concept such as freshwater mangroves is still debatable and doubted by experts and non-experts. This is a potential hindrance in accepting the NUEs as part of the urban landscape.

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Biography

The author is an Associate Professor at the Mariano Marcos State University, Philippines. Her research interest is on sustainability mapping, eco-engineering, climate change, and nature-based solution for environmental management. She is currently working on projects in green engineering for mangrove to assist mangrove plantation and design of floating wetlands for pollution remediation. She is also involved in several extension services to communities giving her services on community-needs assessment for the development of management plan for resource and environmental management. Over the past years, she attended trainings and workshops on sustainability in research and education giving her the interest to work towards sustainability achievement. She is one of the core team members in her university implementing sustainability program and activities.



The heterogeneous effect of technology and macroeconomic policies on financial market development

Muhammad Hussain³, Farzan Yahya¹, Muhammad Waqas² and Abdul Haseeb Tahir⁴

¹Nanchang Institute of Technology, China

²Jiangsu University of Science and Technology, China

³Xidian University, China

⁴Nanjing University of Science and Technology, China

This study examines the heterogeneous effect of technological advancement, anti-monopoly policies, government transparency, and macroeconomic stability on financial market development. A panel data of 74 countries over the period 2007 to 2017 is selected. Based on simultaneous panel quantile regression (SPQR), the findings reveal that macroeconomic stability improves financial market development after the financial markets attain a certain level of efficiency (50th and 90th). Similarly, there is an asymmetric effect of antimonopoly policies on financial market development and a stronger effect is observed for intermediate markets. On the other hand, no significant effect of transparent government policy is indicated at any quantile. Lastly, the “noise trading” mechanism of technology advancement is demonstrated by SPQR estimations, especially for least and highly developed financial markets. These findings suggest that countries could attain financial market efficiency by implementing anti-monopoly policies so that corruption and bureaucratic power could be cramped effectively. Nonetheless, continuous monitoring is essential to sustain the value enhancing mechanisms for financial activities so that information asymmetry issues emerge from technology advancement and competition is avoided.

Biography

Farzan Yahya is working as Professor (Associate) at Nanchang Institute of Technology China. His area of research interest is Financial Analysis and Policy, Behavioral Finance, Corporate Governance, Sustainable Finance. Muhammad Waqas is currently working as Professor (Associate) at Jiangsu University China. His area of research interest is Human Resource Management and Organizational Behavior. Muhammad Hussain is doing PhD at Xidian University China. His area of research interest is Sustainable Finance, financial development and digital economy. Abdul Haseeb Tahir is doing his PhD at Nanjing University China. His area of research interest is Green HRM, Knowledge Management, Environmental Performance and ESG Performance.

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Observed and dark diversity of plants' life forms are driven by climate and human impacts in a tropical dry forest

Magno Daniel de Oliveira Gonçalves-Araújo¹, Carlos Eduardo de Carvalho², Pedro Aurélio Costa Lima Pequeno³, Diego Pires Ferraz Trindade, Frederic Hughes, Francisca Soares de Araújo, Meelis Partel and Julia Caram Sfair

¹Department of Biology, Federal University of Ceará, Brazil

²Research Support Center in Roraima, National Institute for Research in the Amazon—INPA, Brazil

³Institute of Ecology and Earth Sciences, University of Tartu, Estonia

⁴Board of Trustees of the Scientific Collections and Graduate Program in Zoology, State University of Santa Cruz, Brazil

Species richness is the most commonly used metric to quantify biodiversity. However, examining dark diversity, the group of absent species which can potentially inhabit a site, can provide additional insights about how communities are assembled. In this study we aimed to understand how human impacts and environment affect the observed diversity, dark diversity, completeness (how large is the observed diversity compared to dark diversity) and species pool size (observed and dark diversity together) of vascular plants (i.e., trees, shrubs, herbs and lianas) in Caatinga. Along 144 0.4 ha plots for trees and 0.04 ha plots for shrubs, herbs, and lianas, we recorded 2148 stems from 232 native species. We show that larger, well-connected and wetter fragments present either more observed diversity or larger species pools of vascular plants, indicating that these fragments may act as biodiversity reservoirs in Caatinga. However, these drivers are usually plant life-form dependent, with some variables such as chronic anthropogenic disturbance, habitat amount, soil and temperature also playing secondary roles on observed and dark diversity of different life-forms. Overall, by including dark diversity in the analyses we were able to identify additional effects of human impacts and environment on vegetation change, which would not be possible to be captured by using species richness only. Finally, our results highlight the complexity of human-modified landscapes in dry forests and stress the importance of considering the whole species pool of plants and different growth life-forms when assessing the effects of disturbance and environment on Caatinga vegetation.

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Biography

Dr. Magno, hailing from the state of Minas Gerais, Brazil, has dedicated his life to ecology and native forests. Raised by his mother, Maria, he spent part of his childhood living in a rural school, where they worked with underprivileged children and prepared meals using produce from organic gardens. This early exposure to sustainable practices ignited his passion for ecology. Witnessing the devastation caused by deforestation in his region, which is surrounded by the Savanna and Atlantic Forest biomes, motivated him to pursue studies in ecology and forestry engineering.

Despite the challenges in Brazil, including limited investment in research, Dr. Magno's perseverance and determination led him to attain his Ph.D. His journey exemplifies the courage needed to confront environmental issues and contribute to sustainable practices in the face of adversity. Dr. Magno continues to inspire others with his commitment to ecological preservation and education.



Blockchain-enabled smart agriculture: Enhancing data-driven decision making and ensuring food security

Shahla Andleeb¹, Khalil Ur Rehman¹, Maryam Ashfaq¹, Nida Akram² and Muhammad Waqar Akram^{3,4}

¹Department of Environmental Science, Faculty of Natural Science, GC Women University, Pakistan

²Department of Business Administration, GC Women University, Pakistan

³Ningbo China Institute for Supply Chain Innovation- MIT Global Scale Network, Ningbo, China

⁴Jiangxi University of Finance and Economics, China

Agriculture plays a vital role in global food security, but conventional practices have led to environmental degradation and health risks due to excessive use of agricultural nutrients and chemicals. In this era of increased consumer awareness and preference for organic food, the challenge lies in making informed choices amidst various crop production options. To address this, the present research introduces a groundbreaking study that utilizes blockchain technology to record and trace information on crop production from seeds to end-user consumption, enabling easy consumer choices. This study introduces a model that integrates Internet of Things (IoT) sensors to monitor the impact of selected chemicals and nutrients used in agriculture to enhance production yields. To ensure sustainability, the study employs the low-energy adaptive clustering hierarchy (LEACH) protocol, which optimizes energy consumption and network stability, thereby avoiding disruptions. Results indicate that different fertilizers affect soil physical properties such as temperature and moisture. These parameters are monitored using the Agriculture Vercel App, equipped with temperature, moisture, and light sensors in agricultural fields. The app provided threshold readings via alert notifications, revealing significant fluctuations in temperature (12%–43%) and moisture (83%–41%) concentrations upon the application of specific fertilizers like “Agricultural lime” and “Calcium Ammonium Nitrate.” Our IoT-based model is linked with private blockchain technology to prioritize consumer choice and facilitate transparency. This integration enhances food security while mitigating environmental degradation risks. By providing a comprehensive record of crop production practices, our model empowers consumers to make informed decisions aligned with their health and environmental concerns. This research demonstrates the potential of combining IoT and blockchain technologies to revolutionize agriculture, ensure sustainable practices, and promote food security. The findings offer significant implications for policymakers, farmers, and consumers, fostering a more sustainable and health-conscious approach to agriculture worldwide.

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Biography

Dr. Shahla Andleeb is a dedicated advocate in the realms of environmental activism and global food security. From the outset of her career, she has demonstrated a profound connection to nature and a deep understanding of the balance between human activities and ecosystem health. This passion has driven her to pursue a career focused on promoting sustainable practices that benefit both the environment and global communities.

Dr. Andleeb's academic qualifications provide a robust foundation for tackling the complex challenges of climate change, resource depletion, and the increasing demand for food due to a growing global population. Her work extends beyond theoretical research; she actively engages in real-world initiatives, translating her knowledge into meaningful actions that drive positive change. Her commitment to fostering sustainability and improving food security reflects her dedication to addressing pressing environmental and societal issues.

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Nano biochemistry innovation for efficient heavy metal remediation: A promising approach

Anupama Ojha¹, Priya Sahani² and Sarad Kumar Mishra²

¹Mahayogi Gorakhnath University Gorakhpur, India

²Department of Biotechnology, Deen Dayal Upadhyay, Gorakhpur University, India

Environmental cleaning is an urgent need for sustainable development. Nanotechnology is one of the viable routes to handle environmental heavy metal pollution. Nanoparticles of metals and their oxide like Zn, Ag, Au, Mg, etc. are used to remediate heavy metal pollution from contaminated site. Our objective of study was to search the potential nano-biochemistry working behind the removal of heavy metal by use of nanoparticles. Available literature on google, PubMed were studied to find the nano biochemistry of remediation mechanism. Literature suggests that and electrostatic linkage of heavy metal particles with reactive sites on nanoparticles are mainly involved in remediation. Nanoparticles surface huge surface area made eligible for great performance for remediation of heavy metals from contaminated sites. Other chemical bonds like hydrophobic contacts, π - π -donor-acceptor interactions, hydrogen bond interactions, and/or electrostatic attraction are the main bonds involved in remediation through adsorption. Some nanoparticles have magnetic properties used for heavy metal removal. The efficiency of nanoparticles influenced by Initial ion concentration, temperature, contact time, adsorbent doses, pH of site, and ionic strength affect the adsorption properties of nanoparticles. However, more research is needed to develop technique than can reduce the cost of nanoparticles synthesis, reusability, and separation.

Biography

Dr. Anupama Ojha has done M.Sc. and Ph.D. in Biochemistry and has 10 years of research and teaching experiences. Presently she is working as assistant Professor in Department of Medical Biochemistry, Faculty of Allied Health Sciences, Mahayogi Gorakhnath University, Gorakhpur, Uttar Pradesh, India. She has published more than 15 papers in international journal. Her area of specialization includes biochemical toxicology. Presently she working on cancer and studying the effect of pesticide exposure in initiation of carcinogenesis in pesticide exposed population. She also working on obtaining novel arsenic metabolizing microbes from contaminated soil and water that can be utilized for remediation of arsenic from polluted land.



Three decades of forest vegetation dynamics in Nanda Devi Biosphere Reserve, Indian west Himalaya

Balwant Rawat¹ and **Janhvi Mishra Rawat²**

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²*Department of Biotechnology, Graphic Era Deemed to be University, India*

The study, for the first time in Indian Himalaya, considered repeat surveys of the forest communities investigated previously in Nanda Devi Biosphere Reserve (NDBR), west Himalaya. In 2017-2018, we revisited 300 plots distributed across eleven forest communities in buffer zone site of NDBR in Pindari-Sunderdhunga-Kaphni (PSK) area that were originally sampled in 1988–1992. Within each plot, we reinvestigated forest communities present during the 1988–1992, which allowed us to track their individual fates through time for growth and mortality calculations. Although we observed commonality in changes across some sites, our results suggest that these forests differ in their rates and trajectories of change. The data sets revealed that the previously reported dominant tree species in 9 out of 11 communities in PSK site continue to exhibit maximum importance, which suggests marginal change in broad composition of these forests. However, the significant increase in seedling and sapling species richness and density is indicative of forest composition in the process of change. Following the Community Change Sensitivity (CCS) analysis *Quercus floribunda*, *Hippophae salicifolia* and *Abies pindrow* forest communities were ranked as the most change sensitive communities in the reserve. This ranking of communities provided strong base for the identification of priority management intervention sites within the reserve. The evidences of present study suggest the need for re-defining the successional status of various communities. The study also elaborates on effectiveness of CCS while conservation/management plan attempts to accommodate the ongoing and potential changes in community structure.

Biography

Dr. Balwant Singh Rawat is a forest and alpine ecologist and has been working in vegetation dynamics with special focus on regeneration behavior and climate change in high altitude Himalayas including both forest and alpine vegetation for last 15 years. Dr. Rawat has published more than 50 research papers in highly reputed international and national research journals and books. He has four published (Govt of India) and one granted patent (Govt of UK) in the field of nanotechnology and agriculture. Dr Rawat has received many prestigious awards and fellowships, viz. 'Young Scientist Award' from Society of Plant Research & Springer Nature (2023), Uttarakhand State Council for Science and Technology (2015), 'Scientist of the Year Award' from National Environmental Science Academy (2017), 'International Young Scientist Award' from International Science Community Association (2018), 'Best Presentation award' received from honourable Vice President of India in 107th Indian Science Congress (2020), CSIR-SRF Fellowships (2011) etc. Moreover, he has worked as principal investigator and mentor in several research projects funded by DST, SERB, CSIR, Bhopal Biodiversity Board etc. Being familiar with more than six major valleys of Uttarakhand upto the snowline and having vast experience of expedition and vegetation analysis, Dr. Rawat justifies his role in the current project.

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Sustainable energy through anaerobic co-digestion of organic fraction of municipal solid waste and bio-flocculated sludge

Nirav G. Shah and **Kinjal C. Shroff**

Civil Engineering Department, Faculty of Technology & Engineering, The Maharaja Sayajirao University of Baroda, India

In the face of population growth, rapid urbanization and economic development of Indian cities, the issue of Municipal Solid Waste (MSW) management has reached critical importance. At the same time segregation of MSW has gained momentum which led towards more production of Organic Fraction of Municipal Solid Waste (OFMSW) - which is the most favorable substrate to meet the goal of waste to energy conversion through anaerobic digestion. Increasing Indian Population generates more sewage which can be treated with UASB based treatment technology is the most advantageous due its low operational and maintenance cost. Sewage treated with UASB required post treatment using ASP to meet disposal standards which generates sludge from Secondary Settling Tank (SST). The bio-flocculated sludge generated from this SST is with low porosity, low in quantity and rich in microbial nutrient need special attention for disposal. Anaerobic digestion of OFMSW needs liquification for higher degradability rate where bio-flocculated sludge become the potential co-substrate and enhance methane generation. The favorable meteorological condition (20°C to 40°C for more than 9 months of an year) in majority states of India helps in anaerobic co-digestion process. The lab scale experimental work and using batch experimental study different mixing ratios of OFMSW: bio-flocculated sludge 50:50, 75:25, 90:10, 0:100, 100:0 (%wet weight) is optimized. Anaerobic co-digestion exhibits a quick phase of acclimatization and enhance methane yield. The maximum specific methane gas yield is achieved $369.28 \pm 55.51 \text{ L/kgVS}_{\text{added}}$ with OFMSW and bio-flocculated against $167.78 \pm 16.45 \text{ L/kgVS}_{\text{added}}$ in batch research mono-digestion of OFMSW. The results of a kinetic analysis using the Modified Gompertz model and Logistic Function model for methane yield demonstrate the acceptance of the experimental methane yield. The simplicity and economic feasibility of the lab-scale process used in this study make it a promising solution for large-scale implementation in many nations of the world. The abstract highlights the potential of substrates OFMSW and bio-flocculated sludge (post UASB) for anaerobic co-digestion as a sustainable and economically viable approach to address the challenges of urban waste management to energy production.

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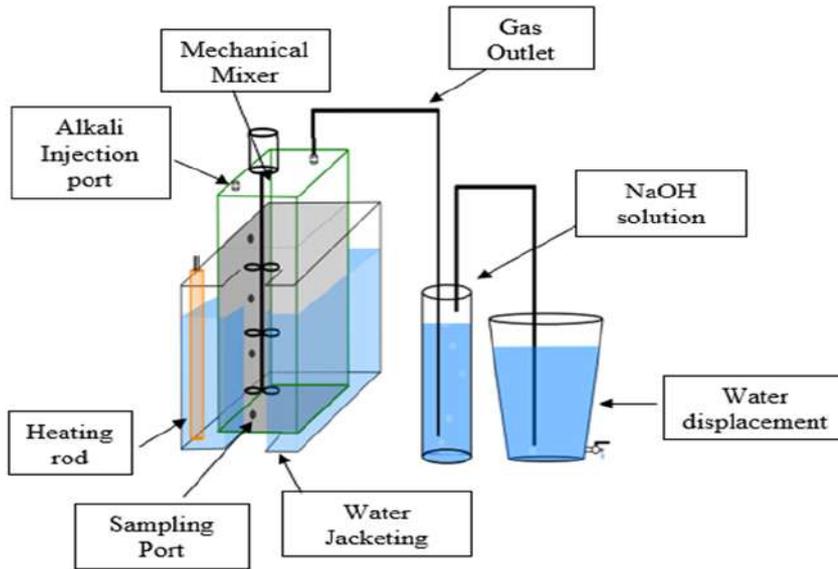


Fig: Schematic diagram of lab scale experimental set up

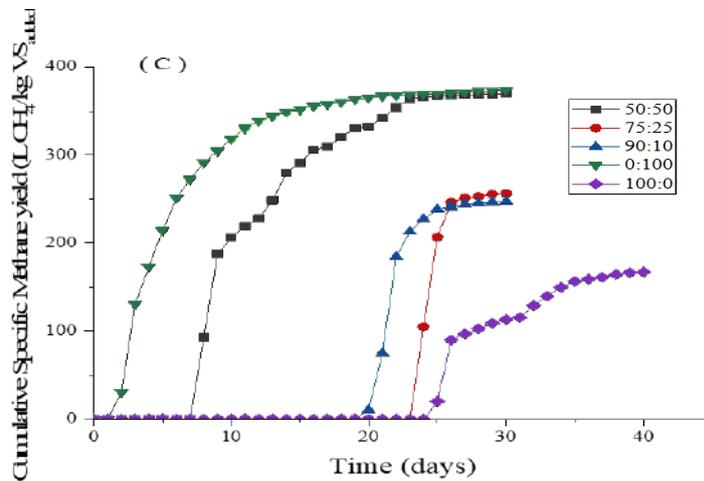


Fig: Cumulative Specific Methane yield (L CH₄/kg VS_{added})

Biography

Dr. Nirav Govindlal Shah is an Assistant Professor in the Civil Engineering Department at the Faculty of Technology & Engineering, The Maharaja Sayajirao University of Baroda, Vadodara, Gujarat, India. With over 20 years of teaching experience, Dr. Shah has made significant contributions to the field of civil engineering through his extensive academic and practical knowledge. His long-standing commitment to education and research has shaped the development of future engineers and advanced the discipline within his institution.



Climate-resilient transport infrastructure planning in Meghalaya: Analyzing geological and hydro-meteorological hazards on the core road network

Ravindra Kumar¹, Rohit Raghubansi² and Prateek Verma³

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²PhD Student ACSIR Ghaziabad and Project Assistant CSIR-CRRI, India

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This paper examines into the critical issue of climate resilience in the context of Meghalaya, India's transport infrastructure, considering the escalating risks posed by climate change-induced extreme weather events. With an anticipated surge in the frequency and intensity of events such as heavy rainfall, floods, and landslides, the vulnerability of the state's core road network is exacerbated. The study specifically explores infrastructure solution to the impacts of geological hazards, including earthquakes, landslides, and rock falls, as well as hydro-meteorological threats like floods, flash floods, storm surges, temperature variations, and wind storms.

Employing advanced GIS tools and a comprehensive road network assessment, the research focuses on the risk assessment of these hazards based on frequency data and mapping. Emphasizing the importance of mobility and accessibility during disasters, the paper assesses alternative road alignments in the event of closures due to heightened vulnerability. This strategic approach ensures continuous connectivity and facilitates swift access to disaster relief, underscoring the pivotal role of transport infrastructure in building climate-resilient communities.

The methodology involves GIS mapping for hazard identification, seismic risk assessments, and the integration of climate-resilient design principles. The feasibility of alternative routes is carefully analyzed, with a goal of minimizing travel time. The paper concludes by offering implementation strategies, emphasizing the need for collaboration with local communities and authorities. By presenting key findings and recommendations, this research serves as a valuable resource for policymakers, engineers, and communities striving to enhance the climate resilience of Meghalaya's transport infrastructure.

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Biography

Dr. Ravindra Kumar holds a Ph.D. from Edinburgh Napier University, UK, and has pursued post-doctoral studies at the Transport Research Institute, UK. Currently serving as the Chief Scientist and Professor at ACSIR, he also holds the position of Head of Information Liaison and Training at CSIR-Central Road Research Institute, New Delhi. Boasting over twenty-six years of experience in the Transport and Environmental sector, Dr. Kumar's notable achievements include contributing to the Urban Road Traffic and Air Pollution Project, which played a key role in formulating the Auto Fuel Policy in India. His extensive research portfolio encompasses topics such as the estimation of fuel consumption in diverse road conditions, idling emissions of vehicles, the impact of expressway construction on pollution, and safety issues in road and transport. Notably, he played a pivotal role in developing social distancing guidelines for public transportation during the COVID pandemic. Dr. Kumar's primary research interests revolve around sustainability analysis and impact assessment of transport infrastructure and mobility. Additionally, he has served as a member of NITI Ayog, providing expertise on the Electric Highway (E-Highway) initiative in India. With an impressive publication record, Dr. Kumar has authored 106 papers in both national and international journals, solidifying his standing as a distinguished researcher and thought leader in the field.

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Enhancing resilience to rural water scarcity through nature-based solutions: A case study of mobilization and development of water sources in the sub-prefecture of Gboguhé, central-west Côte d'Ivoire

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⁴Department of Sociology and Anthropology, Jean Lorougnon Guédé University, Côte d'Ivoire

The shortage of drinking water represents a significant challenge for rural communities. In the Sub-Prefecture of Gboguhé in Côte d'Ivoire, local communities employ various strategies to address these issue. These strategies, characterized by the use of nature-based solutions, focus on the mobilization and development of "water sources." These approaches rely on a profound understanding of local ecosystems, incorporating traditional practices and local knowledge. Thus, from an integrated Bioanthropological perspective, this study examines these novel approaches employed by local communities to tackle the challenge of water scarcity. To achieve this, it employs a qualitative approach for data generation. Data production techniques, such as direct observation, in-depth semi-structured interviews with five village chiefs, and focus group discussions with ten socially representative groups from the surveyed villages, were employed. The findings of this research demonstrate the effectiveness of mobilizing and developing "water sources" in the specific context of the Sub-Prefecture of Gboguhé. Communities have succeeded in overcoming the challenges of water scarcity by integrating nature-based solutions into their daily lives. The study advocates for a holistic approach, combining technical, ecological, and sociocultural elements. The development of water sources involves not only technical interventions to enhance water accessibility but also the preservation of cultural practices related to water management. This ensures local ownership of solutions, thereby reinforcing their long-term sustainability. In summary, this work provides innovative insights into addressing water scarcity in rural areas through nature-based solutions, highlighting the importance of integrating ecological, technical, and cultural aspects in water management. These findings offer essential lessons for the development of policies and practices suitable for other regions facing similar issues.

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Biography

Dr. SERI Jonathan Aser Engelvin was born on December 24, 1994, in Sébraguhé, Gboguhé Sub-Prefecture, Côte d'Ivoire. He holds a Ph.D. in Bioanthropology with a focus on human ecology, awarded by the Félix-Houphouët Boigny University of Cocody on October 18, 2022. Since 2018, he has served as a community development consultant on projects funded by organizations such as Urgence Eau and JICA. Currently, he is a lecturer and researcher at the UFR of Human and Social Sciences at the University of Bondoukou. Dr. SERI is also an associated researcher with the Interdisciplinary Research Group in Environmental Sciences (GRISE) and associated researcher with the Consortium for Adaptation to Climate Change in West Africa (CACCAO). His research focuses on rural development, sustainable water resource management, resilience analysis, adaptation strategies, environmental living conditions, water and sanitation access, and sustainable biodiversity management in sub-Saharan Africa. Beyond his academic pursuits, he is passionate about exploration, travel, and safaris. His guiding principles are diligence, hard work, and dedication.



Climate change impact of water table fluctuations in a shallow aquifer of Tadjenanet region (Mila, North-East Algeria)

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³National Center of Applied Research in Earthquake Engineering (CGS), Algeria

Knowledge of the current and future response of water table fluctuations to climate change is essential to improve water resource management plans at the local or regional scale. The present study concerns the evaluation of water table fluctuations in a shallow aquifer of Tadjenanet region (Mila, North-East Algeria) under the climate change effect. However, a diagnosis on the aquifer's piezometry state was taken over a period of 14 years (2009-2023). For this purpose, we treated the piezometric data available from 2009 to 2023 on 45 water points (boreholes, piezometers and wells) of the study area.

The results of water table fluctuations in a shallow aquifer of Tadjenanet region show a continuous decrease since 2009. This decrease was very weak amplitude of about 8 m, due to the important exploitation of the aquifer. On the other hand, during the period 2016 to 2023, we noted an important drop in the water table level, which is about 40 m due to overexploitation and decrease in the precipitation, in recent years (<500 mm). These Piezometrics data chronicles show clearly the water table fluctuation according to the succession of dry or wet years. Finally, we can conclude that the evolution of water table fluctuations in a shallow aquifer of Tadjenanet region is directly related to the effect of climate change: rainfall variations and overexploitation of the aquifer. On this basis, some recommendations will be outlined for adapting to the consequences of climate change on groundwater and how to maintain these essential resources of the study area: 1) regular hydrogeological and hydrochemical monitoring, 2) prohibit the installation of new boreholes, 3) use of new techniques in the irrigation of crop fields in the region, and finally 4) recharge of the aquifer from wastewater (after tertiary treatment) of the purification stations in the region.

Biography

Dr Radhia LEGRIOUI; She is an Associate Professor Class "B" in Hydrogeology with 4 years of experience (since November 3rd, 2019 to this day) at the University of Science and Technology Houari Boumediene (USTHB) -Department of Geology-Bab Ezzouar, Algiers, Algeria. She graduated from Larbi Tebessi University, Tebessa, Algeria on February 6th, 2019 with Doctorate in Applied Hydrogeology. She was supervisor for 6 Master's thesis in Hydrogeology (2019-2023). Her skills and expertise are Geology, Hydrogeology, Hydrology, Hydrochemistry, Water quality, Water chemistry, Karst, Sedimentary Petrography and Sedimentology. Her goals are to do more research in hydrogeology, especially in the karst area.

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Synthesis and enhanced current-voltage characteristics of carbon nanospheres incorporated porous cobalt metal-organic framework nanoclusters

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²Department of Chemistry, School of Advanced Sciences, KLE Technological University, India

In the present work, novel nanocrystals (NCs) of carbon nanospheres (Cx) (5%, 10%, and 15%) anchored on Co-MOF were synthesized by 4-[[[(1E)-1-hydroxy-3-oxoprop-1-en-2-yl]sulfonyl] benzoic acid as organic linker by a solvothermal method. The synthesized MOFs and have been characterized by X-Ray diffraction spectroscopy, scanning electron microscopy, Brunner Emmett Teller and Fourier transform infrared spectroscopy analysis. Using electrochemical impedance spectroscopy (EIS) and cyclic voltammetry (CV) the supercapacitance performance of the synthesized MOFs was studied. Electrochemical impedance spectroscopy (EIS) study showed I-V characteristics of undoped Co-MOF and CNS (5 wt. %, 10 wt. % and 15 wt. %) doped Co-MOF respectively. The curves with variation in the current gain with voltage, almost linear curve is obtained. As the CNS doping concentration increases non-linearity is seen in case of 5 wt. %, 10 wt. % and 15 wt. % CNS doped Co-MOFs. The non-linearity of the I-V characteristics is due to the presence of carbon nanospheres which shows significant variation in the I-V features. The I-V characteristics significantly varies as the applied current value increased, voltage also varied non-linearly, the shift in non-linear nature of the curve significantly dominated as the wt. % of CNS doping increases inside the MOF. Regardless of the synthetic conditions, we achieved MOFs which exhibited hetero structure formation with spherical morphologies. The results open us new and energy approach for the supercapacitor of the Co-metal based MOFs and applications in the photonics, optoelectronics, and promising electrode material for electrochemical energy storage systems.

Biography

Dr. Santosh S. Nandi working as Assistant Professor, Department of Chemistry, KLE Technological University Dr. M. S. Sheshgiri Campus, Belagavi, India. He has 10 years of research experience. Published more than 20 research articles, book chapters in Q rated high impact factor journals (springer, Elsevier and Wiley etc.). He has published and granted with 7 Indian and international patents. He has attended and presented papers in National and International Conferences. Life Member and Associate Member for many international societies and research institutions. His Research interest includes Material Chemistry, Sensors, Functional Nanomaterials, Synthetic Chemistry, Energy storage devices, Nano electronic devices, Organic synthesis, nanotechnology, etc.

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Assessing the impact of hybrid FACTS devices on the stability of the Kenyan power system

Mutegi Mbae

Kenya Power & Lighting Co. Plc, Kenya

Flexible Alternating Current Transmission System (FACTS) devices have been used for improvement of a power system's stability as standalone devices and as two or more devices for comparative stability studies.

This research sought to take this further by carrying out a simulation that involved pairing up (hybrid) of FACTS devices and studying their impact on voltage, small signal and transient stability simultaneously under various system disturbances.

The simulations were done using five FACTS devices-SVC, STATCOM, SSSC, TCSC and UPFC- in Matlab's PSAT (Power System Analysis Toolbox) grouped into ten pairs and tested on Kenya's transmission network on the loss of a major generator and transmission line.

The UPFC-STATCOM pair performed the best in all the three aspects under study. The settling times were 3 seconds and 3.05 seconds respectively for voltage and rotor angle improvement on the loss of a major generator at normal system operation. The same pair gave settling times of 2.11 seconds and 3.12 seconds for voltage and rotor angle stability improvement respectively on the loss of a major transmission line at 140% system loading. From the study, we developed a performance-based ranking system of FACTS devices as well as a new method of classification of the said devices.

Biography

Dr. Mutegi Mbae is an accomplished Electrical Engineer with over fifteen years of experience, primarily focused on the electricity sub-sector at Kenya Power & Lighting Company Limited (KPLC). He has also worked across several African countries, contributing to various energy initiatives. Currently, Dr. Mbae serves as the Regional Manager for the Mt. Kenya region at KPLC, where he plays a key role in managing power distribution and ensuring reliable service delivery.

His professional interests revolve around research, innovation, universal access to energy, and promoting zero emissions through the adoption of cutting-edge technologies and global best practices in the energy sector. Dr. Mbae holds a Ph.D. in Electrical and Electronics Engineering from the University of Johannesburg, South Africa, which has further enhanced his expertise in the field. With a passion for advancing energy solutions, he remains dedicated to driving sustainable energy systems in Kenya and beyond.



Devonian and Carboniferous conodonts from Mongolia

Uugantsetseg Byambajav and **Ariunchimeg Yarinpil**

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Palaeozoic stratigraphy in Mongolia has been studied for more than 90 years. Conodonts, however, have only been engaged in biostratigraphic analyses during the past 20 years. Our research is considered to fill some of the knowledge gaps surrounding the Devonian and Carboniferous boundary sections.

The Devonian/Carboniferous transition within the Mushgai khudag area is not exposed at the Bayankhoshuu Ruins section which can be explained by thrusting, but in the Murugtsug khudag section upper Devonian conodonts within the lower part were mentioned. In the Shine Jinst area, latest Devonian to early Carboniferous conodonts were reported from the Indert Formation, but none of the previous studies provided conodont images of described taxa. Here we provide new conodont data and biofacies analysis from the lower clastic part, distinguished as Heermorit Member, and the lowermost portion of the succeeding Shombon Member of the Indert Formation at the Tsagaankhaalga-2 and Yamaan Us sections.

A systematic collection of the few marine carbonate-rich levels from the Heermorit Member resulted in a low-diverse conodont assemblage. Conodonts indicating the late *Famennian Bispalathodus ultimus* conodont Biozone are found at the Tsagaankhaalga-2 section. Twelve species in seven genera are identified. The significance and palaeogeographic distribution of the markedly increased occurrence of intergeneric transition forms before and during the late Devonian Hangenberg Event and regionally lacking evidence of the end-Famennian *Protognathodus kockeli* Zone and associated early protognathodid assemblage below the Devonian/Carboniferous boundary were discussed.

Subsequent collection of the lower Carboniferous Shombon Member at the Indert-Uul section resulted in 11 productive samples that yield biostratigraphically important conodonts, fish teeth and ostracods. Although conodonts are poorly preserved in general, 13 species and subspecies are identified. The obtained conodont assemblage allows to distinguish five conodont biozones, from the *Bi. costatus*-*Pr. kockeli* Interregnum (CKI) Zone to the *Siphonodella sandbergi* Zone within an interval from the top of the Heermorit Member to the lower part of the Shombon Member.

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Biostratigraphic investigation of the Indert Formation in the Shine Jinst are resulted in a small conodont fauna indicating the late Famennian *Bi. ultimus* conodont Biozone for the uppermost portion of the Heermorit Member and the early Tournaisian *Si. bransoni* conodont Biozone for the lowermost beds of the succeeding Shombon Member. Microfacies analysis and sedimentological study support correlation of the uppermost 4-20 m of the Heermorit Member with the Hangenberg Sandstone interval. Above deposited Shombon Member limestones are interpreted as post-crisis Hangenberg Limestone equivalent. Due to the lack of index fossils, precise DCB location in southern Mongolia remains unsolved but the DCB seems to be located directly at the significant lithological change which equates with the Heermorit/Shombon member boundary of the Indert Formation.



Biography

Ugantsetseg Byambajav got her PhD from the University of Science and Technology of China and Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences in 2023 and full research at Institute of Paleontology, Mongolian Academy of Sciences. She has more than 10 years of experience in micropaleontology and paleoenvironmental research. Dr. B.Ugantsetseg's research interests are in conodonts, radiolaria and diatom.

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Green evolution in finance: Unveiling the impact of corporate sustainability reports, investor values, and fintech on sustainable investing and financial performance

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Objective: The study explores the Nexus Between Corporate Sustainability Performance (CSP) and Financial Outcomes: Insights from India's NSE Listed Companies

Methodology: This study focuses on the effect CSP on the financial health of mid to large-cap firms on India's NSE between 2010 and 2021. The data related to financial performance, ESG score, and stock performance of the corporate is taken from Bloomberg database. This research divides CSP into environmental, social, and governance (E, S, G) scores to examine their impact on corporate performance.

Findings: The study uncovers the relationship where environmental initiatives, despite their importance, have a negative effect on financial indicators in a developing economy, underscoring the economic costs of such efforts. In contrast, positive outcomes are observed for social and governance engagements. The composite ESG score indicates a complex effect, with negative impacts on some financial metrics but positive on market and stock performance, highlighting a shift towards sustainability in market valuations.

Additional Study Overview:

- The Impact of Social Value Orientation of and Financial Risk Tolerance of investors and SRI Adoption.

This parallel study aims to examine the effects of individuals' social value orientation (SVO), their financial risk tolerance (FRT) levels and the propensity to adopt socially responsible investment (SRI) funds.

- Development of Carbon Credit Procedures Using Fintech

An ongoing project focuses on the development of carbon credit procedures and the application of Fintech technology to monitor carbon credits and transactions. This initiative explores both the opportunities and challenges inherent in integrating technology with sustainability efforts, emphasizing the role of innovation in advancing climate goals.

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Conclusion: Together, these studies and project underscore the multifaceted approach needed to integrate sustainability into financial decision-making and corporate strategy, highlighting the critical role of research in advancing our understanding of sustainable development in the financial sphere.

Biography

Institute of Technology (IIT) Roorkee. With a strong focus on governance, sustainability finance, capital markets, entrepreneurship, and socially responsible investing, she has made significant contributions to the field. Dr. Khanna has successfully supervised five Ph.D. theses and is currently overseeing eight more in progress.

Her research projects include leading a study on the quality of work life of Uttarakhand police personnel, funded by the Indian Council of Social Science Research, and serving as Co-Principal Investigator on a project for tribal development in Chhattisgarh, supported by IIT Bhilai Innovation and Technology Foundation.

Dr. Khanna has published 40 papers in peer-reviewed and reputed journals, reflecting her deep engagement with academic research. Born on October 26, 1974, she continues to play a pivotal role in advancing research and innovation in management studies.



Diversity and distribution of mangrove associated crabs (Infraorder: Brachyura) of India and the relationship between mangroves and crabs

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²ICAR-Central Institute of Fisheries Education, Mumbai, India

³Fisheries Research Station, PVNRTVU, India

India's long coastline harbours an extensive mangrove cover, supporting rich biodiversity. Brachyuran crabs constitute one of the most diverse invertebrate groups in the mangrove ecosystem. In the present study, we have compiled a checklist of 184 brachyuran crabs belonging to 99 genera and 29 families, reported to date from mangroves of India. Mangroves on the East coast of India host 127 species, those on the West coast 83 species, and those on the Islands 54 species. The crabs of mangrove ecosystem form 20% of all the brachyuran crabs reported from various other habitats of India. Two species of crabs, *Nanosesarma sarii* Naderloo and Türkay 2009 and *Neosarmatium malabaricum* (Henderson, 1893) were recorded for the first time during field surveys conducted in the mangroves of Maharashtra. The crab species richness of different coastal states of India showed a positive correlation with mangrove species richness ($R = 0.63$, $R^2 = 0.40$, $p = 0.03$) and with mangrove cover ($R = 0.73$, $R^2 = 0.53$, $p = 0.01$). The present study revealed a high diversity of brachyuran crabs associated with Indian mangroves and also the findings emphasize the importance of mangroves for their existence.

Biography

Sathish Chennuri, in the early stages of his promising career, earned his PhD in Fisheries Resource Management from ICAR-CIFE, Mumbai. His doctoral research focused on the "Study on Mangrove Status and Associated Crustacean Diversity of Dharamatr Estuary, Maharashtra." With a passion for fisheries and climate change issues, Sathish has showcased his dedication through the publication of research findings in esteemed international peer-reviewed journals, with several pending publications awaiting recognition. Currently serving as a Project Scientist at INCOIS, Hyderabad, Sathish is committed to contributing fresh perspectives and innovative solutions to the challenges at the intersection of fisheries science and environmental sustainability. His early career trajectory reflects a proactive commitment to making meaningful contributions to the dynamic fields of fisheries resource management and climate change mitigation.



NH-16 traffic and ozone pollution: Shaping policy and future research

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Ozone (O₃) is a secondary air pollutant in the troposphere. This study aims to assess ground-level ozone (GLO) pollution resulting from traffic activity along National Highway 16 (NH-16) in Kharagpur, West Bengal, India, and distribution of GLO levels at the nearby rural areas of NH-16. It aims to quantify the number of vehicles passing through the area and considers current meteorological conditions to determine the contribution of traffic (vehicle density) to ozone concentration levels. Ozone concentration was measured from 14-23 February, 2023, using a USEPA-approved ozone analyzer (Model; Serinus 10, Make: Acoem, Australia) while traffic counts were manually conducted. A portable weather station (Model: Kestrel 5500, Make: Kestrel Instruments, USA) was used for the measurement of temperature, relative humidity, wind speed, and wind direction. Results showed that high traffic density during morning and evening hours results in lower ozone pollution levels, whereas the opposite trend was observed at noon. The study observed a strong negative correlation ($r = -0.87$) between traffic volume and O₃ concentration. Vehicle speed did not show any influences on O₃ concentration levels. Nearby rural areas of NH-16 have shown high O₃ pollution levels compared to the levels on NH-16 because of local meteorology that shifted wind directions and dispersed O₃ molecules as well as O₃ forming precursors to nearby rural areas. High traffic density and emissions lead to exceeding the O₃ standard value prescribed by WHO 2021 and NAAQS 2009 (100 $\mu\text{g m}^{-3}$). This research provides valuable insights for future studies and policy formulation aimed at addressing GLO pollution concerns in areas nearby national highways in India, as well as to tackle the issues of long-distance and regional ozone transport. The refinement of existing ozone air quality standard is needed, especially considering India's current air quality.

Biography

Samrat Santra, born on June 1, 1995, hails from West Bengal, India. He is currently pursuing his Ph.D. at the Indian Institute of Technology Kharagpur, focusing on ground-level ozone chemistry in a traffic environment under the guidance of Prof. Aditya Kumar Patra. Samrat holds a Master of Science degree in Environmental Science from Visva-Bharati (Central University) and a Bachelor of Science degree in Environmental Science from the University of Burdwan, where he excelled academically. His commitment to environmental research is evident through his proficiency in operating various air quality monitoring instruments. He has presented his work at national seminars and international conferences. He received scholarships for his outstanding academic performance. His research interests include ozone, air quality, and climate change. With a dedication to scientific exploration and environmental preservation, Samrat aims to make significant contributions to the field of environmental science.

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Effects of the Supporting soil behavior on the seismic response of RC moment resisting frames

Samia Louadj, Amar Louzai and Sonia Outayeb

Civil Engineering Faculty, Geomaterials Environment and Development Laboratory (LGEA), University of Mouloud Mammeri of Tizi Ouzou, Algeria

Subsequent analyses of ground motion records achieved during diverse earthquakes in the world, in particular from soft soil deposits, have revealed the considerable consequences of seismic site response on the response of civil engineering structures. The presence of a very soft layer in the soil deposit leads to a stronger increase in the seismic demand of the building and acts as a natural damper for the maximum acceleration at the surface of the soil. The aim of this work is to study the effects of SSI on the seismic response of 3-, 6-, and 9-story RC moment-resisting frames designed according to the Algerian seismic code RPA99/Version 2003 on shallow foundations underlying a very soft soil layer. Emphasis is given to possible effects induced by the nonlinear behavior of the supporting soil on the overall dynamic response of the soil-structure system. Two different constitutive models are considered, including an elastic linear model and an elasto-plastic hysteretic constitutive model for the soil. Seismic response of the buildings is determined using the global method by assuming fixed support at the base of the structure, and when a structure is on relatively soft soil, by using the finite difference code FLAC-2D. The study also extends its scope to assess the impact of the contribution of the secondary modes of vibration of buildings on the seismic response of soil-structure systems, depending on the soil medium's behavior. The results revealed that there is a benefit to be gained, from an economic point of view, by using the dissipative capacities of the plastic soil model to significantly reduce the seismic design forces. However, given the increase in lateral story displacements to which it gives rise and the risk of seismic pounding between adjacent buildings that results, it is important to find a compromise between the economic and safety aspects when designing RC frames with consideration of soil-structure interaction.

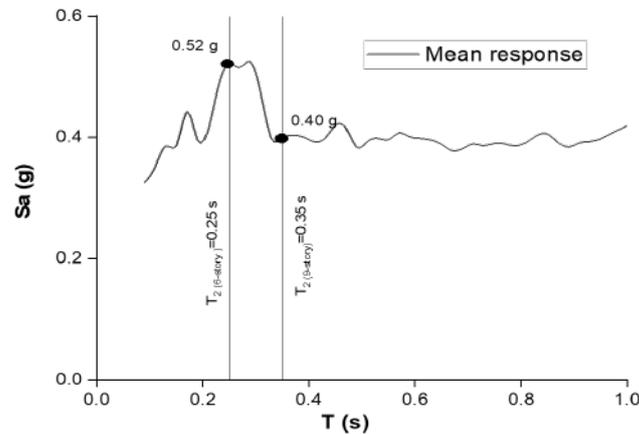


Fig. 1: Mean acceleration response spectra computed at the surface of the elasto-plastic soil model

Biography

Dr. Samia Louadj, a senior lecturer at University of Tizi-Ouzou, earned her Ph.D. in Civil Engineering from University of Tizi-Ouzou in Algeria. With over 15 years of experience in academia, she specializes in Soil Dynamics and Structural Engineering. In addition to her teaching responsibilities, Dr. Louadj is actively involved in research and scholarship. She leads a research group dedicated to advancing the field of geotechnical earthquake engineering and mitigating the risks associated with seismic hazards. Her current research interests include numerical modeling, structural analysis under seismic conditions and numerical analysis of soil-structure interaction effects. Beyond her academic pursuits, she enjoys travelling and hiking.

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The nature of the geomagnetic secular change anomalies revealed in the territory of Armenia

M. Ohanyan and A. Simonyan

Nazarov Institute of Geophysics and Engineering Seismology of the National Academy of Sciences of the Republic of Armenia (IGES NAS RA), Republic of Armenia

The geological and tectonic structure as well as seismic activity of the region under investigation have been analysed aiming to disclose the nature of the geomagnetic field secular change anomalies, revealed in temporal series of the geomagnetic field total vector modulus observational data from the stations “Bavra”, “Gyulagarak”, operated in the territory of Armenia. The study of the geological structure showed that the volcanic lavas formed during different geological periods and possessed higher values of remnant magnetisation, are mainly imbedded in the Earth’s crust of the investigated territory. Strong magnetization of rocks makes auspicious basis for occurrence of piezomagnetic effect, registered as an anomalies of geomagnetic variations while tectonic stress field in the Earth’s lithosphere is changed.

The territory of geomagnetic investigations situated in Ashotsk-Javakhet volcanic upland, is cleaved by the series of faults spread in the Caucasus and anti-Caucasus directions, which stipulate high seismicity of the region. The patchiness of block structure of the territory leads to formation of the complicated system of generated tectonic stresses. It turned out that “Bavra” is located in the area of pressing tensions while in the area of “Gyulagarak” prevail the stretching tensions.

Comprehensive analysis of spatio-temporal features of the geomagnetic field, its secular variations in the light of detected peculiarities of geological, tectonic structure of the Earth’s crust of the investigated territory as well as seismic activity of the region allowed us to disclose that the local anomaly of geomagnetic secular change, revealed during the investigated period in the data of “Bavra” station, is caused by seismic activity of the region and carries the piezomagnetic feature. Though the anomaly revealed in the data of “Gyulagarak” station is of lower power in appearance, by its character it corresponds to stretching tectonic tension field, and must be interpreted as a manifestation of piezomagnetic effect.

Biography

Marine Ohanyan is a dedicated geophysicist with a passion for understanding Earth's magnetic phenomena. Born in Gyumri, Armenia, in 1982. From 1999 to 2004, she pursued her Master's degree at Gyumri State Pedagogical Institute after M. Nalbandyan. In 2005, Ohanyan began her career at the A. Nazarov Institute of Geophysics and Engineering Seismology at the National Academy of Sciences in Armenia, specializing in the Earth Magnetism laboratory. Ohanyan's passion lies in unraveling the mysteries of our planet, particularly in the dynamic field of geophysics. Her commitment to advancing knowledge and understanding Earth's magnetism drives her work, contributing significantly to research in the field.



Permo-Triassic cyclicity on the western shoulder of Muzaffarabad-Hazara paleo-high, during the oceanisation of Neo-Tethys

Tariq Mahmood¹, Naveed Ahsan², Muhammad Armaghan Faisal Miraj², Shaukat Ali³, Saif ur Rahman² and Muhammad Jawad Munawar²

¹Oil & Gas Development Company Limited (OGDCL), Pakistan

²Institute of Geology University of the Punjab Lahore Pakistan, ³Orient Petroleum Inc., Pakistan

The sedimentary record of Permo-Triassic (299 Ma to 201 Ma) is only found on the periphery of the Hazara-Kashmir Syntaxis (HKS), i.e., on the western (central Potwar Sub-basin and its west) and eastern (Zanskar-Spiti Basin) shoulders. During this period, HKS acted as an indentation named as Muzaffarabad-Hazara Paleohigh (MPH), where no sedimentation occurred. Previously, the existence of MPH remained questionable as it has

yet to be defined with the help of an integrated sequence stratigraphic model built by using outcrop, petrography, drilled well, regional correlations, seismic and gravity data sets on its western shoulder.

Permo-Triassic strata outcrop in the western Salt Range, where stratigraphic surfaces, stratal terminations, and their bounding sequences are designed. Permo-Triassic is a mega sequence comprising of two sequences (Permian and Triassic) bounded by SUs. Non-marine (fluvial) Warchha Sandstone split the Permian sequence into two sub-sequences (siliciclastic/clastic and carbonate sequences). The Triassic sequence has the same

depositional architectural features have two sub-sequences. Flooding events (i.e., four MRS/MFSs) influenced every sub-sequence, which developed retrogradational and progradational cyclicity during this period. The defined cyclicity, stratigraphic surfaces, and stratal terminations are validated with the well-log motif cycles and seismic data.

Composite unconformities developed towards the MPH; therefore, only flooding events are correlatable on both shoulders. During the Sakmarian (290 Ma) age, a flooding event with maximum accommodation space (15–20 m) deposited the middle shelf facies (Amb Formation), which is correlatable with carbonates of Panjal volcanics and transgressive Gechang Formation of Zanskar-Spiti Basin. The third flooding event of the Ceratite Bed of Lower Triassic is also correlatable. Flooding continued in Zanskar-Spiti Basin in Middle Triassic, but diastem was observed in the western Salt Range. Carbonates younger than Ladinian (242-237 Ma) age are only found in Zanskar-Spiti Basin, but during this phase, SU truncated the Triassic strata in the Salt Range.

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Biography

He holds a senior position as a petroleum geologist at OGDCL, the largest oil and gas Exploration Company in Pakistan. Specializing in sequence stratigraphy since 2008, he has done his PhD at the Institute of Geology, University of the Punjab Lahore, having previously attained MPhil and MSc degrees from the same institution. With a portfolio encompassing 10 research papers, he extensively analyzes outcrop, seismic and well log data sets using software such as Petrel, DSG, Techlog, ArcGIS, Google Earth, and AutoCAD map. Beyond his professional endeavors, he dedicates his time as a volunteer for GeoHikingClub in Pakistan.

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Environmental DNA (eDNA): An eco-friendly tool for conserving Indian freshwater diversity and how to protect fragile freshwater ecosystems?

Ashish Sahu^{1,2} and Mahender Singh¹

¹National Bureau of Fish Genetic Resources, India

²Faculty of fisheries, Kerala University of Fisheries and Ocean Studies, India

In recent decades, freshwater diversity is declining to different degrees worldwide due to a combination of global changes including anthropogenic activities and climate warming. Currently, fish diversity monitoring become a research hotspot due to the dwindling diversity. In diversity studies, environmental DNA (eDNA) has proven to be a useful tool for the characterization of fish species due to several advantages. e-barcoding of fish communities has become widely adopted for describing, habitat suitability modelling, and predicting the presence of fish in dynamic freshwater habitats. eDNA is an environmentally benign (environmentally friendly), low-cost method that can identify and measure a wide range of taxa from any ecosystem without affecting native species, and habitats. eDNA is short DNA fragments or cellular materials, released by aquatic animals through the skin, urine, feces, mucus, and dead cells into the environment, such as water, air, soil, or sediment. The eDNA is potentially an effective method with next-generation sequencing (NGS) that can read all DNA in parallel at one sequential run. In this review paper, we highlight the concept of eDNA studies, and how fisheries professionals can protect and conserve Indian freshwater diversity by implementing this innovative tool. Additionally, to make a systematic review, we extract the published literature from 2008-2024 from different scientific databases. Given the dramatic increase in eDNA publications over the past decade, this systematic literature review aims to scrutinize the methodological developments in one of the fastest-growing research fields in fisheries.

Biography

Sahu, A., Kumar, N., Singh, C. P., & Singh, M. (2022). Environmental DNA (eDNA): Powerful technique for biodiversity conservation. *Journal for Nature Conservation*, 126325. <https://doi.org/10.1016/j.jnc.2022.126325>.

Sahu, A., Singh, M., & Sarkar, U. K. (2023). Environmental DNA (eDNA) Advancement in Conservation of Indian Freshwater Biodiversity with Future Perspectives. *Aquaculture Spectrum*, 6(9), 47-50.

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Bayesian estimation of the number of species from Poisson-Lindley stochastic abundance model using non-informative priors

Sandeep Kumar², Anurag Pathak¹ and Manoj Kumar³

¹Central University of Haryana, India

²GLA University, India

³University of Delhi, India

Objectives:

The fundamental goal of this research is to estimate the number of species in a certain ecological community using Bayesian approaches. Specifically, we use the Poisson-Lindley stochastic abundance model. We want to obtain these estimates using non-informative priors that exclude any subjective prior knowledge, enabling the data to dominate the outcomes.

Scope:

This research focuses on creating a Bayesian framework for species estimate, using the Poisson-Lindley distribution to model species abundance. The scope includes:

1. Developing the Poisson-Lindley model for species abundance.
2. Applying Bayesian estimating methods.
3. Use non-informative priors to maintain impartiality.
4. Validating the model's performance using both synthetic and real-world data.

Results:

The Bayesian technique using the Poisson-Lindley model yields reliable estimates of the number of species. The key results include:

1. The model accurately estimates the number of species, particularly in cases with dispersed data.
2. Non-Informative Priors: Using non-informative priors leads to estimates that closely match the data without introducing subjective bias.
3. Comparative Performance: The Bayesian Poisson-Lindley model outperforms standard

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approaches like the Chao estimator on datasets with large variability in species counts.

Methods Used:

1. Poisson-Lindley Distribution: Ecological studies often use the Poisson-Lindley distribution to estimate species abundance due to over-dispersed count data.
2. Bayesian Framework: We utilize Bayesian inference to estimate the number of species. This includes:
3. The likelihood function, derived from the Poisson-Lindley distribution.
4. Uniform or Jeffreys priors are examples of non-informative priors, which have negligible impact on the posterior distribution.
5. Markov Chain Monte Carlo (MCMC) uses Gibbs sampling or Metropolis-Hastings to choose samples from the posterior distribution.
6. Validation: The model is evaluated using both synthetic and real-world ecological data.

Conclusion:

In the study, we observed that the maximum likelihood estimation plays an important role in estimating the number of observed species or unobserved species. Intuitively, when there are low coverage fractions i.e. few overlaps of observed species and estimated species, we know that the true number of species is much higher than the observed. On the other hand, if the coverage fraction is high then we are likely to have seen most of the species. Based on this idea, we have proposed a consistent estimator for the number of species, under a P-mixed Poisson-Lindley model. Here the model has low dimensional parameter space then computation became easy. Also, in the parameter space known as hyper parameter or nuisance parameter. For these hyper parameters we have non-informative prior or objective prior i.e. Jeffery's and Bernardo's reference prior, it can be based on one's belief. Both Jeffrey's and Bernardo's reference prior have simple forms in the case when there is only one nuisance parameter, and become increasingly complex as the dimension of the parameter space grows. For the comparison of these considered models based on model deviance criteria in the below Table, PLR has the lesser deviance then we can say that PLR gives a more optimum estimate of the number of species.

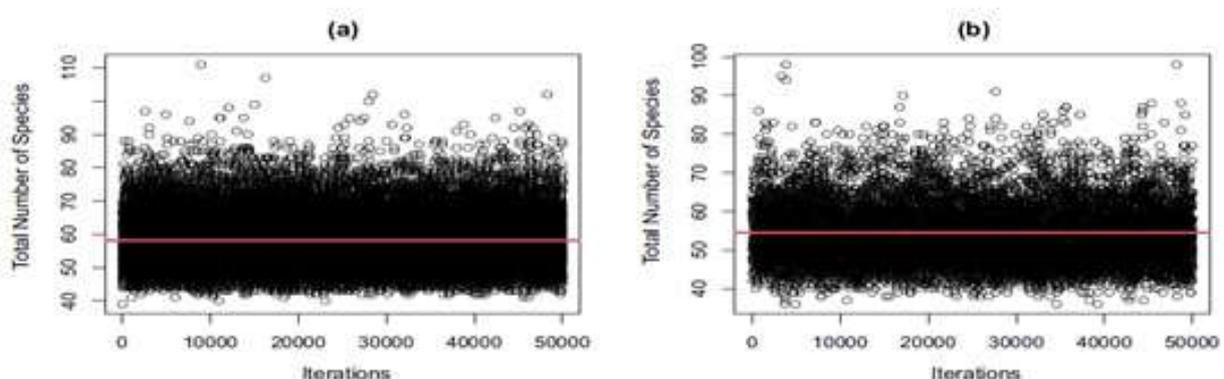


Fig. Trace plot of parameter S with a Jeffery's prior and b Bernardo's reference prior

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Biography

Dr. Sandeep Kumar currently is the Assistant Professor (Statistics), in the Department of Mathematics, Institute of Applied Sciences and Humanities at GLA University, Mathura, Uttar Pradesh (India). He earned his Ph.D. in statistics, from the Central University of Haryana, Mahendragarh, and an M.Phil. in Statistics from Chaudhary Charan Singh University Meerut. His thrust areas are Biostatistics, Bayesian Inference, Lifetime Modelling, and Ecological Modelling. His total number of publications is 15 in reputed journals such as Taylor & Francis, Springer Nature, Elsevier, and many other national and international journals. His research fields are Biostatistics, Reliability Engineering, Bayesian Inference, and Ecological Models. Dr. Sandeep is a Life Member of the Indian Bayesian Society (IBS), Indian Statistical Institute (ISI), Kolkata (India), British Ecological Society (BES), and Indian Society of Industrial and Applied Mathematics, He has been a member of the organizing committee of several international and national conferences, seminars, and workshops. He has received a travel funding offer, for the meeting on stochastic processes to be held March 8-11, 2023, at the University of Arizona in Tucson, Arizona, USA. Recently he delivered a talk at an International Day of Women in Statistics and Data Science on "Towards Empowering Data Sciences: Role of Bayesian Inference Using Ecological Models in Species Ecosystem Management" which is organized by the CAUCUS FOR WOMEN IN STATISTICS AND DATA SCIENCE, USA.



Seismotectonic investigation of a MW 5.1 earthquake and localized stress regime analysis in Siang valley, eastern Himalayan syntaxis

Debonil Baruah, Ashish Pal and Dilip kumar Yadav

Wadia Institute of Himalayan Geology, India

Eastern Himalayan syntaxis is one of the most seismotectonically active zone of the Himalayan mountain belt. Siang valley forms the core of this syntaxial zone. The valley has nested significant number of earthquakes in the past and current times. One such important event reported in 2019 of Mw 5.9. Our research finds its interest when a similar magnitude earthquake of Mw 5.1 has rocked the valley on 10th Nov 2022 having very close epicentral distance from the event reported in 2019. The seismic event was well recorded by local broadband seismograph stations installed in Siang valley with its epicentre located at 28.420N and 94.470E at a depth of 9.4 km, situated near to Main Central Thrust (MCT). We calculated Source parameters for the event which gives a stress drop (Δ) value of 79.95 bar, source radius (r) 1460.78 m and seismic moment (M_0) $6.42E+16$ Nm. This high value of stress drop similar with 2019 event in the Siang Valley region, which generally reported for low values of stress drop in upper brittle crust suggests that the earthquake of 10th November, 2022 is likely rooted to crustal blocks with robust material strength, allowing for high stress accumulation during the earthquake building phase. Further, the focal mechanism solution (FMS) of the event implies that the underlying source fault exhibits a strike, dip, rake value of 262° , 8° , 89° , respectively, exemplifying the typical manifestation of thrust fault displacement along MCT. To acquire a more comprehensive understanding of the local stress conditions, we have performed the iterative joint inversion technique using seven FMS of events recorded within the vicinity of 50 km radius from the main event and conclude that the maximum horizontal stress direction, S_{max} is ESE, which shows compression in that zone of Siang Valley.

Biography

Debonil Baruah is a postgraduate in Geosciences with over two years of project experience in seismology. Driven by a deep curiosity to explore Earth's mysteries, he specializes in seismotectonics studies, focal mechanism solutions, and stress inversion analysis. Debonil is proficient in using tools such as SEISAN, ISOLA, QGIS, CorelDraw, and Grapher for data analysis and interpretation. His expertise extends to curating and processing data from Broadband seismograph stations, and he is skilled in scientific report writing and editing, with a strong command of the English language.

Currently, Debonil serves as a Project Junior Research Fellow (JRF) at the Wadia Institute of Himalayan Geology in Dehradun, India. His ability to work efficiently under pressure and manage time effectively has enabled him to achieve optimal results in his projects. He is committed to contributing meaningfully to the field of geosciences and society through his research.

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Predictive spatial correlation analysis of snakebites of Krishna District, India

Rao P. Krishna Subba

Gayatri Vidya Parishad College of Engineering, Visakhapatnam, India

Infectious diseases in plants can significantly impact economic productivity, particularly in the pulse crops like urdbean, also known as blackgram. These diseases, including Anthracnose, phoma blight, crinkled leaf, yellow mosaic leaf, and hole leaf, can lead to reduced yields and premature death. This study aims to develop a cloud-based intelligent Convolutional Neural Network (CNN) for detecting diseases in blackgram plants to improve the Crop Yield Index (CYI) in India.

The global demand for food security requires innovative solutions in agriculture, particularly in detecting and managing crop diseases and leaf damages. The proposed system utilizes cloud computing and deep learning techniques to enhance the accuracy, speed, and scalability of detecting urdbean leaf diseases. The integration with cloud platforms allows parallel processing and efficient resource utilization.

Timely and accurate disease detection is crucial for maintaining crop yield and economic productivity. This proposed system offers a promising solution, potentially revolutionizing agricultural practices and contributing to food security. The study also discusses the potential of deep learning algorithms in detecting leaf diseases, leaf damages, and Indian snakes' identification.

The study aims to address challenges in agriculture and public health by proposing a solution for detecting blackgram diseases and predicting snakebite prone areas. However, there are still challenges in disaster management and agriculture applications.

Biography

Dr. Pulugurta Krishna Subba Rao was the former Head of the Computer Science and Engineering Department and currently a full professor in the Department of Computer Science and Engineering and Dean of Student Affairs, at Gayatri Vidya Parishad College of Engineering in Visakhapatnam, Andhra Pradesh, India.

Two Ph.D. scholars have been awarded under his direction in research areas such as "A Machine Learning Approach for the Detection and Prediction of Epileptic Seizure Disorder in Children Using EEG Signals" and "Crop Yield Prediction Using Machine Learning Techniques. Five doctoral students are working on their research project, "Enhancing the Network Security By Detection" , under his direction at Jawaharlal Nehru Technological University, Kakinada (JNTUK) is a public university located in Kakinada, East Godavari district, Andhra University at the state of Andhra Pradesh Visakhapatnam.



Application of visualization techniques to the hydrolysis reaction of the hydrogen production process

Chimnaz Shabanova, Mirsalim Asadov and Dilqam Tagiyev

Institute of Catalysis and Inorganic Chemistry MSE, Azerbaijan

Solid hydrides, such as NaBH_4 , LiBH_4 , LiH , MgH_2 , etc., are considered as potential sources of hydrogen as a clean energy source that does not contain carbon [1]. Sodium borohydride (NaBH_4) seems to be a promising candidate due to its high hydrogen (10.8%) content [2].

To optimize the amount of hydrogen obtained as a result of the hydrolysis reaction from NaBH_4 , the digital visualization module [3] was applied in Excel environment using VBA package. Four parameters of the process for hydrogen production were considered for the optimization: the reaction temperature (T), the concentration of the reactant (NaBH_4), the amount of the catalyst (C), and the concentration of the stabilizer (NaOH). The equation of the hydrogen generation rate (HGR) regression model was used from [4].

With approach of response surface methodology, a distribution surface of HGR (object function) values was constructed. To obtain a 2-parameter surface, it was decided to fix the found in [4] optimal value of the parameters T and C, based on considerations of simplicity or priority in establishing input data when conducting experiments: $T_{\text{opt}}/x_1 = 50^\circ \text{C}$; $C_{\text{opt}}/x_3 = 39 \text{ mg}$. The resulting model in the form of a polynomial of 2 variables (1) was used to visualize the optimal area of product yield:

$$f(x_2, x_4) = -6310,338 + 18501,8 \cdot x^2 + 24495,9 \cdot x^4 - 27324 \cdot x^{22} - 26085 \cdot x^{42} - 880 \cdot x^2 \cdot x^4 \quad (1)$$

The program algorithm with included conditional optimization was built on the fulfillment of conditions on the ranges of variables used in the module: $\text{NaBH}_4/x^2 \in (0.3-0.5 \text{ M})$; $\text{NaOH}/x^4 \in (0.3-0.5 \text{ M})$.

As a result a visualized response surface of the HGR data distribution was obtained (Fig. 1). A wide range of options for parameters combination was obtained to ensure maximum product yield. Providing sets of optimal parameters from the optimal region on the response surface minimizes the energy and chemical costs of the experimental studies thus ultimately reduces the cost of the product&process.

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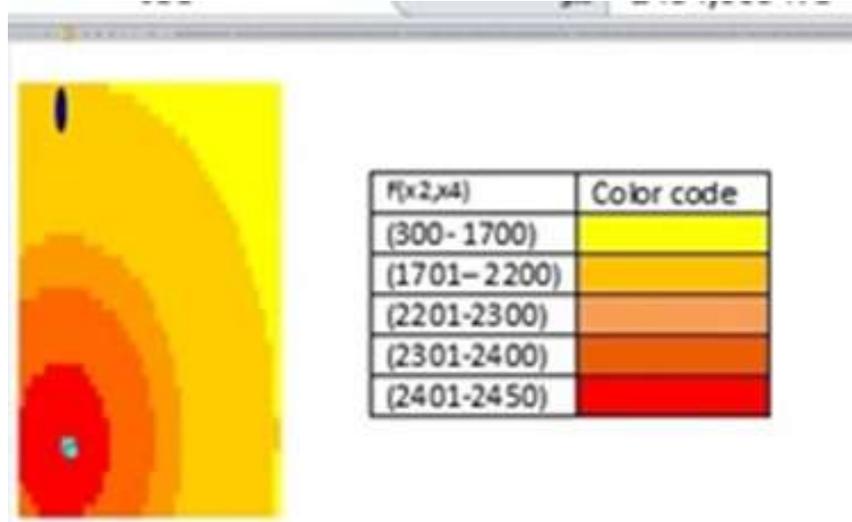


Fig.1 Response surface of distribution of hydrogen generation rate (HGR) data

Biography

Ph.D. candidate, Shabanova Chimnaz MamedZahyd is with the Institute of Catalysis and Inorganic Chemistry Ministry of Science and Education of the Azerbaijan Republic. Having graduated from Baku State University faculty of Mechanics and Mathematics, Chimnaz Shabanova obtained her M.Sc in 1982. Her research interest covers mathematical modeling, optimization and digital visualization of ecological sound chemical-technological processes with the response surface methodology application.



Carbon dioxide sequestration: Direct carboxylation of ethanol amine to linear and cyclic urethane over bi-functional heterogeneous catalyst

Sharda Kondawar¹ and **Chandrashekhar Rode²**

¹School of Basics and Applied Sciences Faculty of Science and Technology Department of Chemistry, JSPM University Wagholi, India

²Chemical Engineering and Process Development Department, CSIR-National Chemical Laboratory, India

The adverse effect of carbon dioxide occurred in past decade on environment, led researchers to use CO₂ as a C1 building block for the synthesis of various commodity chemicals. Most of the drug molecules and polymers have back bone of carbon chain which provides great opportunity to researchers, to make use of CO₂ as an abundant and renewable source of carbon. Chemo-catalytic synthesis of industrially important cyclic and open chain carbamate using amino alcohol/alcohol and amine in presence of CO₂ as carbonylating agent has got much more attention in recent years. This review focuses on the literature survey from 1986 to 2022 on carbamate synthesis and provides clear idea about prerequisite active sites in catalyst for the activation of CO₂ which is a major challenge. The details of mechanism proposed for the chemo-catalytic pathway has been discussed in detail in order to understand and design the novel and efficient catalyst system in near future in this demanding research field.

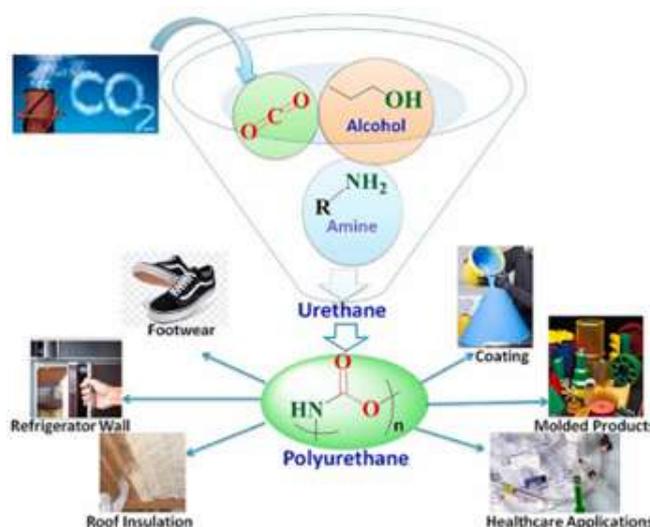
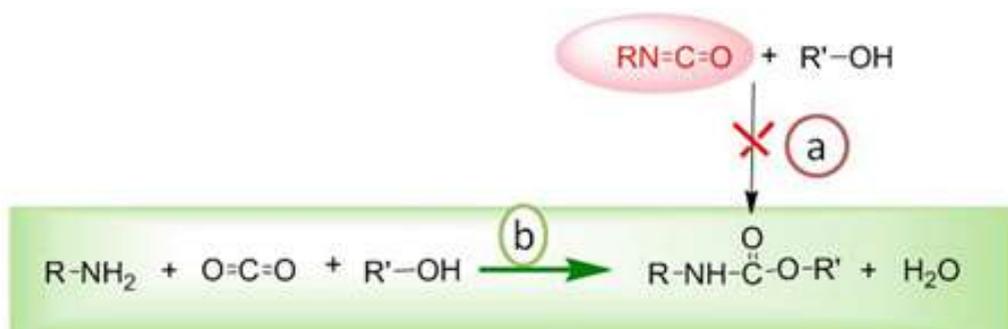


Figure 1. CO₂ utilisation for urethane synthesis.

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Our focus is on catalytic active sites which are taking part in the activation of highly stable CO_2 and mechanistic pathway followed for the carboxylation of amino alcohol to carbamate. Now-a-days, toxic phosgene has been replaced with dimethyl/diethyl carbonate. Whereas use of carbon dioxide as C1 building block in the carbonylation reactions has got much more attention of researchers to develop methodology to exclude use of toxic reagents and to minimise the emission levels of CO_2 into atmosphere as one of the greenhouse gas.

Our focus is on catalytic active sites which are taking part in the activation of highly stable CO_2 and mechanistic pathway followed for the carboxylation of amino alcohol to carbamate. Now-a-days, toxic phosgene has been replaced with dimethyl/diethyl carbonate. Whereas use of carbon dioxide as C1 building block in the carbonylation reactions has got much more attention of researchers to develop methodology to exclude use of toxic reagents and to minimise the emission levels of CO_2 into atmosphere as one of the greenhouse gas.



Scheme 1. Schematic for the synthesis of linear urethane a) using isocyanate, b) using amine and CO_2

Biography

Dr. Sharda Kondawar is an Assistant Professor at the Faculty of Science and Technology, JSPM University, Pune, India. Her research focuses on interdisciplinary studies in heterogeneous catalysis, particularly in converting bio-derived platform molecules into fine chemicals and fuels. With numerous awards and fellowships, Dr. Kondawar has made significant contributions to her field.

She received the International Best Researcher Award in 2022 for her research on Cu-Zn mixed oxide catalysts and has been a CSIR-Research Associate since 2021. Dr. Kondawar also held the prestigious CSIR-Nehru Science Postdoctoral Fellowship from 2019 to 2021.

Her global recognition includes international travel grants from the Department of Science and Technology (DST), enabling her to present at leading conferences in Thailand and France. She also received the Best Poster Award from the Royal Society of Chemistry in 2017. Dr. Kondawar continues to advance her research while inspiring students in the field of catalysis.

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Back to the nature: A tale of reverse migration in India

Subhra Chattopadhyay

Lady Brabourne College, University of Calcutta, India

Scope:

When the Ministry of Health published their daily briefing on the number of deceased and Corona-infected individuals, as well as the breadth of the locked down continued to grow, a silent revolution happened in the minds of young educated urban Indians. It sparked a social conscience for the mother earth. An undercurrent of reverse migration (from urban to rural) has begun. Many of them have left white-collar employment and metropolitan routines to live in villages, where they practise modest, nature-oriented livelihoods. This event refutes the conventional development notion of interwoven lines of industrialisation, urbanisation, rural labour surplus, and unidirectional migration from rural to urban and it also rejects the 'city in fied' concept of agropolitan development.

Objectives:

In this setting, this study seeks to address two questions: who is moving and what causes drive people to relocate from city to village. The study's objectives are to evaluate

1. the demographic characteristics of the actors of reverse migration,
2. the ways they follow to adopt the rural life, and
3. the motivational factors of reverse migration

Methods:

A qualitative research method has been used. A purposive sampling is Followed. Data is collected via phone calls from various parts of the country as well as face-to-face interviews. Dialogues are transcribed, coded, categorised, and then themes are extracted.

Results:

It is noted that mainly educated and well-paid urban residents are the drivers of reverse migration. These people practise sustainable agricultural approaches such as permaculture,

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natural farming, bee keeping, fishing, bio-fertiliser production, and natural animal raising. The research participants are aware of COP28 and SDG30, but these conferences do not sensitise much. The study identifies four themes matching with the motivational variables driving reverse migration, the most important of which is social conscience towards the mother planet.

Conclusion:

Despite all efforts to spread capitalism, profit-motivated economy throughout the world, Indians continue to be more 'social man' than 'economic man'. The confinement and corona-devastation churned the emotions of young, qualified people. Inner sensitivity towards nature becomes the primary motivator for their adoption of a nature-oriented lifestyle in the pursuit of sustainable development.

Biography

Dr. Subhra Chattopadhyay is an Associate Professor of Geography (WBES) in the Higher Education Department of the Government of West Bengal, India. She teaches undergraduate and postgraduate students of Geography at Lady Brabourne College in Kolkata. In addition, she serves as an independent Ph.D. supervisor at the University of Calcutta. Her recently published book, titled 'Man and Manure of the Darjeeling Himalayas,' has been highly appreciated in the academic circle of Kolkata.



Plant extract preparation and green synthesis of silver nanoparticles using *Swertia chirata*: Characterization and antimicrobial activity against selected human pathogens

Muhammad Adnan Shereen, Aftab Ahmad and Hashir Khan

Department of Microbiology, Kohsar University Murree, Pakistan

Herbal medicinal plants have been used for centuries in traditional medicine, and it is interesting to see how modern research has identified the active compounds responsible for their therapeutic effects. The green synthesis of silver nanoparticles using herbal medicinal plants, such as *Swertia chirata*, is particularly noteworthy due to its antimicrobial properties. In the current study, the *Swertia chirata* plant was collected for the first time from the region of Murree, Punjab, Pakistan. After collection, extracts were prepared in different solvents (ethanol, methanol, chloroform, and distilled water), and silver nanoparticles were synthesized by reducing silver nitrate (AgNO_3). The UV-visible spectrophotometer, SEM, and EDX were used to characterize the synthesized nanoparticles in terms of their size and shape. The phytochemical analysis of crude extract was performed to determine the presence of different kinds of phytochemicals. The antibacterial activity of plant extracts and the silver nanoparticles were then assessed using the agar well diffusion method against various pathogenic bacteria. The results showed that the plant contains several phytochemicals with remarkable antioxidant potential. The antibacterial analysis revealed that silver nanoparticles and the plant extracts exhibited a significant zone of inhibition against human pathogenic bacteria (*Escherichia coli*, *S. capitis*, *B. subtilis*, and *Pseudomonas aeruginosa*) as compared to the cefixime and norfloxacin. This implies that the nanoparticles have the potential to be used in nano-medicine applications, such as drug delivery systems, as well as for their antibacterial, antifungal, and antiviral activities. Additionally, the development and application of materials and technologies at the nanometer scale opens possibilities for the creation of novel drugs and therapies. Overall, the study highlights the promising potential of herbal medicinal plants found in Murree, Punjab, Pakistan, and green-synthesized silver nanoparticles in various fields of medicine and nanotechnology.

Biography

Dr. Muhammad Adnan Shereen is a dedicated researcher at Northwestern University, US, and Head of the Department of Microbiology at Kohsar University, Murree, Pakistan. His work emphasizes the characterization and antimicrobial properties of these Plant nanoparticles against various human pathogens. Dr. Shereen's research aims to harness the potential of natural products for developing sustainable and eco-friendly solutions in nanotechnology and Microbiology. His efforts contribute significantly to the fields of medicine and microbiology, offering innovative approaches to combating microbial infections, and therefore, ranked among the top 2% of influential scientists in the world by Stanford University. Throughout his career, Dr. Shereen has demonstrated a strong commitment to scientific excellence, reflected in his numerous publications (40+ articles / 300 IF / 7500 citations) and contributions to the broader scientific community. He holds a Ph.D. and has been actively involved in both teaching and research, fostering the next generation of scientists.

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A comparative analysis of SPEI forecasting models and development of drought prediction framework

Khushboo Jariwala and **Prasit Agnihotri**

Sardar Vallabhbhai National Institute of Technology, India

Drought is a pervasive natural hazard that significantly impacts agriculture, water resources, and ecosystems, particularly in regions already vulnerable to climate variability. With the growing influence of climate change, the frequency, duration, and severity of droughts are expected to increase, posing critical challenges for water resource management and planning. In this context, understanding and predicting drought conditions at a regional scale is essential for mitigating its adverse effects. This study focuses on the Bharuch district, a region prone to drought, where a comprehensive analysis was conducted to identify drought-prone areas and forecast future drought scenarios. Utilizing Indian Meteorological Department, Pune's drought analysis framework, the study employed various predictive modeling techniques, including Long Short-Term Memory (LSTM), Linear Regression, Lasso Regression, Ridge Regression, ARIMA, SARIMA, XGBoost, Holt-Winter, and Prophet, to determine the most effective method for predicting the Standardized Precipitation Evapotranspiration Index (SPEI) across multiple timescales (1, 3, 6, 9, and 12 months). A comparative analysis of these models revealed that the Seasonal Autoregressive Integrated Moving Average (SARIMA) model outperformed others in terms of accuracy. Consequently, a SARIMA-based drought model with parameters (4,1,6) (4,1,6,12) was developed for SPEI prediction. This model was then used to forecast drought conditions in Bharuch for the period from 2022 to 2036. The model's performance was validated using Root Mean Square Error (RMSE) and R-squared metrics, which confirmed its reliability across different temporal scales. The findings of this research provide valuable insights into drought dynamics in Bharuch and offer a robust framework for future drought prediction, contributing to enhanced regional water resource management and planning.

Biography

Khushboo Jariwala is a PhD candidate in Water Resources Engineering specializing in drought analysis and prediction using advanced statistical and machine learning techniques, with a focus on SPEI. Her research applies models like LSTM, Linear Regression, ARIMA, and SARIMA to the Bharuch district in India, aiming to improve regional water management through accurate drought prediction and identification of drought-prone areas. Her work contributes significantly to understanding and mitigating drought impacts.

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Dr. Prasit Agnihotri is a seasoned professor at SVNIT Surat with 28 years of teaching experience in Water Resources Engineering. His expertise lies in geospatial technologies, including GIS, GPS, and Remote Sensing, which he applies to his research on Flood Mitigation and Management. Dr. Agnihotri's research also extends to Hydrology and Irrigation Water Management, where he focuses on leveraging geospatial platforms to enhance water resource management. His extensive experience and dedication to integrating technology with water management have made him a respected figure in the field.

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Spatio-temporal assessment of urban heat Island (UHI) effect in Dehradun, India

Jasmine Parihar¹ and Neelesh Yadav²

¹M.Sc. Forest Research Institute, India

²Scientist-E, Forest Research Institute, India

My study investigates the Urban Heat Island (UHI) effect in Dehradun, India, by analyzing satellite data from MODIS Terra and Aqua, Landsat 8, and Sentinel-2. The research spans from 2010 to 2023, focusing on a consistent one-week period in mid-May each year to minimize cloud cover and capture peak summer conditions, ensuring optimal UHI detection. Using QGIS, UHI effects were mapped across three distinct settings: the Shorea robusta forest, the core urban area of Dehradun, and the Forest Research Institute (FRI) campus.

The results reveal significant temperature disparities between the studied areas. The average daytime LST difference between Dehradun city and the Shorea robusta forest was around 5°C, highlighting the cooling effect of the forest's vegetation. In contrast, the temperature difference between Dehradun city and the FRI campus was only around 1°C, suggesting that even partially vegetated areas offer some mitigation against the UHI effect; however, open areas are still very prone to heating. Notably, nighttime temperatures at the FRI campus were occasionally lower than those in the Shorea robusta forest, further emphasizing that open areas tend to lose heat more quickly.

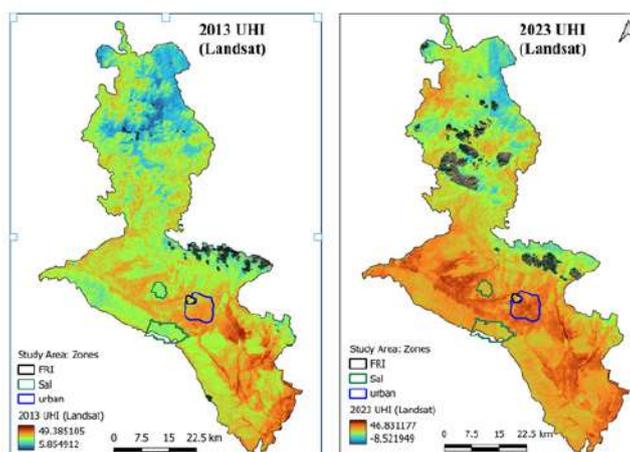


Figure: Daytime UHI map of 2013 and 2023 (using Landsat data)

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The findings underscore the importance of strategically expanding urban green spaces, ensuring they are appropriately vegetated to provide effective cooling and minimize heat retention. It's crucial to avoid leaving too much empty space, as well-planned, continuous green cover, especially with tree species that provide ample shade, can more efficiently mitigate the UHI effect. Additionally, promoting sustainable urban design, enhancing public transportation, raising public awareness, and using Decision Support Systems for urban forestry are vital. The results contribute to a growing body of knowledge on UHI impacts in hilly regions, with implications for urban planning and climate change mitigation strategies.

Biography

Jasmine Parihar is a dedicated professional with expertise in Forestry and Environmental Management. She holds a Bachelor's degree with honors in Forestry from Dr. Yashwant Singh Parmar University, where she developed a strong foundation in silviculture, hydrology, soil science, and wildlife management. Jasmine furthered her education with a Master's degree in Environment Management from the Forest Research Institute, Dehradun, focusing on urban forestry, ecology, climate change, environmental laws, GIS, and the Urban Heat Island (UHI) effect.

Her hands-on experience includes one-month training at the Renuka Forest Division, where she gained practical insights into forest management. Jasmine is also the author of a chapter titled Heat Resilience in Urban Environments: Strategies for Sustainable City Climate Management, featured in *The Climate-Health-Sustainability Nexus* (2024). Passionate about sustainability and environmental improvement, she is committed to utilizing her skills to drive positive change and promote sustainable practices in forestry and urban management.



Role of *Kappaphycus alvarezii* seaweed-based biostimulants in sustainable agriculture

Khanjan Trivedi¹, K. G. Vijay Anand¹, Pradipkumar Vaghela^{1,2}, Alan T. Critchley³, Pushp Sheel Shukla⁴ and Arup Ghosh^{1,2}

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²Academy of Scientific and Innovative Research (AcSIR), India

³Verschuren Centre for Sustainability in Energy and the Environment, Canada

⁴Sea6 Energy Private Limited, India

The indiscriminate or non-strategic use of chemical fertilizers in agriculture can potentially have adverse effects on natural ecosystems due to their harmful impacts. As a cleaner, more sustainable supplementary treatment to minimize the need for synthetic nutrient inputs, seaweed-based biostimulants (phyco[bio]stimulants) are being widely studied to increase agricultural productivity for the burgeoning global population. *Kappaphycus alvarezii*, a fast-growing, tropical red alga widely cultivated for its hydrocolloid content, is a promising source of bioactive compounds that improve plant growth, including imparted tolerance to some levels of abiotic and biotic stressors in harsh environmental conditions. The alga also contains protein, carbohydrates, fatty acids, fibres, algal hormones, polyphenols, and various macro- and microelements. The polysaccharide k-carrageenan, a major constituent of this particular seaweed, also has known plant growth-stimulating effects. Thus, various *K. alvarezii*-based biostimulants are used in agriculture, including liquid extracts and solid formulations which are applied as: drenches, foliarly and seed coatings, or seed soaking. These groups of biostimulants are reported to increase growth, yield, nutrient uptake, and biotic and abiotic resilience, depending on the type of extraction method, concentration of the applied extract, and also timing of the application within the treated plant's growth cycle. This study summarizes various *K. alvarezii*-based products used in agriculture for plant biostimulation, their extraction procedures, application modes, and proposed mechanisms of action. We reviewed the scientific data supporting the use of *Kappaphycus* extracts as biostimulants to enhance crop productivity and quality. Additionally, the beneficial impacts of using *Kappaphycus* extracts on soil health and their potential as a sustainable, adaptive strategy for addressing climate variability is discussed. Several research gaps have been identified to understand the current limitations of the existing knowledge base, and a way forward has been presented to prioritize areas for further investigation.

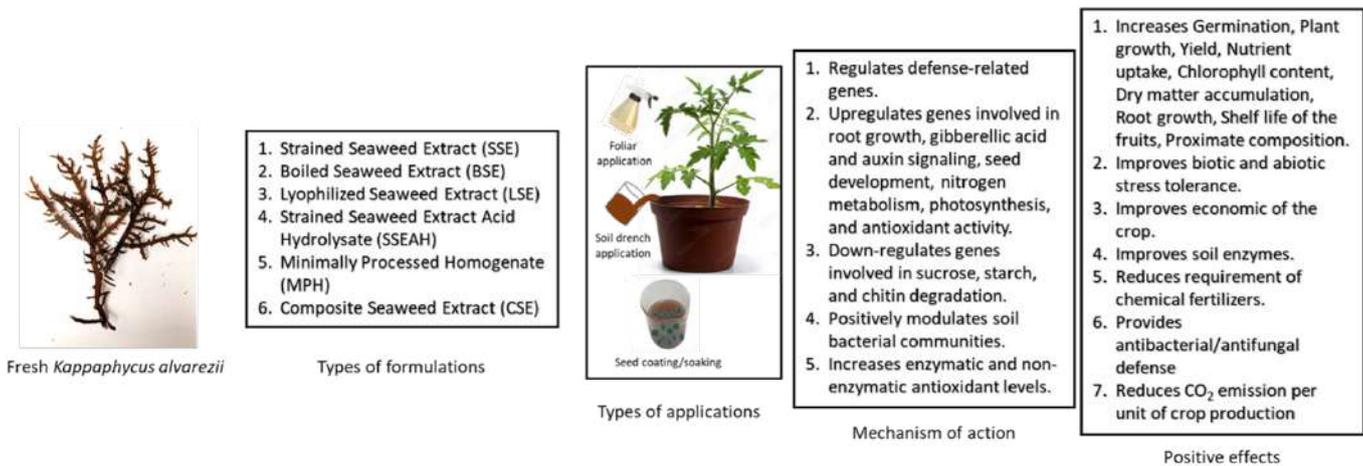


Figure 1: All positive effects of the Kappaphycus-derived formulations on plants as well as the current known mechanism behind these effects.

Biography

Dr. Khanjan Trivedi is currently a Scientist in Applied Phycology and Biotechnology Division at CSIR-Central Salt and Marine Chemicals Research Institute, Bhavnagar, Gujarat, India. Dr. Trivedi has over 10 years of experience in Applied Phycology. His current research is centered around understanding seaweed reproduction biology and seaweed extract’s mechanism of action on plants. He has unveiled biochemical and molecular pathways in maize that was responsible to alleviate drought stress due to an application of seaweed extract. He has also identified the changes in soil microbial community due to an application of seaweed extract. He has over 20 publications in national and international journals to his credit.



Understanding the impact of altitude on the expression of the genes and metabolites in *Artemisia brevifolia* in cold desert, Himalaya

Bilal Ahmad Mir

Department of Botany, North Campus, University of Kashmir, India

High altitude areas like the Himalaya offer the best natural laboratories for studying the ecological responses and adaptive strategies of plants in high-altitude areas like the Himalaya. In these unique mountain regions many gradients coexist on a relatively small spatial scale. Here, we investigate the effect of altitudinal gradient on eco-physiological properties, specialized metabolites (VOCs & Phenolic compounds) composition and pathway genes of *Artemisia brevifolia* in the Ladakh region of Western Himalaya. *A. brevifolia* is adapted to such extremely high altitudes due to its ability to tolerate the harsh climatic conditions. The plant is aromatic in nature and produces large quantity of volatile compounds which might be one of the adaptive strategies towards the herbivores and surrounding competitive plants. We collected samples for all the analyses at four different sites along an altitudinal gradient (2800–5000m). Our results demonstrate a significant difference between soil physico-chemical and eco-physiological parameters along the altitudinal gradient. We observed a significant decrease in the size of the shrub along with the number and size of leaves and inflorescence with increase in altitude. The flowering time at high altitude was observed early compared to low altitude. These variations might be because of harsh climatic conditions, limited available resources and shorter growing season at high altitude. Volatile organic compounds (VOCs) are the main specialized metabolites synthesized and released by aromatic plants. They play crucial role in interacting with the surrounding environment of the plant. Phenolic compounds such as phenols and flavonoids are synthesized as the defense compounds against biotic and abiotic stresses under harsh environmental conditions. We observed that with increase in altitude the number of VOCs particularly low volatile/low molecular weight VOCs increased whereas the concentration remains same. Also the number of most phenolic compounds remains same whereas their concentration decreased with increase in altitude, Caffeic acid and Picein showed significant difference.

Biography

Dr. Bilal Ahmad Mir did his masters in Botany from Savitribai Phule Pune University in 2006 and PhD in Botany from GNDU, Amritsar in 2011. During his PhD Dr. Mir worked on various aspects of medicinal *Withania somnifera*. A new species *W. ashwagandha* was proposed to the cultivated taxon of *W. somnifera* based on multidisciplinary genome diagnostic

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approaches and morpho-chemical and cytological data. Dr. Mir worked as Vice-Chancellors Postdoctoral Fellow at University of Pretoria, South Africa and worked till November 2015. In 2016 Dr. Mir returned India on a prestigious DBT-Energy Bioscience Overseas Fellowship (Re-entry fellowship) and joined at University of Kashmir. Subsequently Dr. Mir was appointed as Assistant Professor at University of Kashmir. Dr. Mir published his findings in internationally acclaimed research journals with high impact e.g., Trends in Biotechnology, Industrial Crops and Products, Scientific Reports, Phytomedicine, Phytochemistry, Physiology and Molecular Biology of Plants, Functional & Integrative Genomics, South African Journal of Botany, Environmental Pollution, Frontiers in Cell & Developmental Biology, Frontiers in Ecology and Evolution & Current Topics in Medicinal Chemistry etc (please see the CV for complete list of publications). Dr. Mir is awarded with a number of national and international fellowships and awards such as Bioenergy Awards for Cutting Edge Research (B-ACER) by DBT-IUSSTF, DBT-Energy Bioscience Overseas Fellowship by DBT, Govt of India, Prestigious Vice-Chancellors Postdoctoral Fellowship by University of Pretoria, Prestigious Freestanding Postdoctoral Fellowship by National Research Foundation, South Africa, Dr. D.S. Kothari Postdoctoral Fellowship by University Grants Commission and INSA Visiting Scientist Fellowship by INSA DST and SPR Young Scientist Award in Botany in 2021 by Society for Plant Research, India. Recently I was elected as the Fellow of International Society for Development & Sustainability (Japan) on December 19, 2021 and Member Royal Society of Biology (London, UK) on July 01, 2021. In addition to this I am currently sitting in the editorial board of various national and international journals (CV for perusal).

Dr. Mir has recently shifted his research to chemical ecology and to understand the role of altitude on the plant adaptation in Ladakh region of Western Himalaya. His research group has identified an elite chemotype of *Artemisia brevifolia* that accumulates higher content of artemisinin and santonin from Ladakh region.

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Urban flood management: Synergy between mitigation and adaptation

Ashish Kumar Srivastava

Government of Uttarakhand, Civil Secretariat, India

Cities are very prone to disasters due to high population density, built-up areas, and environmental degradation. Cities are generally unplanned due to organic growth. Flood is one of the most frequent disasters in the cities world over. Himalayan cities are doubly exposed due to heavy rainfall and loose soil strata. Due to the fragile ecosystem of the Himalayas, cities face riverine floods, flash floods, and landslides every year. Disaster Management Act 2005 mandated all the districts in India to formulate disaster management plans, which are more focused on mitigation efforts to avoid such risks. Mitigation efforts are primarily focused on engineering interventions like the construction of flood walls, levees, retaining walls and check dams. Such accommodated engineering resilience results in safety from the floods, but may fail in extreme flood events as happened in the 2013 flash floods known as the Himalayan Tsunami. This extreme climate event revealed many shortcomings in urban planning like construction in river beds, blockage of natural drains, encroachment in flood plains, depletion of green cover, etc. The community was not aware of how to deal with such catastrophe because the community was not exposed to flood management due to engineering resilience. Thus it is not more, than equally important to have ecological resilience in the cities like protecting flood plains, increasing the permeability of the city, plantation of trees in flood plains, and exposing communities to minor flood events. Urban planning must thrive in blue and green cities with a proper synergy between mitigation and adaptation to avoid major devastation in extreme flood events.

Biography

Ashish Kumar Srivastava is a member of the IAS, having more than 12 years administrative experience. He has a doctorate degree from Banaras Hindu University. He is a recipient of many national and state level awards including National e-Governance Awards two times and Chief Minister Award of Excellence and Good Governance four times. His interests include smart urban infrastructure and sustainable cities. He has also received Joint Japan World Bank Graduate Scholarship to pursue a Masters' from Institute of Housing and Urban Development Studies of Erasmus University, Rotterdam, the Netherlands.



Pollution load index of heavy metals in the flood affected areas of Pakistan: Case study of 2022 super flood

Nida Gul¹, Nazish Huma Khan¹, Nasir Mehmood¹, Muhammad Uzair¹, Salma Kiran¹, Ubaid Ullah¹ and Taufiq Nawaz²

¹Department of Environmental Sciences, University of Swabi, Pakistan

²Department of Biology and Microbiology, South Dakota State University, USA

The current study aimed to assess the impacts of 2022 flood in terms of Heavy metals (HMs) contamination in different environmental media of flood affected districts. For this purpose, sixty (60) representative samples including surface and groundwater sources, agricultural fields, and sediments were collected from the districts of Charsadda and Nowshehra. Samples were analyzed for different parameters such as pH, Total Dissolved solids (TDS), Electric Conductivity (EC), and HMs including Cadmium (Cd), Chromium (Cr), Copper (Cu), Lead (Pb), and Nickel (Ni). HMs in the drinking water samples from Charsadda and Nowshehra were found in the decreasing of Pb > Ni > Cr > Cd > Cu. Concentrations of the Cd and Cr were found multi-times higher than the safe limits suggested by WHO, and USEPA. Similarly, the levels of Pb were also at the alarming level especially in the drinking water of Charsadda where it ranged from 45 to 1150 µg/L. Sediment collected from River Kabul at Charsadda showed significant contamination of Cd, Cu and Pb, while Cr and Ni were high in samples from Nowshehra. Pollution Load Index (PLI) values for agricultural soils in Charsadda and Nowshehra were 8.7 and 6.7 respectively, which confirmed the high level of contamination and ecological risk. In case of sediment samples the obtained PLI values were 9.5 and 8.1, again attributed to the elevated levels of HMs accumulation. No significant correlation was found among the metals which indicated contribution from multiple sources. Elevated levels of the HMs can be attributed to the deposition by recent floods.

Biography

As a highly motivated and accomplished researcher with a Ph.D. in Environmental Sciences and a solid background in Environmental Chemistry. She completed her Ph.D in 2018 from the Department of Environmental Sciences, University of Peshawar, Pakistan. Her dissertation topic was "Sorption and Risk Assessment of Selected Dioxins", with basic aim of studying the sorption/desorption behavior of Dioxins in the local soils and their leachability potential. Her research experiences include the Heavy metals and Dioxins contamination in the Environmental Media and their impacts on Human health and ecological systems. She has published Sixteen (16) research articles in various international journals. Luckily she have completed a project on Heavy metals contamination in the Surface water and sediments of the River Indus, which was funded by Higher Education Commission, Pakistan. This activity strengthened her project management skills from inception to completion



The role of minor cereals in food and nutrition security: Constraints to sustainable production

Md. Rafiqul Islam¹, Md. Abiar Rahman² and Asif Reza Anik³

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³*Department of Agricultural Economics, Bangabandhu Sheikh Mujibur Rahman Agricultural University, Bangladesh*

Minor cereals are becoming increasingly important for global food security because of their high nutritional content and resilience to environmental challenges. In unfavourable ecosystems, these crops frequently exhibit better potential than the major cereals. Among minor cereals, foxtail millet (*Setaria italica*), proso millet (*Panicum miliaceum*), barley (*Hordeum vulgare*), pearl millet (*Pennisetum glaucum*), and oats (*Avena sativa*) are gaining popularity in Asian nations due to the adverse impact of climate change on major cereals like rice, wheat and maize. In South and Southeast Asia, minor cereals have long been grown on a small scale, but little is known about their growth, yield, and potential for area expansion. In Bangladesh, a study evaluated the status and potential of minor cereals using secondary data, GIS mapping, and structured survey questionnaires. The current yield of minor cereals is low, around 2.0 t ha⁻¹. The crops are mostly grown on marginal lands formed by river siltation, locally called char lands. Minor cereal farmers take advantage of the low production costs, including inputs, relatively simple cultural practices, and minimal risks of crop loss from natural hazards to grow minor cereals. The main factors limiting the large-scale cultivation of minor grains are poor yield levels, a lack of high-yielding varieties, and production technology. Strengthening research to develop high-yielding, climate-resilient varieties of minor cereals and improved agronomic management methods and raising farmers' awareness about their nutritional value and economic benefits will be needed to ensure their sustainable production and extension. A strong collaborative network between researchers, extension agents, policymakers, and farmers would be effective in developing and implementing government policies for the sustainable production of minor cereals.

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Biography

Md. Rafiqul Islam received his Ph.D. degree from the Bangabandhu Sheikh Mujibur Rahman Agricultural University (BSMRAU) in 2003. He is currently a Professor of Agronomy and Director of the Institute of Climate Change and Environment (ICCE), BSMRAU, Bangladesh. Dr. Islam has a strong background in teaching and research in agronomy, land and crop management, and climate change. He is a leading researcher at the BSMRAU in fields including NRM, eco-physiology, environment, and farming systems, and has skills in ecosystem management, remote sensing, and GIS in agriculture. He supervised more than 50 MS and 6 PhD students and published about 90 research articles, reviews, books, and book chapters. Dr. Islam serves as an external peer reviewer for many reputed international journals. He has participated in various international projects, including APN (Japan), NSF (USA), FAO (Italy), PR & D (Philippines), DANIDA (Denmark), and has attended many international conferences as an invited speaker.

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Carbon footprint reduction: Tracking the journey of a sustainable renewable energy enterprise in Europe

Santanu Roy¹ and **Mohammed Arshad Khan²**

¹ICFAI Business School (IBS), The ICFAI University, India

²Publicis Sapient, UK

The total amount of greenhouse gases, especially carbon dioxide that are emitted directly or indirectly - by an individual, organization, event or product - throughout its lifecycle, comprises carbon footprint on our earth. The extent of carbon footprints contribute to climate change, and therefore, an understanding of the carbon footprint is crucial for organizations that are committed to sustainability. One of the major factors influencing carbon footprint comprises the energy sources underlying the criticality of the promotion of renewable energy such as solar energy. The work reported probes into the aspect of renewable energy in the continent of Europe and presents a case of a renewable energy enterprise located in United Kingdom. Data indicates that corporate power purchase agreements (PPAs) for renewable energy in Europe had hit a record of 10.4 GW in 2023, a significant growth from the 6.7 GW of deals in 2022 (RE-Source). Europe solar photovoltaic (PV) market size was valued at USD 37.37 B in 2023 and is expected to register CAGR of around 7.1% from 2024 to 2032. The Company, Alten Solar, started functioning in the year 2022. The Vision of the Firm is reduction of carbon footprint for embracing a cleaner tomorrow and its Mission is to save Planet Earth. Alten Solar primarily works on the design, procurement, installation, commissioning and management of end-to-end solar PV systems; maintenance, repairs as well as operation of existing installations; and comprehensive 360 degree audit based on walk-through energy audit, targeted energy audit and detailed energy audit. Till date the firm has commissioned 45+ MW capacity projects and a further 70+ MW capacity projects are currently under process with a range of 10 KW to 4800 KW per unit. The successfully implemented design, installation and maintenance projects include a 4.8 MW solar PV installation for Indian Railways and a 14 KW solar PV installation at Leicester, United Kingdom. The path initiated is challenging but immensely enriching.

Biography

Prof. (Dr.) Santanu Roy is currently serving as the Director, ICFAI Business School (IBS) Dehradun, India. He is a Chartered Member, CILT, UK. He is a Ph.D., Industrial Engineering & Management, IIT Kharagpur, and holds an M.S. Degree from IIT Delhi. Dr. Roy is a Member of the Executive Committee of the Association of Supply Chain Professionals (ASCP), India. He has been a Corporate Trainer for companies such as HINDALCO, ONGC and CPWD in India, and for companies such as the Landmark Group, Choithrams, and Redington Gulf FZE, in Dubai, UAE. Dr. Roy was an ERASMUS MUNDAS Teaching Fellow (European Commission) at Fontys University of Applied Sciences, Eindhoven, the Netherlands. He was a recipient of Best Paper Awards at 14th International Entrepreneurship Forum (IEF) Conference, 16th -18th September 2015, Cape Town, South Africa, and 35th Institute for Small Business and Entrepreneurship (ISBE) Conference, 7th -8th November 2012, Dublin, Ireland.

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Towards achieving university sustainability! Linking social responsibility with knowledge sharing in higher education setting

Muhammad Haroon Shoukat

Department of Management Sciences, COMSATS University Islamabad, Pakistan

Corporate social responsibility is a developing approach that any organization can implement for sustainability. Higher education institutions (HEIs) are implementing this strategy in the current climate to improve their quality of education and sustainability, which aligns with the UN Sustainable Development Agenda for 2030. The current research examines the critical role of university social responsibility (USR) in sustainable knowledge sharing via the mediation effects of collaborative climate and entrepreneurial orientation. We obtained our dataset from 456 public and 605 private university students. SmartPLS4 findings showed that USR significantly affects collaborative climate, entrepreneurial orientation, and sustainable knowledge sharing. The multi-group analysis results show that collaborative climate and entrepreneurial orientation partially mediated the USR-knowledge-sharing linkage in favor of private university students. This paper provides useful information for policymakers within HEIs.

Biography

Muhammad Haroon Shoukat is a researcher in sustainability and tourism and hospitality management at COMSATS University, Pakistan. He received his Master of Science in Management Sciences (Marketing). His research interests include environmental sustainability, green HRM, the adoption of digital technologies, and influencer marketing. His research work has been published in the Journal of Cleaner Production, International Journal of Sustainability for Higher Education, Sustainability, Journal of Hospitality & Marketing Management, and Journal of Marketing for Higher Education.



Nyiragongo (DRC) volcanic eruption of May 22, 2021: Petrography of lava flows, seismicity and geothermal data relating to pre and post-eruptive periods

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¹Goma volcano Observaatory, DR Congo

²University of Dschang, Cameroon

³University of Manono, DR Congo

Nyiragongo is one of the eight volcanoes of the Virunga volcanic chain located in the western branch of the East African Rift, more specifically in eastern Democratic Republic of Congo (DRC). The volcano's lava flows pose a threat to the city of Goma. Here we present seismographic, geothermal and petrographic data related to the May-June 2021 unrest and eruption of Nyiragongo. The methodology includes acquisition and processing of satellite images for mapping processing, seismographic data processing provided by the seismic network of the Goma Volcano Observatory, thermometric data processing. These were collected by thermal sensors placed in volcanic fissures on the southern flank of Nyiragongo volcano. The second part of thermometric data were provided through MODIS satellite image. For this case, the model of Coppola et al. (2020), which links volcanic radiative power with the size of the pixel alerted to the thermal anomaly was used. Seismicity was low prior to the eruption, with a daily average of 11 earthquakes from January 1 to May 22, 2021, the day of the eruption. Seismicity increased on May 22 2021, when the eruption began. During May 23 to September 28, 2021 the daily average number of earthquakes rose from 11 to 57 with the daily number of detected earthquakes peaking between May 22 and June 3, 2021. Prior to the eruption, there was a moderate increase in ground temperature at the southern sites from February 27 to June 15, 2021; but stability at the northern sites close to the volcano, and a constant radiant heat output from the crater. After the eruption, ground temperatures dropped from 23.5°C to 22.8°C; 23.7°C to 21.9°C from June 12 to June 20 2021 at the southern sites and from 26.0 °C to 24.5°C from May 26 to May 30 2021 at northern sites. The lava is foiditic and glassy, with a low phenocryst content. The mineral contents are: clinopyroxenes, plagioclases, nepheline and haüyne.

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Biography

Mumbere Mutima Yves is a young volcanologist affiliated with the Goma Volcano Observatory in Eastern DR Congo. The observatory focuses on monitoring the Nyiragongo and Nyamulagira volcanoes and predicting potential eruptions. Mumbere's role involves studying the active Virunga volcanoes, analyzing their dynamics through seismology, and delivering scientific communications on volcanic activity.

He holds a Master's degree in Endogenous Petrology from the University of Dschang, Cameroon, and a Bachelor's degree in Mining Exploration from the University of Goma, DR Congo. With nearly three years of experience in geoscientific research, Mumbere has specialized in monitoring active volcanoes in eastern DRC.

In addition to his research expertise, he possesses strong skills in teaching, teamwork, critical thinking, analysis, and adaptability. Mumbere is committed to advancing volcanological research and contributing to the safety and preparedness of communities near active volcanic regions.

Virtual Event

3rd Global Summit on Advances in Earth Science and Climate Change

SEPTEMBER 26-27, 2024



Climate change inculcate crop loss and livelihood- a case of drought in Bangladesh

Md. Shafiqul Islam

Department of Environmental Science, International University of Business Agriculture and Technology, Bangladesh

Purpose: Crop loss is linked with drought and the consequences. Drought damage the crops and make losses to the people and make them vulnerable in different channels similarly other disasters. The work has been carried out in the Northwest region of Barind in Bangladesh to explore relevant issues may lead crop damage by frequent drought.

Methodology: Various methods were used in this study to gather both qualitative and quantitative information along with primary and secondary sources. Survey was conducted using semi-structured questionnaire with the sample population. Few selective case studies were made to obtain more information on crop loss and drought. In this study, Ordinary Least Square technique was utilized.

The model of crop loss:

$$C = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_4 X_4 + \alpha_5 X_5 + \alpha_6 X_6 + \alpha_7 X_7 + \alpha_8 X_8 + \alpha_9 X_9 + \mu_1$$

Findings: The study found that income of the households, their age, sex and migration have no significance influence on crop production and loss. Other variables such as frequency of drought study areas, sustenance, livelihoods and agricultural land have the significant influence. It was mentioned by the households that frequency of drought is increasing during the study period. Result indicates the significance relationship between drought frequency and crop losses. Few adaptation measures like re-sowing, early sowing, late planting can reduce crop loss. A wide range of alternatives for livelihood activities such as small business, van pulling, handiworks and raising of seedlings for nursery business were identified.

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Biography

Associate Professor Dr. Md. Shafiqul Islam completed his Postdoctoral Fellowship from London School of Economics and Political Science (LSE), UK. He did his PhD in Disaster Management from University of Dhaka. His contributions reach the development sectors over two decades in the field of education, research, consultancy and training. He provided research focus on sustainable development, gender equality and women empowerment, environmental extreme management, climate change adaptation, social ecological resilience, soil and water management in agro ecosystems, pollution and waste management. He wrote 5 single author's book and reviewed many book chapters, journal articles, published 14 book chapters, and over 40 peer-reviewed articles. Taylor and Francis, Routledge, Apple Academic Publishing, Springer Nature, Springer, Green Leaf Publishing, IGI Global Publication are the few publishers of his innovative research. Currently he is working at the International University of Business Agriculture and Technology. Dr. Islam contributed UN Sustainable Development Report 2016. Dr. Islam conducted social and environmental impact assessment for many projects. He worked with many universities, NGOs and donor funded projects including DFID, USAID, WB, European Union and NETZ.



Vis-NIR spectroscopy based rapid and non-destructive method to quantitate microplastics: An emerging contaminant in farm soil

Namita Das Saha¹, Priyanka Kumari¹, Bappa Das², R. N Sahoo³, Rajesh Kumar⁴, Debasish Golui⁵, Bhupinder Singh¹, Niveta Jain¹, Arti Bhatia¹, Anita Chaudhary¹, Bidisha Chakraborty¹, Arpan Bhowmik⁶, Partha Saha⁷ and Sadikul Islam⁸

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³Division of Agricultural Physics, ICAR-Indian Agricultural Research Institute, India

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⁶ICAR-Indian Statistical Research Institute, India

⁷Division of Vegetable Science, ICAR-Indian Statistical Research Institute, India

⁸ICAR-Indian Institute for soil and water conservation, India

Microplastics (MPs) have been identified as the second most important environmental issue and can potentially enter into food chain through farmland contamination and other means. There are no standardized extraction methods for quantification of MPs in soil. The embedded errors and biases generated serious problems regarding the comparability of different studies and leading to erroneous estimation. To address this gap, present study was formulated to develop an efficient method for MPs analysis suitable for a wide range of soil and organic matrices. A method based on Vis-NIR (Visible-Near Infra Red) spectroscopy is developed for four different soil belonging to Alfisol, Inceptisol, Mollisol and Vertisol and two organic matter matrices (FYM and Sludge). The developed method was found as rapid, robust, reproducible, non-destructive and accurate method for estimation of all three-density groups of MPs (Low, Medium and High) with a prediction accuracy ranging from 1.9 g MPs/kg soil (Vertisol) to 3.7 g MPs/kg soil (Alfisol). Two different regression models [Partial Least Square Regression (PLSR) and Principal Component Regression (PCR)] were assessed and PLSR was found to provide better information in terms of prediction accuracy and minimum quantification limit (MQL). However, PCR performed better for organic matter matrices than PLSR. The method avoids any complicated sample preparation steps except drying and sieving thus saving time and acquisition of reflectance spectrum for single sample is possible within 18 seconds. Owing to have the minimum quantification limit ranging from 1.9-3.7 g/Kg soil, the vis-NIR based method is perfectly suitable for estimation of MPs in soil samples collected from plastic pollution hotspots like landfill sites, regular based sludge amended farm soils. Additionally the method can be adapted by small scale compost industries for assessing MPs load in product like city compost which are applied at agricultural fields and will be helpful in quantifying possible MPs at the sources itself.

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Biography

Dr. Namita Das Saha has significantly contributed in the field of Environmental Science. She did her Doctor of philosophy in the research area on Assessment of climate change variables on bacterial pathogenesis of soft rot in tomato plants. The bacterial quorum sensing mediated pathogenesis response under elevated CO₂ and temperature was assessed. Dr. Namita Das Saha is having nearly 10 years of teaching and research experience in Environment, climate change and microbial application to solve different environmental issues. She has attended many International and National seminars and she is a life member in many Professional Bodies viz. Indian Science Congress Association (ISCA), Soil Conservation Society of India (SCSI), NESAC and SADHANA. She presented many research papers in national and international conferences. Her field of interest is developing microbial interventions for greenhouse gas mitigation from agricultural soil, reducing Ozone stress in plants by Plant Growth Promoting Microbes and assessing recently emerging microplastics pollution in soil. Dr. Namita Das Saha has published many research articles, book chapters, training manual chapters and many popular articles in reputed National and International journals.

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Climate change in South Asia and its impacts on Pakistan: Causes, threats, and measures

Muhammad Naeem Javed

Department of Media & Communication Studies, Emerson University, Pakistan

Climate change is an emerging challenge for the entire South Asia. Today, climate change has become one of the greatest threats to the development and welfare of human beings. Climate changes are predicted to have very harmful effects on human and natural systems, i.e., floods, droughts, rain, and thrilling weather conditions, lower agriculture productivity, migration, and clashes due to declining resources. When these environmental changes affect the natural system, the quality of life of all living things is affected, either indirectly or directly. Due to the systemic effects of climate change, Pakistan frequently suffers from global warming, water scarcity, agriculture and food security, and natural disasters. The present study explores how climate change has affected South Asian countries, especially Pakistan, what outcomes may appear in the future due to climate change in this region, and what preventive measures should be adopted by the government. There is a need for government administration to tackle climate change and protect natural resources in the interest of future generations.

Biography

Dr. Muhammad Naeem Javed is currently an assistant professor and head of department at Emerson University Multan, Pakistan, and he completed his post-doctoral research fellowship in the department of media and communication studies at the University of Malaya, Malaysia. In the past, he also served as chairperson and associate professor in the Department of Mass Communication at Lahore Leads University, Pakistan. He holds a master's in mass communication from Bahauddin Zakaria University and an M.Phil. and Ph.D. in media studies from Islamia University of Bahawalpur, Pakistan. He has over 13 years of research and teaching experience, supervised over 35 graduate students' postgraduate students, and published 23 research papers in national and international journals. Naeem has supervised over 34 graduate students and research projects, focusing on climate change, global warming, environmental sustainability, water scarcity, print and social media, climate communication, and agriculture and food security.



Understanding spatio-temporal dynamics and driving factors of grasslands in a Ramsar site

**Ravindra Nath Tripathi, Umama Khan, Neelamadhav Sahu, Revan Cahudhary, Ruchi Badola
and Syed Ainul Hussain**

Ganga Aqualife Conservation monitoring Centre, Wildlife Institute of India, India

This study investigates the spatiotemporal dynamics and driving factors of grasslands within Haiderpur Wetland, a Ramsar site of international significance and a part of the Hastinapur Wildlife Sanctuary. Employing remote sensing data and GIS techniques, we scrutinized land cover changes over a specified period, with a particular emphasis on grassland extents and alterations. Field surveys were conducted to validate remote sensing outcomes and identify local factors impacting grassland dynamics. Our analysis unveiled substantial spatiotemporal variations in grassland distribution, predominantly shaped by land use modifications, climate fluctuations, and anthropogenic interventions. Comprehending these dynamics and underlying factors is pivotal for formulating efficacious grassland conservation and management strategies within Ramsar sites. This research presents invaluable insights into the intricate interplay between ecological dynamics and human interventions, furnishing a groundwork for informed decision-making and fostering sustainable development practices in wetland ecosystems.

Biography

Ravindra Nath Tripathi is a dedicated researcher affiliated with the Ganga Aqualife Conservation Monitoring Centre at the Wildlife Institute of India. His work focuses on the conservation and monitoring of aquatic life in the Ganga River, contributing to the preservation of biodiversity and ecosystem health. With a commitment to environmental conservation, Ravindra plays a key role in initiatives aimed at protecting aquatic species and ensuring the sustainability of riverine ecosystems.

At the Wildlife Institute of India, he engages in research and monitoring activities that support conservation efforts, helping to address the challenges faced by aquatic habitats in the region. His passion for wildlife and aquatic conservation drives his work, making a significant impact on the preservation of natural resources in India.

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COVID-19 lockdown in Pakistan: Estimating economic losses using input- output analysis

Asmat Ullah² and Farah syed¹

¹Department of Economics University of Peshawar, Pakistan

²UET Peshawar, Pakistan

Estimating economic losses of an emergency is always a challenge for researchers especially in a country like Pakistan where data availability is a constraint. A pandemic situation like COVID-19 is an example where inconsistent decisions like complete lockdown, smart lock down and other restriction on economic activity made the issue more complicated. Usually guess estimated are given for political and economic debate. However, work on testing some formal methodologies is still going on to get more meaningful results. The present study is an attempt to use *Input-output* method to estimate the losses to build a more meaningful picture. The methodology includes the direct impact in the form of losses in selected sectors through Final Demand and indirect impact through *Total Output*. The study has taken time of forty-six days for the year 2020 where all the sectors were closed due to nationwide complete lockdown. The results show that the economy faced a loss of 19 percent of the Final Demand. Moreover, the overall losses in the *Total Output* were about \$75641 m. The results conclude that the Primary sector faced highest losses (31%) as compared to *Secondary* (18%) and *Tertiary* (16.4%) sectors.

Biography

Dr. Asmat Ullah is an Associate Professor in the Department of Chemical Engineering at UET Peshawar, Pakistan. He earned his PhD from Loughborough University, UK, and completed a Postdoctoral Fellowship at NTU Singapore. With over 15 years of academic and research experience, Dr. Ullah specializes in water purification using slotted pore membranes and environmental economics. His research has resulted in numerous publications in high-impact journals and contributions to international conferences and book chapters. Dr. Ullah's work focuses on membrane/particle interactions, both with and without membrane oscillation, and the economic implications of climate change. He has developed strong collaborations with leading scientists in the USA and UK in the fields of membrane technology and water purification. His innovative research aims to advance sustainable water treatment solutions and address global environmental challenges.



Utilization of rice husk substituting fossil fuel for pelletization process of low grade goethite iron ore

Golap Mohammad Chowdhury and Sriprakash Sudhir

Research & Development Centre for Iron and Steel, Steel Authority of India Limited, India

Recent challenges on climate change and the negative impact of harmful emissions through metallurgical processes on society have motivated the researchers to search for environment friendly and sustainable production process. This research provides an avenue to use rice husk as a sustainable alternative to fossil fuels in pellet. In addition to this, using risk as an additive material also deals with the environmental issues connected to the use of fossil fuels. This creative use of rice husk highlights its potential as a renewable resource, encouraging the manufacture of goethite iron ore pellets in a more sustainable and environmentally friendly manner. This study investigated the pelletization of goethite iron ore using rice husk as a renewable carbon and energy substitute for coke breeze, which is a traditional fuel used as pellet feed in integrated steel plants. Cold Crushing Strength and porosity of the indurated pellets with rice husk addition were assessed to determine the utilization potential in the blast furnace iron making process. The X-ray diffraction studies showed the presence of iron rich magnetite and wustite, along with hematite and other oxide slag phases, which may impart high strength to the indurated pellets. FESEM studies showed the absence of free granules, which in turn confirmed the occurrence of particle-particle fusion. 3D skeleton image analyses of the indurated pellets in an X-ray micro-CT show uniform formation of round pores with good pore compactness and narrow pore size distribution inside the pellets, which are favorable properties to achieve high strength and porosity of the indurated pellets.

Biography

Dr. Golap Mohammad Chowdhury is the Deputy General Manager at RDCIS, Steel Authority of India Limited (SAIL), Ranchi, India. He holds a B.Tech in Metallurgical Engineering and an M.Tech in Process Metallurgy from the National Institute of Technology, Durgapur. He earned his PhD in Process Metallurgy from the Indian Institute of Technology, Kharagpur in 2007. With over 17 years of experience in research and development, Dr. Chowdhury has made significant contributions to ironmaking, iron ore pelletization, sintering, and mineral engineering.

He has published 8 papers in international journals, 16 in national journals, authored a book, and holds 8 patents. His research output includes 12 conference proceedings and 4 copyrights. Dr. Chowdhury has received prestigious awards, including the "National Young Metallurgist of the Year 2012" from the Ministry of Steel, and the "Dr. M Visvesvaraya Award" and "SAIL Award" from the Institute of Engineers in 2019. He is currently focused on the pelletization of iron ore fines.

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Biotic stressors in the agricultural ecosystem: Case of invasive insects species in Algeria

Leila Bendifallah

Laboratory of soft technologies, valorization, Physical chemistry of biological materials and Biodiversity, Faculty of sciences, M hamed Bougara university of Boumerdes, Algeria

Invasive species are a significant threat to many of the world's most important biodiversity hotspots. Biological invasions caused by Invasive Alien Species (IAS), introduced outside their natural range, constitute the fifth threat to biological diversity and the second threat to species extinction. They alter ecosystem services and induce the disappearance of native species through various mechanisms such as hybridization, predation and competition. Globally, the economic cost of invasive species is estimated to be in the billions of dollars annually to agriculture. North African countries are home to invasive exotic fauna and flora whose threats would increase with climate change. Algeria is one of the countries that suffers from invasive species, especially insects causing economic and environmental damage for more than a century. More than a hundred species of harmful insects are introduced. Recently, an invasion of a new species of *Oryctes* beetles (Coleoptera: Scarabaeidae) in date palm (*Phoenix dactylifera* L.) plantations in El Oued in southern Algeria is reported. It is *Oryctes agamemnon arabicus* (Fairmaire).

Biography

Prof. Leila Bendifallah has more than 30 years of experience in plant protection, environment, biodiversity and apidology. Prof. Bendifallah is currently Professor at the University of Boumerdes. She is a teacher-researcher at the university, M'hamed Bougara of Boumerdes; Faculty of Science since 2003. She is a head of Agronomic department. She held the position of head of department for Studies and Research at the National Institute of Plant Protection (INPV) at El Harrach – Algiers from 1993 to 2003. She is the founder and initiator of the Agronomy program at the University of Boumerdes with the Plant Protection Specialty for which she is responsible. She is Head of a research team: Biodiversity of the fauna and its interaction with its environment at the Research Laboratory of Soft Technologies, Valuation, Physical chemistry of Biological materials and Biodiversity. Dr. Bendifallah holds a Ph.D. on 2011 in Agronomy, Applied entomology specialty from the National School of Agronomy at El Harrach, Algiers in Algeria; she also has a diploma Enabling to conduct research (HDR) on 2013. She is a head and member of several national and international projects. She co-authored more than 45 publications and book chapters in her field and is an active member of multiple scientific organizations. She is an international expert and consultant in United Nations of Environment Program UNEP (UNO), and member of Global Environment Outlooks, Intergovernmental and Multi-stakeholder Advisory Group. (GEO-7, IMAG). She expertises and comments submitted articles to national and international journals. She is Member of UNESCO - Organization for Women in Science for the Developing World (OWSD). Pr. Bendifallah is a chairwomen and Membership in the organizing and the scientific committees of National and International scientific events such as the international congress on the valorization and preservation of biomass CIVAPB which took place at the University of Boumerdes on 05 and 06 November 2017. She is Editor-in-Chief of the National Journal of applied sciences to biomass. She is member in editorial board of several scientific journals like the journal Journal of Fundamental and Applied sciences El Oued (JFAS).



The effect of wet coffee processing plant effluent on physicochemical and bacteriological quality of receiving rivers used by local community: Case of Aroresa District, Sidama, Ethiopia

Beyene Dobo

Department of Biology, Faculty of Biological Sciences, College of Natural and Computational Science, Hawassa University, Ethiopia

Freshwater bodies such as lakes, rivers and their biodiversity are being threatened with water pollution from industrial effluents and household sewages. The main objective of this study was to assess the effects of wet coffee processing plants effluent on the physicochemical and bacteriological properties of receiving rivers. Four rivers and four sampling points of the selected rivers were included in the study. Focus group discussion and interview were employed to gather primary data. The result showed that parameters of water quality for downstream of the rivers were significant, particularly in the dry season with BODs ranging from 45 ± 1 to 782.6 ± 97 g/ml, COD ranges from 71 ± 21 to 1072 ± 183 g/ml, Conductivity ranges from 75.5 ± 6.6 to 943 ± 56.3 , Turbidity ranges from 7 ± 4.3 to 105 ± 6.2 , TDS ranges from 62 ± 6.4 to 1059.6 ± 121 g/ml, temperature ranges from 20.1 to 33 ± 1 , T. coli form ranges from 77 ± 1.1 to 493 ± 66 and E. coli ranges from 28 ± 1 to 213 ± 41 were significantly higher and DO ranges from 2.6 ± 1.5 to 6.1 ± 0.78 g/ml, NH_4 ranges from 1.85 ± 0.4 to 3.3 ± 0.5 g/ml and pH ranges from 3.6 ± 0.2 to 7.3 ± 0.45 were significantly lower. Most of the samples taken from wastewater and downstream parts of the river showed high level of water contaminants that are significantly greater than the EEPA discharge limits for surface water. Moreover, the qualitative data indicated that the community was affected by bad smell and color change on rivers, skin irritation, malarial case in human due to coffee processing plant effluents. Therefore, coffee processing plants should treat their effluents before they discharge it into the rivers. Responsible government bodies should authorize activities of coffee processing plants in line with the regulations set for environmental safety.

Biography

Dr. Beyene Dobo Bono is an Associate Professor of Microbiology at Hawassa University, Ethiopia, where he has served since April 2017. His academic journey includes a two-year College Diploma in Biology and Chemistry from Kotebe College of Teacher Education, a BSc and MSc in Biology/Microbiology from Mechnikov State University of Odessa, Ukraine, and a PhD in Soil Science (Soil Microbiology) from Haramaya University, Ethiopia.

Dr. Bono's research interests are broad and impactful, focusing on bio-fertilizers in crop production, bioremediation of environmental pollutants, and the diversity of arbuscular mycorrhizal fungi and Rhizobium in Ethiopian agro-ecological zones. He is passionate about promoting soil resilience through the use of bio-inoculants instead of inorganic fertilizers and pesticides, emphasizing organic, nutrition-based agriculture. His work contributes significantly to the sustainable management of soils and enhancing agricultural productivity through environmentally friendly practices.

Virtual Event

3rd Global Summit on Advances in Earth Science and Climate Change

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GIS and remote sensing based flood risk assessment and mapping: The case of Dikala Watershed in Kobo

Wondim Alemu Ayenew and **Hailu Ayene Kebede**

Woldia University, Ethiopia

The most destructive natural disasters that harm both natural and man-made features on the surface of the world are floods. The study area, which is located in the low-lying areas of the Amhara Region, is characterized by intensive human activity, a steep slope, heavy summertime rainfall with high drainage density and a predominance of verti soil type, as well as proximity to rivers, all of which have been identified as factors that increase the risk of flooding. For the examination of vulnerability, data on population and land use were employed, and data on flood depth were used for further analysis. The primary goal of the study was to evaluate the flood risk in the Dikala Watershed in the Kobo Woreda Amhara Region using remote sensing and geographic information system (GIS) techniques. This was accomplished by weighing the "vulnerability" and "hazard" elements that contribute to flooding individually at various degree levels using the rank-sum approach. Using a raster calculator, the final vulnerability and hazard index were multiplied to create the risk map. The study's key findings indicated that the danger and hazard of flooding was between "moderate" and "high." Future land use and development activity should be done to reduce the risk of flooding in the study area using these flood risk maps for the river and the Dikala watershed.

Biography

Mr. Wondim Alemu Ayenew is a dedicated lecturer, researcher, and natural resource conservationist based in Ethiopia, located in the Horn of Africa. With a keen interest in spatial data analysis and Earth observation science, he aspires to become a global consultant in this field. Despite the challenges faced by his country, including active civil conflicts, Mr. Ayenew is committed to addressing poverty through environmental conservation and community development.

He recognizes Spain's advanced systems in nature conservation and bio-geo chemical studies as valuable models for Ethiopia. From the start of his career, Mr. Ayenew has been deeply involved in community development projects and contributes scientifically to research initiatives at his university. Although early in his career, he has made significant strides and looks forward to participating in the Earth Observation Conference scheduled for September 26-27, 2024, in Barcelona, Spain.



Critical challenges and key drivers for adopting renewable energies and energy-efficient technologies in the buildings sector

M. Kazemi

Shahid Beheshti University, Iran

The building sector has emerged as a significant contributor to the world's total energy consumption and greenhouse gas emissions, accounting for approximately 30% and 27%, respectively. Despite the pressing need to adopt renewable energy sources and energy-efficient technologies, many building users continue to exhibit high energy consumption habits, showing resistance to change. Multiple barriers, including economic, market, behavioral, technical, and legal constraints, have hindered efforts to achieve energy efficiency in buildings. Among these barriers, financial and behavioral obstacles are identified as the most significant hurdles to overcome. This speech aims to investigate financial and behavioral barriers to implementing sustainable architecture and provide corresponding solutions. Our research is based on document analysis and semi-structured interviews with experts in sustainable architecture, economics, and socialism. Subsequently, we developed a questionnaire based on these statements and received responses from relevant experts. The data collected was analyzed using principal component analysis (PCA) in SPSS version 26. Our research findings suggest that financial barriers, such as misplaced incentives, unpriced costs and benefits, fear of hidden costs, controversial evaluation methods, distortionary fiscal and regulatory policies, and focus on initial costs, impede the widespread adoption of renewable energy sources and energy-efficient technologies. In addition to financial barriers, behavioral obstacles also hinder progress towards sustainable architecture. These behavioral barriers include traditional education, lack of online feedback, unenforced regulations, inappropriate curtailing of behaviors, weak government policies, lack of practical solutions and design, and the absence of aesthetic and symbolic benefits. In light of these findings, we suggest several corresponding solutions, including regulation, loan financing, project financing, grants and subsidies, fiscal incentives, creating real fossil fuel prices, as well as soft instruments like training programs, awareness campaigns, and information disclosure initiatives. It is essential to note that implementing multiple policies is much more effective in the long-term. Policymakers worldwide can benefit greatly from the policies and solutions we have identified. By overcoming financial and behavioral barriers, policymakers can contribute to the realization of a sustainable built environment, reducing greenhouse gas emissions and mitigating the impacts of climate change.

Virtual Event

3rd Global Summit on Advances in Earth Science and Climate Change

SEPTEMBER 26-27, 2024



Biography

Dr. Mohammad Kazemi is an Assistant Professor of Architecture at the University of Tehran, Iran. He earned his PhD in Architecture from Shahid Beheshti University in 2018, with doctoral research focused on "Factors Influencing Energy Reduction in Buildings." His research primarily addresses building energy efficiency and has been published in esteemed journals like Energy Efficiency.

Dr. Mohammad Kazemi co-authored a paper with Dr. Julia Udall titled "Behavioral Barriers to the Use of Renewable and Energy-Efficient Technologies in Residential Buildings in Iran," reflecting his collaboration on energy-efficient solutions. He also translated the book Mechanical and Electrical Equipment for Buildings, published by Tehran University Press, enhancing knowledge on passive and active systems. Since 2013, he has worked as a building designer at the Tehran Construction Engineering Organization. His diverse experiences in teaching, research, and practice contribute to his expertise, which he will share at the 3rd Global Summit on Advances in Earth Science and Climate Change (Adv. ESCC 2024).

Virtual Event

3rd Global Summit on Advances in Earth Science and Climate Change

SEPTEMBER 26-27, 2024



Economics of open data: What aspects should SMEs consider prior to releasing their data?

Arash Moghadasi

Independent Researcher, Iran

Economics of Open Data, Arash Moghadasi, Iran, Alborz, Fardis This systematic literature review evaluates the impact of global open data policies on small and medium-sized enterprises (SMEs) in different economic levels. Six case studies were analyzed to provide insights into the utilization of open data in the private sector. The review followed the PRISMA 2020 checklist and selected studies based on specific criteria, including high quality, strong methodology, and published by a valid publisher. The findings suggest that open data promotion can bring significant benefits to SMEs in terms of innovation, efficiency, and competitiveness. However, SMEs also face significant challenges in accessing and utilizing open data due to technical, legal, and cultural barriers. Therefore, practical aspects should be taken into account when implementing open data initiatives for SMEs. A framework is needed to measure the impact of open data policies on SMEs, and governments and policymakers should support open data initiatives in their countries, especially for SMEs whose valuable data can contribute to society's development. Using the GRADE approach, the certainty of evidence was rated as moderate according to limitations in study design and inconsistency across studies. Overall, this systematic literature review highlights the potential for open data policies to drive growth and development in small businesses while acknowledging the challenges that must be addressed for these policies to be effective. The review provides a guide for SMEs on measures to take prior to releasing their data and whether to release their data from an economic aspect. Moreover, this paper emphasizes the importance of practical aspects when implementing open data initiatives for SMEs and proposes a framework for measuring their impact. Finally, it highlights the need for government policies and support to facilitate SME adoption of open data initiatives.

Biography

Arash Moghadasi is an independent researcher based in Iran with a background in law. Specializing in contract drafting, and company and intellectual property registration, he has developed a strong expertise in legal and research domains. Arash has been recognized with an honourable mention in the Change Makers Model United Nations and received a scholarship for UNITAR's Young Leaders Training Program.

He has authored three publications and is currently working on another research project. His experience as a legal advisor, combined with his research skills, has refined his analytical abilities. Arash's dual focus on legal practice and research underscores his commitment to advancing knowledge and practice in his field.

SEPTEMBER 26-27, 2024



Investigation of anisotropic upper critical magnetic field in two-band model for the copper-based superconductors $\text{YBa}_2\text{Cu}_4\text{O}_8$ and $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_8$

Tadese Desta Gidey

Department of Physics, College of Natural Science, Aksum University, Ethiopia

This research work focuses on the theoretical investigation of upper critical magnetic field (H_{C2}), lower critical magnetic field (H_{C1}), Ginzburg-Landau coherence length (ξ_{GL}) and Ginzburg-Landau penetration depth (λ_{GL}) in two-band model for the copper-based superconductors $\text{YBa}_2\text{Cu}_4\text{O}_8$ and $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_8$. By employing the phenomenological Ginzburg-Landau (GL) free energy density functional theory in two-band model in the presence of two superconducting order parameters, we obtained the mathematical expressions for the temperature dependence of the upper critical magnetic field ($H_{C2}(T)$) and lower critical magnetic field ($H_{C1}(T)$); the angular dependence of upper critical magnetic field, $H_{C2}(\theta)$; the temperature dependence of GL coherence length, $\xi_{GL}(T)$ and GL penetration depth, $\lambda_{GL}(T)$ for the superconductors $\text{YBa}_2\text{Cu}_4\text{O}_8$ and $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_8$. By using the experimental values in the obtained expressions, the phase diagrams for the temperature dependence of upper critical magnetic fields parallel, $H_{C2}^{\parallel}(T)$ and perpendicular, $H_{C2}^{\perp}(T)$ to the crystallographic c-axis are plotted for $\text{YBa}_2\text{Cu}_4\text{O}_8$ and $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_8$. Similarly, using the obtained expressions the phase diagrams for the angular dependence of upper critical magnetic field, $H_{C2}(\theta)$ are plotted for $\text{YBa}_2\text{Cu}_4\text{O}_8$ and $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_8$. We demonstrated that, the upper critical magnetic field along the ab-plane is greater than along the crystallographic c-axis for both for $\text{YBa}_2\text{Cu}_4\text{O}_8$ and $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_8$. We have also plotted the phase diagrams for the temperature dependence of lower critical magnetic fields parallel, $H_{C1}^{\parallel}(T)$ and perpendicular, $H_{C1}^{\perp}(T)$ to the crystallographic c-axis for the two copper-based superconductors. Moreover, the phase diagrams for the temperature dependence of GL coherence lengths in the ab-plane, $\xi_{GL}^{ab}(T)$ and along the c-axis, $\xi_{GL}^c(T)$ are plotted. Furthermore, we have plotted the phase diagrams for the temperature dependence of GL penetration depths in the ab-plane, $\lambda_{GL}^{ab}(T)$ and along the c-axis, $\lambda_{GL}^c(T)$. Finally, the phase diagrams for the GL characteristic parameters, $\kappa_{GL}^{ab}(T)$ and $\kappa_{GL}^c(T)$ are plotted and the large values indicate that, $\text{YBa}_2\text{Cu}_4\text{O}_8$ and $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_8$ are extreme type-II copper-based superconductors. The results we obtained in this research work are in broad agreement with previous experimental findings.

Virtual Event

3rd Global Summit on Advances in Earth Science and Climate Change

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Biography

Dr. Tadesse Desta holds a PhD in Physics, specializing in Condensed Matter Physics, from Addis Ababa University, Ethiopia, which he completed in 2017. Recognized as one of the top students in his class, Dr. Desta has accumulated substantial knowledge and experience through both classroom learning and hands-on laboratory work. His academic background equips him with a strong foundation for conducting independent research in physics.

Dr. Desta has demonstrated his research capabilities by publishing several articles in various scientific journals. His work reflects his commitment to advancing the field of physics and showcases his expertise in condensed matter studies.

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***Acidithiobacillus ferrooxidans* leaching of silica-sulfide gold ores from May-Hibey deposits, Tigray, Ethiopia**

Goitom Gebreyohannes Berhe¹, Desta Berhe Sbhatu², Samuel Estifanos Gebre¹, Kiros Hagos Abay², Genet Gebryohannes Mhretu¹, Gebrekidan Mebrahtu Tesfamariam¹, Samuel Alemayehu Lapiso¹, Mulugeta Sisay Cheru³ and Afewerk Gebre Meressa⁴

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Oxidative leaching is an inexpensive alternative to use chemical cyanide extraction methods for gold from low-grade gold sulfide. Oxidation of finely ground gold-bearing ore by *Acidithiobacillus ferrooxidans* was evaluated in terms of in cell density, pH, and leaching efficiency of Fe and Au in shake flask experiments. The compositional and elemental analysis of the beneficiated ore were analyzed using XRD and EDXRF spectroscopy. The main elements of the gold sulfide ore were silicon, iron, and sulfur 62.456, 15.441, 7.912 w/t%, respectively and gold content was 4.356 mg/L. XRD spectra, the main phases of the concentrated ore, showed that the major components of the ore were quartz, syn (major, SiO₂), silconsulfide (SiS₂), pyrite (FeS₂) and polymetallic elements such as; silderenrite, gismandine, siderenikite, hematite, syn. The results of two bioleaching experiments, with *Acidithiobacillus ferrooxidans* bacteria and without blank were evaluated. The pH of the blank remained nearly constant and the pH of the bioleached was occasionally lowered. The *A. ferrooxidans* strain always grows better throughout bioleaching process. For the *A. ferrooxidans* strain, the cell density of cells was reached a maximum 90.00 × 10⁷ cells/mL after 11th weeks and decreased to 87.00 × 10⁷ cells/mL after 12 weeks. The decrease in cell density may be due to the presence of polymetallic elements such as Al, Cr, Ti, and Ni, leading to reduced metal tolerance of the *A. ferrooxidans* strain. At that time, bacterial were better at dissolving total iron and total gold than without bacteria. For bacteria leaching, the maximum total iron and gold extraction reached 92.16% (14.23 mg/L) and 99.97% (4.355 ppm), respectively, after 11th weeks. Meanwhile, by leaching without bacteria the extraction the total amount of iron and gold leached changed after 11th weeks. In the later stages of bioleaching, the extraction of total iron and gold leaching tends to decrease, which may be due to the formation of secondary minerals. Further experiments will be performed aimed at optimizing the process, considering not only extent of gold recovery but also the potential pollution of the bioleaching process.

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Biography

Goitom Gebreyohannes Berhe: Date of Birth: 16/03/1977; Nationality: Ethiopian; Civil Status: Married; Assoc. Prof. Dr. Metallurgical Engineering (2018), MSc, Inorganic Chemistry (2010), BED, Chemistry (Minor Mathematics and Physics, 2006), Diploma, Teaching Chemistry (Minor Mathematics, 2001), Certificate, Teaching (elementary schools, 1996), and Status, married having two sons. Associate Professor in the Department of Chemistry, College of Natural and Computational Sciences, Mekelle University, Mekelle, Ethiopia. October 2010 – Present and Head of Teaching, Learning and Assessment Affairs of Mekelle University. Goitom has 21 indexed with impact factors published articles, two books and 6 abstracts. Goitom is a member of national and international associations.



Spatial analysis of the impacts of the urban form on the energy consumption of Karaj over the Covid-19 era (2019-2022)

Mohammad Rahim Rahnama and **Kiyan Shakarami**

Ferdowsi University of Mashhad, Mashhad, Iran

Sustainable urban development as part of every nation's development policy tries to achieve a balanced physical, social, environmental, and economic development of cities. The issue was drastically affected by the Covid-19 pandemic, as many crises like cities' energy consumption was emerged. Considering the significance of the issue, this study spatially analyzed the impact of the urban form as a dimension of urban sustainability on the energy consumption of Karaj city over the Covid-19 pandemic (2019-2021). The required data, including the consumption of electricity and gasoline (of 35 gasoline stations) and the data on urban form, including density, use diversity, connectivity, and accessibility (on 173 neighborhoods of Karaj) were collected from Alborz Electric Power Distribution Company, Alborz National Oil Products Distribution Company, Karaj Municipality ICT Organization. Data analysis was done using GIS software and weighted regression option of geography, GWR, and Moran's I (indicating the spatial distribution pattern of energy consumption). The results showed that the impact of independent variable "urban form" on "electricity consumption" over the studies period is $R^2=0.68$ and on gasoline consumption is $R^2=0.73$. This amount (R^2) showed the high impact of Karaj's urban form on its energy consumption over the Covid-19 pandemic, but its spatial distribution shows some differences. The results of the spatial analysis showed that over the Covid-19 period, Karaj's urban neighborhoods with dense forms have had higher electricity consumption, while the urban neighborhoods having a spiral form and located on the skirt of ten regions of the city, consumed more gasoline. In other words, the impact of the urban form on gasoline and electricity consumption is not the same. This study can be applied as a report on the spatial impacts of urban form on energy consumption, using an accurate model in other similar situations.

Biography

Dr Mohammad Rahim Rahnama is a full professor in geography and urban planning at Ferdowsi University of Mashhad, Iran. His specialty is teaching and research in postgraduate programs in urban planning and spatial analysis. He was graduated in the field of master of urban geography from Tarbiat Modares University, Tehran capital of Iran in 1993, then perusing his doctoral research courses in the field of Urban Geography and Planning in 1997 from Tarbiat Modares University. After graduation, he worked as Assistant Professor at the department of geography at Ferdowsi University of Mashhad, the second largest university in Iran. He has attended postgraduate study opportunities at Macquarie

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University (2004), Melbourne (2012) and Deakin University (2018–2020) as an academic visitor. Furthermore, he was the general manager of a spatial research plan in Khorasan Razavi Province (2012-2014), which was one of the most important projects in the whole province. Since 2014, I have also been working as Dean of the Faculty of Letters and Humanities at Ferdowsi University of Mashhad, Iran until 2017. Over the last few years, he also could translate two fundamental English books into Persian for Iranian students, namely 'Eco-city', and 'Urban planning for urban leaderships. From 2017 to 2018 I was general manager of Cultural Heritage, Handicraft and Tourism Razavi Khorasan Province Administrative. Now I am academic member of Geography Department of Ferdowsi University.

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Quick evaluation of rocks potentials for aggregates production: Focus on Afikpo Basin sandstone complex, Nigeria

S. N Ukpai

Ebonyi State University, Nigeria

Construction industries are faced with challenges of unavailability of adjoining rock mass for aggregates processing. The challenge results in transporting aggregates from far distances, causing road traffics that lead to accidents; loss of life and properties, even as rocks of competent aggregates could be found nearby, yet, unnoticed. This research was conducted to explore and verify aggregate chips from simpler methods than customary direct (strength) analyses using samples outside those of igneous and metamorphic products; particularly where sedimentary rocks were massively emplaced in regions needing quality aggregates for building/ road construction. Bulk samples of highly consolidated Sandstones occurring at centre of Afikpo Basin were collected for petrographic and grain size analyses; just as litho facie studies showed underlying shales that change to argillaceous nature, mostly at contact with the sandstone units. While quartz dominated the modal mineralogy at 74–81%, the grains are poorly sorted, angular shaped with convex/ concave contacts. Based on these characters, it is suspected that fragment of the rock mass can withstand stress when subjected to compression/ compaction that relates loads during and after constructions. So, the Sandstones can be used as good alternative means of providing chipping aggregates.

Biography

Dr S.N Ukpai was born on 10th August, 1977 at Onueke, Ezza South of Ebonyi State, Nigeria. He is a consulting Hydro/ Engineering geologist, and a lecturer in the Department of Geology, Ebonyi State University, Abakaliki, Nigeria. Dr Ukpai has successfully published several research articles relevant across multidisciplinary fields of Earth Sciences.



Community-based Landscape restoration in the Gewocha forest area for sustainable land management and livelihood improvement

Regassa Terefe and **Adamu Mekonnen**

The Hunger Project Ethiopia, Ethiopia

Unsustainable use of forest products and agricultural practices by the local community, added to the effects of climate change are seriously affecting and altering the distribution of Gewocha forest resources. The aim of the project is to contribute to a flourishing future for the Gewocha natural forest and its surrounding landscape in Jabi-Tehnan Woreda of Amhara Region. The project has four strategies: seedling production & enrichment planting, community livelihood & food security, IGA, and WASH. These four strategies are implemented in the project area, considering the needs of the local communities.

During the project implementation period, 516 ha of land from the degraded Gewocha forest were delineated with geo-references and enrichment plantation activities were conducted accordingly. A total of 494675 seedlings of different tree species were produced and planted for restoration purposes in the delineated area. The local community highly engaged in planting and protecting the planted seedlings from external pressure. For further protection of forest resources, a forest management plan and management regulations have been prepared and implemented by members of the forest association and the local community.

Besides this, in this project a total of 229086 agro-forestry seedlings (Rhamnus, Coffee, Mango, Avocado, banana & multipurpose trees), respectively distributed for the local community and planted at their homestead. So, incorporating agroforestry as one component it helps the local community to diversify their livelihoods. Apiculture and AI service implemented at the project site helps to diversify the intervention approaches and enhance the livelihood of the community.

After the intervention of the project, the local community is actively engaged in conserving nature, planting fruit trees, use of AI services and modern beehives. In general, within a short time, the local community is highly motivated and gives attention to nature, and engages to diversify their livelihoods.

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Biography

Dr. Regassa Terefe is a seasoned professional with over 16 years of experience in forestry conservation, management, and research. Currently serving as the Program Manager for The Hunger Project Ethiopia, Dr. Terefe is deeply involved in environmental conservation, forest management, and landscape restoration. Her work focuses on mitigating climate change and addressing environmental challenges.

Dr. Terefe holds a PhD in Forest Management from Fujian Agriculture and Forestry University, an MSc in Agroforestry & Soil Management, and a BSc in Forestry from Hawassa University, Wondo Genet College of Forestry & Natural Resources. She is actively engaged in various professional societies, including the Ethiopia Soil Society, Ethiopian Forestry Society, and Ethiopian Heritage Trust. Her extensive experience includes community development, agroforestry, watershed management, and natural resource management. She has published numerous scientific articles and journals, reflecting her commitment to advancing the field.

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Location of seawater pumped storage hydropower plants: Case of Morocco

Jamal Elmansour², Patrick Hendrick¹, Abdelowahed Hajjaji² and Fouad Belhora²

¹Universite Libre de Bruxelles, Belgium

²National School of Applied Science, Morocco

Seawater-pumped storage is an electricity storage that uses two vertical reservoirs and the lower one is the sea. Energy storage helps the electricity market to be more reliable regarding consumption change. In this paper, we studied a multi-criterion analysis for different energy storage solutions. Pumped Storage is a good solution based on its environmental and efficiency criteria. Hydrogen will come in the first ranking in case of increasing technical maturity and efficiency.

The Moroccan market is dominated by using fossil fuels as energy sources. However, 80% of total electricity consumption is produced from coal and oil power plants. The share of renewable is 20% which was considered less regarding the installed capacity. The need for energy storage, especially hydropower solutions, is a key element to increase the renewable share and meet the national targets.

By using Geographical Information Systems (GIS) we selected 11 sites suitable to install seawater-pump storage with a potential energy storage capacity of 300MWh. The slope analysis shows two main sites in the south of Morocco with flat areas. These sites are close to wind resources potential onshore and offshore.

Biography

Jamal El Mansour is a research engineer at Chouaib Doukkali University, specializing in Physics and Engineering. He is also a graduate of the Polytechnique School of Brussels, where he studied management and technology. With a background as a business analyst and energy engineer, Jamal has significant experience in thermal power plant design, including turbines, compressors, and combustion systems. His academic expertise is focused on energy market analysis and the design of thermal power plants. His work integrates technical knowledge with practical insights to advance energy systems and market strategies.

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Actors and their roles for sustainable forest governance in south eastern Ethiopia: The case of Bale Eco-Region

Endalkachew Birhan¹, Engdawork Assefa² and Maria A. Petrova³

¹Madda Walabu University, Ethiopia

²Addis Ababa University, Ethiopia

³Georgetown University, USA

This study assesses the practical roles of different actors for sustainable forest governance in south-eastern Ethiopia, taking the Bale Eco-Region as a case study. To this end, the study employed descriptive research design and qualitative research approach. Consistent with this, the relevant data was collected through in-depth interviews and focus group discussions from the direct decision makers (government and organized forest communities) and the indirect decision influencers and implementers (NGOs, research institutions, and media) and analyzed through descriptive analysis. Based on this, it was found that forest governance is open to the participation of all critical actors, regardless of its relative inability to bring about the desired outcomes. In this regard, the direct decision makers, like the government and the organized community plays a crucial role in jointly governing the forests that they are responsible for and authorized to do so through participatory forest management. In addition; the government is regulating; it controls all the forests through its institution of the Environment, Forest and Climate Change Authorities. Another primary actor, Oromia Forest and Wildlife, is authorized to protect, conserve, use, and manage parts of the forests in Oromia Regional State. The other crucial actor, NGOs (Non- Governmental Organizations), particularly FARM Africa and SOS Sahel Ethiopia, is playing the role of indirectly influencing the government decisions and also implementing those decisions in the Bale Eco-region. Finally, research institutions, and media are playing a limited role of influencing government decisions and its implementation. Regardless of all these, deforestation and forest degradations are recurrent and significant improvement on the life of the poor forest dependent communities have not yet been achieved. Hence it is highly required to empower those critical actors to effectively discharge their roles that ultimately contribute to sustainable forest governance.

Biography

Dr Endalkachew Birhan is an Ethiopian citizen who was born in Algje Sachi Wereda, Ilubabor Zone, Oromia Regional State, Ethiopia. He was awarded his BEd degree and PhD degree from Addis Ababa University in History and Development studies (Environment and Development) in 2007 and 2021 respectively, while he has got his MA degree from Hawassa University in 2012. Currently, he is an assistant professor in one of Ethiopian University known as Madda Walabu University. So far he has published five scientific articles and one book.

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Environmental effects of β -Ga₂O₃ semiconductor as a substitute to silicon for low-loss efficient power converters and inverters

Yusuf U. Tarauni¹, Maitama Hotoro¹, and John Thiruvadigal²

¹Department of Physics, Aliko Dangote University of Science & Technology, Nigeria

²SRM Institute of Science and Technology, India

This research work is directed towards the investigation of β -Ga₂O₃ materials based novel high electron-mobility transistors (HEMTs) for mixed-mode circuit design and simulation in future generation of III-V/Si integrated platforms. In the designing of efficient power switching devices, more than 10% of total power is lost in the form of conversion losses, constituting over 10 times higher volume than the world's supply of renewable energy. To reduce the conversion losses, that bring environmental pollution, a low-loss efficient power converters and inverters, employing an advanced generation of switching transistor based on Silicon Carbide (SiC) or Gallium Nitride (GaN) is needed. Compared to other devices, GaN devices offers the intense Figure-of-Merits (FOMs) considerably better than the state-of-the-art existing Silicon (Si) based power switching devices. Moreover, GaN have effective dielectric constant (), robust, chemically stable material and also very good thermal conductivity resistive to high temperature operation and surroundings. However, a wider development of the GaN power switching devices is restricted by the technology imperfection and, in specific, unavailability of a safe Enhancement mode (E-mode or Normally-OFF) transistor operation concept with a high value of positive threshold voltage (VT). The E-mode operation can be approached by realizing techniques such as efficient doping in the GaN cap layer, high- metal-Insulator-semiconductor (MIS) with graded barrier structure, N-polar InN channel MIS-HEMT for high power, high breakdown and high-frequency operation with a sufficiently low density of surface donors.

Biography

Professor, Department of Physics, Faculty of Science, Aliko Dangote University of science and Technology, Wudil – Kano Nigeria.

Yusuf U. Tarauni is a full professor with the Department of Physics, Aliko Dangote University of Science and Technology wudil, Kano - Nigeria. He was educated at the Usman Danfodio Universiy, Sokoto for First degree in Physics with First Class, and received MSc from Bayero University, Kano and PhD degrees from SRM Institute of science and technology in India both with distinctions in 2014 and 2021, respectively. He was a recipient of the two-year TETFUND doctoral scholarship from 2018 through 2021. He was a visiting professor to both public and private universities in Nigeria. He was a co-recipient of the 2021 Best researcher of SRM Institute of science and Technology. In 2017, he was named one of the three most promising scientists in the category "Contribution to a better society" of the Nigerian academy of science. He has many publications in scholarly journals.

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The impact of geomagnetic storm conditions on the ground positions

F. Nobakht-Ersi and **M. Hoseinpour**

Assistant Professor, Faculty of Education Center of Miandoab, Urmia University, Iran

This paper aims to present the effect of geomagnetic storm conditions on the ground positions driven by Global Navigation Satellite System (GNSS). Attention is confined to ground positions under weak and intense geomagnetic storm conditions. It is thereby two different studies have been conducted. The first study focuses on evaluating the positioning performance in the presence of intense geomagnetic storm conditions while the second study is concerned about the positioning accuracy under weak geomagnetic storm conditions. Our numerical results demonstrate that an intense geomagnetic storm can have a significant impact on GNSS positions specially in the case of single constellation (GPS) positioning. Furthermore, a weak geomagnetic storm circumstances can have an insignificant effect on GNSS positions quality.

Biography

Dr. Fereydoun Nobakht Ersi is an Assistant Professor at Urmia University, Urmia, Iran, since 2022. He holds a PhD in Geodesy from the University of Tehran, completed in 2021. His academic journey includes an MSc in Mathematics with a focus on Numerical Analysis from the University of Tabriz (2015), and another MSc in Geodesy from the University of Tehran (2010). He completed his B.Sc. in Surveying and Geomatics Engineering at K.N. Toosi University of Technology in 2007. His diverse educational background underpins his expertise in geodesy and applied mathematics, contributing significantly to his research and teaching in these fields.



Determinants of solar energy use as alternative source of power by small and medium enterprises in Lagos State, Nigeria

Sylvester Anaba

University of Ibadan, Nigeria

Small and Medium Enterprises (SMEs) in Lagos State suffer from frequent power outages from the national grid. Use of alternative sources of power is growing among SMEs. Extant literature showed solar energy is one of the alternative sources, however, only a few literatures assessed determinants of solar energy use. The study aimed to ascertain level of adoption of solar energy, level of solar energy use, nature of solar energy use, duration of use of a fully charged solar system and determinants of solar energy use by SMEs in Lagos State.

The research employed quantitative techniques. The research population (SMEs) was stratified into 3 clusters. A simple random sampling method was used to select 383, 172 and 45 SMEs respectively from clusters and questionnaires were administered. Descriptive statistics, perceptual map and logistic regression model were used to analyse data.

There was 88.0% level of adoption of solar energy, level of use was 77.0%. Nature of use was majorly lighting (100%), and powering of equipment (67.0%). Duration of a fully charged solar energy system was 7 to 9 hours. Durability of accessories and cost of electricity accessories were not statistically significant but positively associated with adoption of solar energy. Meanwhile, customer services ($\beta = -0.714$), estimated electricity bills ($\beta = -0.398$), inadequate access to electricity facility ($\beta = -0.390$), and policy support for solar energy ($\beta = 0.431$) were statistically significant. Nevertheless, the general cost of power from public grid ($\beta = 0.325$), average number of power failures ($\beta = -0.011$) and DisCos' inefficient processes ($\beta = -0.038$) were not statistically significant but positively associated with solar energy use.

Estimated electricity bills, inadequate access to electricity facilities, and policy support for solar energy were key determinants to solar energy use. Therefore, government should provide an enabling environment for solar energy to thrive.

Biography

Dr. Sylvester Anaba is a seasoned capital market expert with 14-year track record of accomplishments encompassing quantitative and qualitative research, corporate finance, capital market regulation, capital market rules redrafting, risk management, corporate governance, and investor relations.

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Previously, he held the position of Listings Analysis Manager at the Nigerian Exchange Group Plc, where he played a pivotal role in the listing of over 200 securities on the Daily Official List (DOL) of the Nigerian Exchange Limited (NGX). His extensive experience also includes stints as Head of Research and Strategy at Ecellon Capital.

Dr. Anaba holds a PhD in Energy Economics. He is a Chartered Stockbroker and an Authorized Dealing Clerk of the Nigerian Exchange Limited. Dr. Anaba's research papers are published in reputable journals such as Springer etc. Notably, he authored a chapter for the United Nations Encyclopedia of Sustainability.

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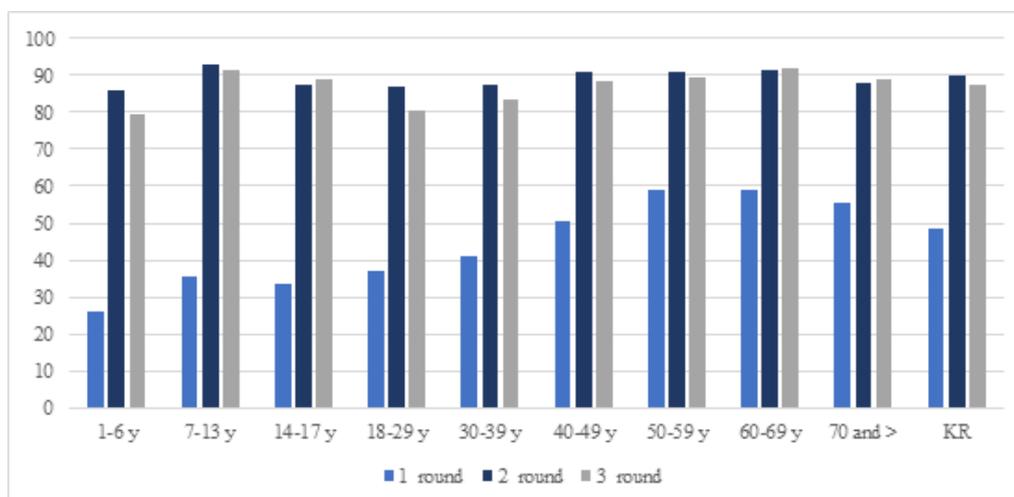
SARS-CoV-2 herd immunity of the Kyrgyz population in 2023

Nurmatov Z., Nuridinova Zh, Abdrakhmanova Z, Sattarova G and Temirbekova S

National Institute of Public Health of the Ministry of Health of the Kyrgyz Republic, Kyrgyzstan

To take effective measures to combat coronavirus infection in the republic, 3 rounds of study were conducted in 2021-2022 with an interval of 7-8 months to study population immunity to COVID-19 in the population of Kyrgyzstan. The aim of the study was to determine the level of antibodies to SARS-CoV-2 by region and by age categories in the population. The study methods were cross-sectional, prospective population-based study. The material for the study were blood serum samples and questionnaires collected from the population.

Results. Seroprevalence in the population was in the first round 48.7% (July 2021), in the second round 89.7% (February 2022), and in the third round 87.4% (October 2022.) The highest proportion of seropositive individuals was found in all phases among volunteers in 3 older groups: 50-59 y, 60-69 y, and 70 and older. The minimum seroprevalence rates were found in groups 1-17, 18-29 and 30-39 years. Differences with the cohort average are statistically significant at $p < 0.001$ (Fig. 1).



Results of the seroepidemiological study by age group (1st round July 2021, 2nd round February 2022, 3rd round October 2022, KR).

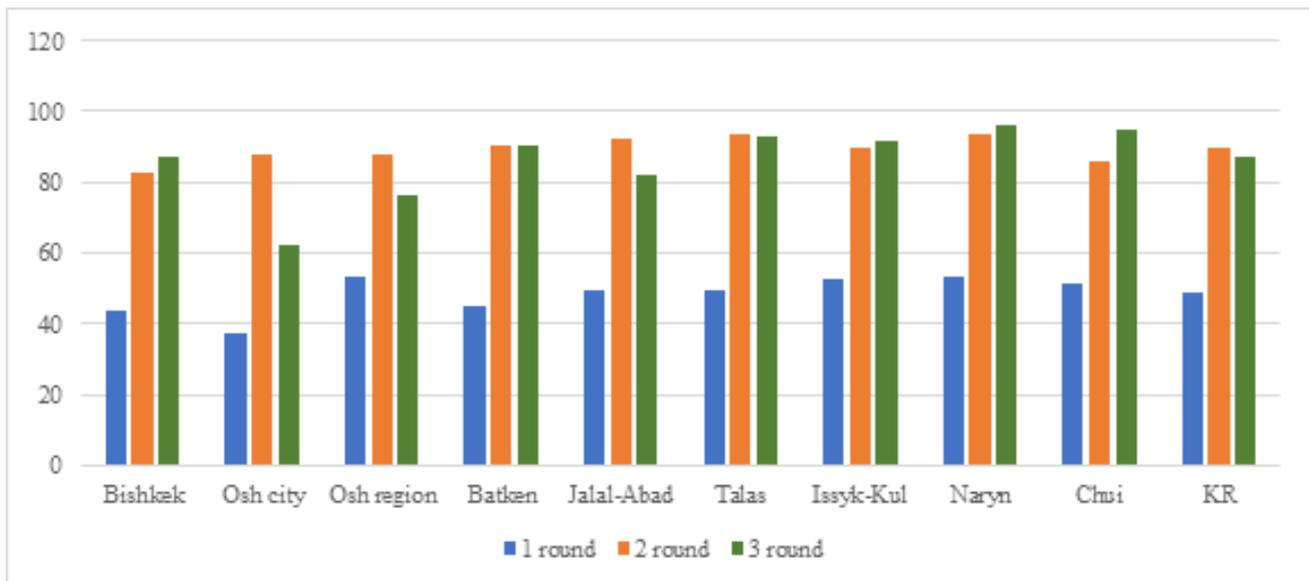
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The proportion of seroprevalence by region in 1st round ranged from 38.1 to 53.3, in 2nd round 82.6 to 93.8%, and in 3rd round 62.5 to 95.9%. The differences between these regions were statistically significant (Fig. 2).



Results of seroepidemiological survey by region

(1st round July 2021, 2nd round February 2022, 3rd round October 2022, KR).

Conclusion. Seroprevalence to SARS-CoV-2 increased statistically significantly with time in all regions and age categories.

Biography

Nurmatov Zuridin Sharipovich graduated from the Kyrgyz State Medical Institute, Sanitary and Hygienic Faculty (public health) in 1981. From 1981 to 2013, worked as a practical epidemiologist and head at various levels (district, regional and republican) of the state sanitary and epidemiological supervision of the republic. In 2008, defended his PhD thesis on the theme «The effectiveness of hepatitis B vaccination among children of the Kyrgyz Republic» in the specialty «Epidemiology». August 2013 till present time chairman of the Republican Scientific and Practical Center for Control of viral infections National Institute of Public Health of the Ministry of Health of the Kyrgyz Republic. December 2010, approved the theme of the thesis on “Epidemiology of influenza and SARS in the Kyrgyz Republic” for the degree of doctor of medical sciences, specialty “Epidemiology”.

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GIS – based flood susceptibility mapping using frequency ratio and information value models in upper Abay river basin, Ethiopia

Abinet Addis

Debre markos University, Ethiopia

In this study, flood susceptibility mapping was carried out for Chemoga watershed upper Abay River basin, Ethiopia. The main objective of this study is to identify the flood susceptibility areas using Frequency ratio and Information Values models. Based on Google Earth imagery and filed survey, about 168 flooding locations were identified and classified randomly into training flood locations datasets 70% (118) and the remaining 30% (50) of flooding locations datasets were used for validation purpose. Identified 12, flood conditioning factors such as slope, elevation, aspect, curvature, TWI, NDVI, distance from road, distance from river, soil texture, lithology, land use and rainfall were integrated with training flood locations datasets to determine the weights of each flood location conditioning factor and factor classes using both frequency ratio and information value models. The flood susceptibility maps were produced by overlay the weights of all the flood conditioning factors using raster calculator of the spatial analyst tool in ArcGIS 10.4. The final flood susceptibility maps were reclassified as very low, low, moderate, high and very high susceptibility classes both FR and IV models. This susceptibility maps were validated using flood location area under the curve (AUC). The results of AUC accuracy models showed that the success rates of the FR and IV models were 82.90% and 82.10%, while the prediction rates were 80.70% and 80.00% respectively. Past flood events are compared with the flood vulnerable database to validate the modeled output in the present study. This type of study will be very useful to the local government for future planning and decision on flood mitigation plans.

Biography

Born on July 19, 1988, in Dimela, Ethiopia, he exhibited a remarkable aptitude for Engineering and problem-solving from an early age.

The degree of bachelor's in surveying technology and Master's in the field of geodesy and geomatics engineering from Adama Science and Technology University in Ethiopia. His research on developing innovative algorithms for pattern recognition and predictive modelling has garnered widespread acclaim. The findings have been published in numerous esteemed scientific journals, earning him recognition as a leading expert in the field.

Outside of academia, he has been invited to speak at various international conferences and seminars where he shares his expertise and insights on the latest developments in machine learning. His presentations and workshops have inspired countless researchers and professionals to push the boundaries of innovation in their respective fields.

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Air pollutant emissions in Isfahan city of Iran, a new challenge of public health

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¹Department of Natural Resources and Environment, Islamic Azad University, Iran

²Research Center of Applied Plant Science, Islamic Azad University, Iran

Air pollution is a significant environmental problem in Isfahan city, Iran, with detrimental effects on human health and ecosystems. It comes from various sources, including the asphalt industry, motor vehicles, power plants, industry, and natural events such as forest fires and dust storms. The data used in the study was obtained through a combination of different methods and strategies. Reliable laboratory information beside, Reports from the European Environmental Protection Organization, American Environmental Protection Organization, and Australian Environmental Protection Organization, Standards from environmental organizations were used to determine emission coefficients. Questionnaires were prepared and referred to trade and industrial units to gather information on production and air pollutant emissions. Finally Statistical analysis and grouping methods were used to analyze the data. Based on average data of emission rate of different sources, prioritizing resulted in identification of 5 main sources of gaseous pollutant including: Chemical industries, Synthetic Textiles and Pharmaceutical Industries (7.36%), Burning Garden Waste Outdoors (7.68), Brick Kilns (12.43%), Garbage Center (15.78), Digestion of Humans (45.68). Other 30 sources contribute less than 3%. Based on the results it is obvious that CH₄ only contribute 44% in gas emissions of Isfahan city followed by CO, (23%), TSP, (13%), MVOCS (9%), PM₁₀ (2.17%), NH₃ (1.96%), nonmethanevolatileorganic, compounds (1.89%), Nox (1.70%), PM_{2.5} (1.36%), SO_x (0.89%), VOC (0.76%), PM (0.03%). The results of paper provides information on the major sources of air pollutant emissions in Isfahan City. It presents the average data of emission rates from different sources, helping in prioritizing and targeting specific sectors for reducing emissions. The study highlights the importance of considering both natural and anthropogenic sources of air pollution and the need for implementing strategies to obtain accurate information on emissions. The research contributes to the understanding of air pollution sources in Isfahan City, which can aid in developing effective measures for reducing pollution and improving air quality.

Biography

Javad Varvani is an Associate Professor, in Engineering Faculty, Azad University, Arak, Iran, Head of Research Center of Applied Plant Science, Islamic Azad University, for over 20 years. He also works closely with Consulting Companies, Head of consulting company in irrigation systems design and installation. Fluent in Arc GIS, RS Projects. More than 50 Scientific Articles cited in Google scholar, Citations: 234, h-index: 8,

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Performance evaluation of small scale irrigation scheme: Case study of selamko irrigation scheme, upper Blue Nile, Ethiopia

Zigiybel Firiew Berihune and **Michael Mehari Moges**

Faculty of Civil and Water Resource Engineering, Bahir Dar Institute of Technology, Bahir Dar University, Ethiopia

The study was conducted to evaluate the performance of the Selamko small-scale irrigation scheme using internal and external performance indicators. The irrigation scheme command area was 63 ha and during the study season, the irrigated area was 42 ha. Overall activities in the primary data collected included: field observation, discharge measurements in the canals, soil moisture before irrigation and after irrigation, depth of water applied at the field, and interviewing beneficiary farmers. Secondary data was collected from secondary sources that were the South Gondar Small Scale Irrigation coordination office, SGBowR, and WUA of the scheme. In order to evaluate the irrigation water and use efficiency of the scheme, nine farmer fields were selected from the scheme concerning their location: at the head, middle, and tail end water users. The internal process indicators which include conveyance efficiency and application efficiency were used to evaluate the performance of the scheme. From the analyses of internal performance indicators, the conveyance efficiencies were found to be 9% in the main canal, 57.09 at secondary canal 1, and 54.55% at secondary canal 2. The canals supply less water than the demand of the delivery points. And the application efficiencies were estimated to be 56.994%. The overall efficiency was 35.268%. The output per command area has to be calculated as 60,198.14 Birr/ha and 89,738.1 Birr/ha during the 2017 and 2016 irrigation seasons, respectively. The output per cropped area was estimated as 90,297.62 Birr/ha and 99,621.1 Birr/ha in the 2017 and 2016 irrigation seasons, respectively. The output per water consumed has to be determined as 17.66 Birr/m³ and 20.14 Birr/m³ in the 2017 and 2016 irrigation seasons, respectively. The water supply and irrigation supply were found as 1.71 and 1.47, respectively. From the analysis of the physical performance of the scheme, during the study period, the irrigation ratio of the scheme was 66.67%, and the sustainability of the scheme was 62.69% but in the 2016 irrigation season, the irrigation ratio was 84.7% and sustainability of the scheme was 90.08%. During the study period, the total effectiveness of the scheme infrastructure was 20.69%. It displayed that high system maintenance is required. Generally, the performance of the irrigation scheme is poor. Therefore, scheme monitoring, capacity building of the users and the water user associations, providing the flow control measurement structures, and adequate operation and maintenance of the system are required to improve the irrigation scheme performance.

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Biography

Zigiybel Firiew obtained his first degree in Water Resources and Environmental Engineering at Bahir Dar Institute of Technology, Bahir Dar University, and his master's degrees in Irrigation Engineering and Management at Arba Minch University. He has more than 7 years of development and research experience in irrigation Engineering, water resources, systems modelling, and climate adaptation. Zigiybel has extensively participated in the development, application, and research of decision support systems for integrated water resources planning and management. He has also developed practical skills in applying analytical tools, global datasets, GIS, and Remote sensing products for research and development of performance evaluation of irrigation. His working experience includes data compilation; water resources and irrigation; spatial analysis of natural resources. He has established the Irrigation action research integrated with NICHE and also he has given the training of irrigation structure and irrigation water management for Koga irrigation scheme experts and water users association.

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Virtual coastal altimetry tide gauges along the West African coast

**Lucrece Djeumeni Noubissie¹, Florence Birol², and Raphael Onguene¹, Fabien Léger²,
Fernando Niño² and Dzone Naoussi Serge¹**

¹LTSA, Institut Universitaire de Technologie, Université de Douala, Cameroon

²LEGOS, Université de Toulouse, Germany

Africa's coastal areas are generally low-lying and vulnerable to the impacts of climate change, such as mean sea level rise. This study aims to assess the potential of satellite altimetry to compensate for the lack of in situ sea level observations in this area. With three decades of accurate measurements and recent advancements in processing and instruments, satellite altimetry offers reliable data up to a few kilometers from the coast, covering nearly all coastal regions worldwide and available for various applications in addition to existing tide gauges. This study uses the high-resolution coastal altimeter product X-TRACK/ALES to measure the tide and the long-term sea level changes in the Gulf of Guinea. This product provides sea level time series along the altimeter tracks with a resolution of ~350m. In our study area, at each intersection between one track and the coast, we define a virtual tide gauge station by averaging the 20 altimeter data points closest to the land. Comparisons between virtual stations and in-situ tide gauges demonstrate good agreement, with correlation values of 0.58 to 0.78 and root mean square differences of 5.6 to 8.3 cm. Virtual stations reproduce the observed tide with errors less or equal to 6.5 cm. Differences in tidal data are partly related to the difference in position between tide gauges and virtual stations. The analysis of sea level trends from tide gauges and virtual stations can help correct errors and improve the accuracy of sea level trend estimates. This approach is especially useful in regions with limited tide gauges. The study also highlights the importance of altimetry in monitoring coastal sea levels. In areas with few tide gauges, altimetry can be used to study both tidal variations and long-term sea level changes.

Biography

Djeumeni Noubissie Lucrece, a final year Ph.D. student in physical oceanography, enrolled in a joint program between Paul Sabatier University in France and the University of Douala in Cameroon. Passionate about environmental protection, her research focuses on coastal areas, particularly in the Gulf of Guinea, threatened by climate change-induced flooding and coastal degradation. With a master's degree in integrated coastal environment management, she has honed skills in remote sensing, altimetry, climate change, and coastal risk management. Her Ph.D. research concentrates on analyzing sea level variations in low-lying areas using altimetric and in-situ data. Her goal is to generate scientific knowledge for sustainable coastal management and the protection of local populations.



Removal of Ni(II) ions from aqueous solution using polypyrrole/Fe₃O₄ nanocomposite

Fariba Ostovar¹, Reza Ansari² and Zahra Esdaki²

¹Faculty Member in the Environmental Research Institute, The Academic Center for Education, Culture and Research (ACECR), Iran

²Department of Chemistry, Faculty of Science, University of Guilan, Iran

In this research, Polypyrrole/Fe₃O₄ (PPy/Fe₃O₄) nanocomposite (NC) were synthesized and used for removal of Ni(II) ions as important and toxic heavy metal from aqueous solutions. Adsorption experiments were conducted in a batch system. PPy/Fe₃O₄ NC were prepared by the polymerization and chemical precipitation method under optimized conditions. The characterization methods such as X-ray Diffraction (XRD) and scanning electron microscopy (SEM) and Fourier-transform infrared spectroscopy (FT-IR) were used for the prepared adsorbent. The SEM micrographs show the formation of PPy/Fe₃O₄ NC within 32–41nm in size which has been homogeneously dispersed. The effects of several factors, including pH, contact time, initial concentration of Ni(II), amount of adsorbent, and temperature on sorption were evaluated. The optimum condition for Ni(II) sorption occurred at pH 7 and time 40 min. In optimum condition, the removal efficiency was 99.2% for 50 mg L⁻¹ Ni(II) solution with an adsorbent dose of 0.05 g. The experimental data were also analysed by Langmuir and Freundlich adsorption models. Based on the linear regression analysis (R²) it was found that equilibrium data fitted well with Freundlich isotherm. The PPy Fe₃O₄ NC has considerable Langmuir adsorption capacity to Ni(II) removal 250.0 mg/g. Equilibrium adsorption data were also examined by pseudo-first-order and pseudo-second-order models and their respective rate constant were estimated. It was found that sorption of Ni(II) ions onto PPy Fe₃O₄ NC is fitted very well with the pseudo-second-order kinetic model and chemical adsorption processes. The adsorption process was exothermic with a negative value of ΔH° (-21.9 KJ/mol) and spontaneous in nature ($\Delta G^\circ = -7.03$ KJ/mol). The results have established the good potentiality of the Polypyrrole/Fe₃O₄ NC to remove Ni(II) from aqueous solutions.

Biography

Fariba Ostovar, graduate of PhD in Analytical Chemistry. She work at the Environmental Research Institute (ERI) of Academic center for education, culture, and research (ACECR) as a faculty member in the field of environmental engineering and she work in the field of water and wastewater treatment in various industries. Also, she worked with the international JICA team for 5 years in the field of Anzali wetland management. During of her work, she worked as a lecturer in the chemistry and environmental engineering departments. Also, she has advised several MSc thesis. She has succeeded in publishing several ISI, ISC articles, and she has published several volumes of books in the form of authorship and translation. She has been the executor and collaborator of several employers and research projects. She has also been selected as a top environmental researcher and speaker at international and national conferences for several consecutive years.



The fate of foraging sea turtles of Persian Gulf in the face of global warming

Forough Goudarzi

Shahid Beheshti University, Environmental Science Research Institute, Iran

Global warming is influencing the occurrence of species on earth by changing the availability of biotic and abiotic suitability of habitats. Climate change affects sea turtles in both the marine (for foraging) and coastal (for nesting) environments. It is expected to lose approximately half of their nesting sites and more than two-third of their foraging habitats by 2100. However, their habitats are rarely protected through marine protected area network that makes them more vulnerable to human disruptions. The Persian Gulf is home of the two resident sea turtles including green and hawksbill turtles. It is the hottest sea in the world and expected to experience the harsh climatic/thermal situation by the end of this century. The green and hawksbill sea turtles are resident in the Persian Gulf and there is no strong evidence about their emigration to other seas. In this situation, the key question is what strategy will be followed by Persian Gulf sea turtles in the future? Emigration, adaptation, or extinction? One answer is we are not able to anticipate the future but they may pass through the future global warming as they opted to the past harsh conditions. Sea turtles have existed since the time of the dinosaurs and the earliest marine turtle lived about 120 million years ago. However, we have to note that speed of global warming is probably higher than the ability of adaptation which occurs during the evolutionary times. Furthermore, they are Temperature Sex Dependent (TSD), which means that higher temperatures produce females and lower temperatures produce males. Therefore, if they do not emigrate, their sex ratio of their populations will bias in favour of the female and consequently the reproduction success will dramatically decrease. If we do not mitigate the climate change we must stay to see what decision will be made by species: to be or not to be, this is problem.

Biography

Forough Goudarzi is an ecologist interested in ecosystem conservation and aim to understand how biodiversity respond to anthropogenic change, including climate change, and habitat modification (loss, fragmentation, degradation) at ecosystem level. Her approach is interdisciplinary ways of thinking and practice to conserve entire communities of species by considering their interactions with their biotic and abiotic environment as well as human pressures. She is also increasingly focusing on translational ecology to make better connection of environmental science and top-ended decision makers.

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Assessment of drought conditions and prediction by machine learning algorithms using Standardized Precipitation Index and Standardized Water-Level Index (Case study: Yazd province, Iran)

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²Cardiff University, UK

³Amirkabir University of Technology, Iran

⁴Tarbiat Modares University, Iran

Drought as a natural phenomenon has always been a serious threat to regions with hot and dry climates. One of the major effects of drought is the drop in groundwater level. This paper focused on the SPI (Standardized Precipitation Index) and SWI (Standardized Water-Level Index) to assess meteorological and hydrological drought, respectively. In the first part, we used different time frames of SPI (3, 6, 12, and 24 months) to investigate drought in Yazd, a dry province in the center of Iran for 29 years (1990–2018). Then, in the second part, the relationship between SPI and SWI was investigated in the three aquifers of Yazd by some rain gauge stations and the closest observation wells to them. In addition to using SPI and SWI, we also used different machine learning (ML) algorithms to predict drought conditions including linear model and six non-linear models of K_Nearest_Neighbors, Gradient_Boosting, Decision_Tree, XGBoost, Random_Forest, and Neural_Net. To evaluate the accuracy of the mentioned models, three statistical indicators including Score, RMSE, and MAE were used. Based on the results of the first part, Yazd province has changed from mild wet to mild drought in terms of meteorological drought (the amount of rainfall according to SPI), and this condition can worsen due to climate change. The models used in ML showed that SPI-6 (score ave = 0.977), SPI-3 (score ave = 0.936), SPI-24 (score ave = 0.571), and SPI-12 (score ave = 0.413) indices had the highest accuracy, respectively. The models of Neural_Net (score ave = 0.964–RMSE ave = 0.020–MAE ave = 0.077) and Gradient_Boosting (score ave = 0.551–RMSE ave = 0.124–MAE ave = 0.248) had the highest and lowest accuracy in prediction of the SPI in all four-time scales. Based on the results of the second part, about the SWI, Random_Forest model (score = 0.929–RMSE = 0.052–MAE = 0.150) and model of Neural_Net (score = 0.755–RMSE = 0.235–MAE = 0.456) had the highest and lowest accuracy, respectively. Also, hydrological drought (reduction of the groundwater level) of the region has been much more severe, and according to the low correlation coefficient of average SPI and SWI ($R^2 = 0.14$), we found that the uncontrolled pumping wells, as a main factor than a shortage of rainfall, have aggravated the hydrological drought, and this region is at risk of becoming a more arid region in the future.

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Biography

Experienced Civil and Environmental Engineer with a demonstrated history of working in the environmental services industry. Skilled in AutoCAD, Arcgis Products, Quantum GIS, ENVI, and Expert Systems. Strong engineering professional with a MSc focused in Civil and Environmental Engineering from Amirkabir University of Technology - Tehran Polytechnic.

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Introducing Regional to Local Mineral Exploration Keys for Exploring Possible Orogenic and Epithermal Gold-bearing Quartz Veins at Takab-Takht-e-Soliman, NW of Sananadaj-Sirjan Metamorphic Zone: A Case Study Barout Aghji gold-bearing Quartz veins

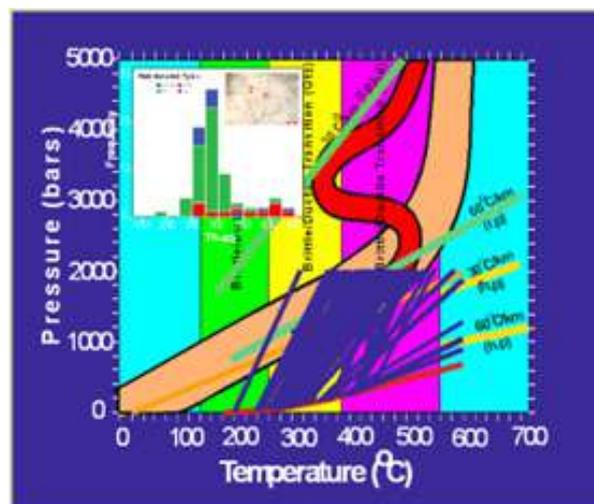
Babak Asli¹, Hemayat Jamali² and Mir Ali Asghar Mokhtari³

¹School of Geology, College of Science, University of Tehran, Iran

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The Barout Aghaji low sulfide gold-bearing quartz veins are located ~90 km northwest of Zanjan, within the Takab-Takht-e-Soleiman Core Complex (TTSCC), a subzone of the Sanandaj-Sirjan metamorphosed-deformed zone. The ore-bearing quartz veins are formed close to low angle detachment right-lateral strike-slip NNW-SSE striking Qeynarjeh - Chartagh fault (40-50° dips to the ENE). They are hosted within Neoproterozoic amphibolite and Eocene to Oligocene granitic gneisses, and both unconformably overlaid by the Oligo-Miocene Upper Red Formation related to an extensional regime. Field observations and petrographic studies show the rock units underwent two deformation stages, as the main host for gold-bearing quartz veins, which are related to regional tectonic tensional and compressional regimes. The first deformation stage was ductile (i.e., the Oligocene to Miocene, Hajjialioghli & Moazzen., 2017), and produced barren sheared milky quartz veins with minor sulfide minerals consisting of low-frequency pyrite and chalcopyrite minerals. In contrast, the second stage was brittle and produced dark to light gray ore-bearing quartz veins at the shallow level of the crust during the Miocene according to Heidari et al. (2015). Fluid inclusion, Sulfur isotope, and petrographic studies indicated two hydrothermal fluid sources so that metamorphic hydrothermal fluids were likely derived by devolatilization and dehydration of host rocks at deep crustal levels during retrograde metamorphism and were possibly mixed with magmatic fluids sourced from the juvenile granitic rock during ascent to upper crustal levels (syn to post tectonic magmatism) during the Miocene period, which is consistent with major metamorphism periods and deformation of the host rocks and possibly with the initiation of the collision of Arabia with Iranian continental crust, synchronous with extensional tectonics after uplifting of the TTSCC (i.e., Moghadam et al., 2016; Biralvand et al., 2019). Fig. 1: The P (bar) vs. T (°C) diagram illustrates the trapping conditions of studied fluid inclusions in the study area (Asli et al., 2023).



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Biography

Babak Asli studied economic geology at the Research Institute for Earth Science, Iran. From 2014 to 2021, he worked for the Geological Survey of Iran and was involved in geological studies. Babak is an active researcher who enjoys developing global ideas to redefine geoscience boundaries, such as implementing global standardization in university geoscience activities. Despite not receiving any research support funding, he remains dedicated to his work. His master's thesis focused on the Barout Aghji Orogenic Gold Deposit, and he is presently engaged in two field studies. The first study assesses the fertility potential of magmatic rocks to uncover concealed epithermal and porphyry deposits based on their whole rock and mineral geochemistry. His secondary area of interest lies in scientometrics studies, which play a crucial role in the global standardization of scientific activities and in the literature reviewing for researchers engaged in their studies. He has presented his idea in the GSA meetings etc.

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P-wave velocity calculation (PVC) in rock mass

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¹Department of Earth Science, University of Kurdistan, Iran

²Department of Engineering Geology, Tarbiat Modares University, Iran

³Institute of Geophysics, University of Tehran, Iran

Ultrasonic studies have been used as low-cost, quickly-updated, non-destructive techniques in geology and geo-technique. Conventional geophysical operations that allow measurements of wave velocity in rock mass are costly. In this study, we sought a strategy for calculation of wave velocity in rock mass without these field operations. The velocity of a wave in rock mass is a function of two major factors: the intact rock and joint properties. Wave velocity has the highest value in the intact rock, and decreases in the presence of joints, the poorer the conditions of the joints, the greater the decrease. Therefore, wave velocity can be predicted from a measurement of velocity in the intact rock and the properties of the joints. In this research, we first measured P-wave velocity in selected Andesite intact samples from the boreholes, and then measured the rate of effect of joint spacing, opening, orientation, infilling, and roughness on wave velocity by inducing joints in the rock. Afterwards, the orientations of the joints were recorded through surficial joint studies at 29 stations in field. Moreover, the characteristics of the underground joints (6,530 joints) were determined through geotechnical drillings along 9 boreholes (with a total length of 840 m). Finally, the velocity of the P-wave in the rock mass was calculated in field along the assumed profiles. For validation, we compared our velocity estimations with available field data along seven profiles with a total length of 644m, coinciding with our assumed profiles. The calculated wave velocity and that measured through geophysical operation in field were in close agreement. Thus, wave velocity in rock mass could be computed at an approximation rate of about 10%.

Biography

Mohammad Fathollahy has PhD in engineering geology, working as assistant professor in University of Kurdistan from 2015. Also he has experience in engineering geology and Geotechnic in many national and international project like Dam, Road and Tunnel design in different companies for more than 12 years. He is interested to innovative issues in geoscience, so he worked on the wave velocity and behaviour in rockmass and tried to achieve a method to calculate the wave velocity in rockmass without applying field geophysical operation as PhD thesis and has published some results.

It should be mentioned as supervisor and advisor, he has graduated some students in engineering geology and geo material area.

He is interested in cooperation and team work in research fields and is willing to work as a team in implementation and research projects.



Operating conditions, products and sustainable recycling routes of aminolysis of Polyethylene Terephthalate (PET) – A review

Desalegn Abera Mersha¹, Tesfa Nega Gesese¹, Zenamarkos Bantie Sendekie¹, Asmare Tezera Admase¹ and Atrsaw Jejaw Bezie¹

¹Department of Chemical Engineering, Bahir Dar Institute of Technology, Bahir Dar University, Ethiopia

²Department of Mechanical Engineering, Bahir Dar Institute of Technology, Bahir Dar University, Ethiopia

Chemical recycling of Polyethylene Terephthalate (PET) has gotten great attention today. Aminolysis, one of the chemical recycling methods, is the degradation of polyesters using primary amines that attack its functional group. It is not much explored as a commercial recycling technique among the chemical recycling methods. This review aims to explain the aminolysis method of PET degradation in terms of reaction operating conditions such as PET to solvent ratio, temperature, degradation time, and catalyst dosage. It was precieved that the interaction effect of these parameter has a major effect on the yield of depolymerized product. The primary product of aminolysis of PET is also discussed and their most common application in the preparation of secondary products is presented. Thus, PET-derived primary products can be used to synthesize polymers such as polyurethane and develop enhanced products like paints and coatings. Additionally, nonconventional procedures of PET aminolysis techniques: such as microwave radiation, ultrasound, UV radiation, and sunlight were assessed by comparison (Figure 1).

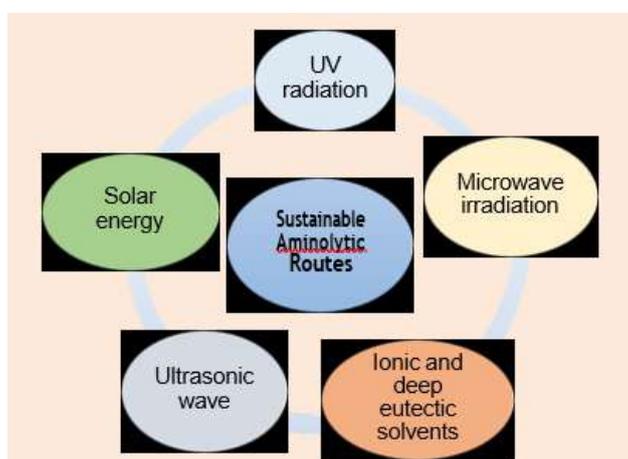


Figure 1: Sustainable aminolytic routes

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Biography

Dr. Desalegn Abera Mersha began his academic journey at Bahir Dar University, Ethiopia, where he earned his Bachelor of Science in Chemical Engineering in 2017. He furthered his studies with a Master's degree in Chemical Engineering, specializing in process engineering, through a collaborative program with KU Leuven University, Belgium. This international experience enriched his research skills and broadened his perspectives. Dr. Mersha has published four research articles in peer-reviewed journals and presented four conference papers, three of which are accepted but not yet released. Currently, he is actively involved in teaching, research, and community service, focusing on innovative solutions that utilize waste materials to minimize environmental impact and enhance resource efficiency. His commitment to impactful research aims to influence both national and international policies.



Lithological, structural, and alteration mapping of uraniferous granitoid using Landsat 8, in the oriental part of the Reguibat shield, northern Mauritania

Brahim Salem-Vall

Pan African University of Life and Earth Sciences in Ibadan, Nigeria

The efficacy of remote sensing techniques for mineral exploration has been well documented. This study employs these techniques to delineate uranium prospective zones in the eastern part of the Reguibat Shield. This region is desert, flat and uncovered by vegetation and presents suitable characteristics for use of satellite images. Radiometric calibration, atmospheric correction, colour composite, principal component analysis (PCA), lineament extraction and band ratios were the main methods performed for the pre-processing and the processing of Landsat 8 OLI images.

Our findings revealed lithological units dominated by felsic rocks associated with metasediments, highlighted using band composites (bands 7, 5, and 3; 7, 2, and 1 in RGB), PCs (PC1, PC2, and PC3), and band ratios (7/5, 5/4, and 6/7 in RGB). Lineament extraction indicated major NNE-SSW deformation trends affecting the geological units. The delineated prospective uraniferous zones showed a spatial distribution linked to an identified shear zone, suggesting structural control of the mineralization.

Validation with existing data and ground truthing demonstrated high agreement, reinforcing the applicability of Landsat 8 OLI for lithological mapping in desert areas. The methodology employed in this research has wide-ranging applications in the identification and delineation of potential uranium-rich regions using remote sensing techniques. For uranium exploration purpose, this approach can be effectively utilized in various other regions to delineate new uraniferous area within the Reguibat shield, as well as in arid and semi-arid areas across the globe.

Biography

Brahim Salem-Vall is a geoscientist currently pursuing a PhD at the Pan African University of Life and Earth Sciences in Ibadan, Nigeria. His research interests span mineral exploration, remote sensing, geochemistry, and petrology. Through his work, Brahim Salem-Vall aims to advance the understanding of uranium mineralization in the Precambrian context of West African Craton.

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Waves and instabilities in relativistic, anisotropic drifting astrophysical plasma

Temesgen Kassaw

Wolkite University College of Natural and Computational Sciences, Department of Physics, Ethiopia

The investigation of plasma waves and instabilities in the context of relativistic, anisotropic drifting astrophysical plasma is the focus of this study. Utilizing fluid equations in the linear regime, the research reveals the emergence of novel instabilities as a result of drift velocity. Furthermore, the study uncovers a modification in the condition for the mirror instability due to the drift velocity. These findings potentially hold significant implications for comprehending plasma behavior in space environments, particularly in regions like the solar wind or the interstellar medium. The study proposes the further development of the theory to directly apply to space plasma, which could enhance our understanding of the intricate astrophysical systems that are driven by plasma dynamics.

Biography

Mr. Temesgen Kassaw received his Bachelor of Education in Physics from Dilla University in 2008, and a Master's of Science in Plasma Physics from Mekelle University in 2013. He Worked at Mizan Tepi University from 2009 to 2019 as a lecturer and researcher. At Mizan Tepi University, in addition to his teaching-learning, research, and community service activities he worked in different academic positions like Head department of Physics, Academic vice Dean, and Dean of College of Natural and Computational Sciences, and Academic program director of Tepi Campus. Starting from September 2019 to date he works at Wolkite University as a lecturer and researcher of Physics under the college of Natural and Computational Science Department of Physics.



Phytochemical composition and In vitro antioxidant and antimicrobial activities of the seed extract of *Bersama Abyssinica* Fresen

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¹Department of Biochemistry, School of Medicine, College of Medicine and Health Science, Dilla University, Ethiopia

²Department of Biochemistry, College of Medicine and Health Science, School of Medicine, University of Gondar, Ethiopia and Flinders University, College of Medicine and Public Health, Flinders Health and Medical Research Institute, South Australia

³Department of Biochemistry, College of Medicine and Health Science, School of Medicine, University of Gondar, Ethiopia

⁴Department of Applied Chemistry, School of Applied Natural Sciences, Adama Science and Technology University, Ethiopia

Background: Medicinal plants can be potential sources of therapeutic agents. Traditional healers use a medicinal plant from Ethiopia, *Bersama abyssinica* Fresen, to treat various diseases. This study aimed to investigate the phytochemical components and antioxidant and antimicrobial activities of *B. abyssinica* seed extracts (BASE).

Methods: Gas chromatography coupled to mass spectroscopy (GC-MS) analysis was used to determine the phytochemical compositions of BASE. The antioxidant activities were assessed by using 2, 2-diphenyl-1-picrylhydrazyl (DPPH) assay, thiobarbituric acid-reactive species (TBARS) assay, ferric chloride reducing assay and hydroxyl scavenging capacity assay. Antimicrobial activity was investigated using the agar well diffusion method.

Result: Phytochemical screening showed the presence of saponins, glycosides, tannins, steroids, phenols, flavonoids, terpenoids, and alkaloids. GC-MS analysis revealed the presence of 30 volatile compounds; α -pinene (23.85%), eucalyptol (20.74%), β -pinene (5.75%), D-limonene (4.05%), and o-cymene (5.02%). DPPH-induced free radical scavenging ($IC_{50} = 8.78$), TBARS ($IC_{50} = 0.55 \mu\text{g/mL}$), and hydroxyl radicals' scavenging capacities assays ($IC_{50} = 329.23$) demonstrated high antioxidant effects of BASE. Reducing power was determined based on Fe^{3+} - Fe^{2+} transformation in the presence of extract. BASE was found to show promising antibacterial activity against *S. aureus*, *E. coli*, and *P. aeruginosa* (zone of inhibition 15.7 ± 2.5 mm, 16.0 ± 0.0 mm, and 16.7 ± 1.5 mm, respectively), but excellent antifungal activities against *C. albicans* and *M. Furfur* (zone of inhibition 22.0 ± 2.0 mm and 22.0 ± 4.0 mm, respectively).

Conclusions: The seeds of *B. abyssinica* grown in Ethiopia possess high antioxidant potential, promising antibacterial and superior antifungal activity. Therefore, seeds of *B. abyssinica* provide a potential source for drug discovery.

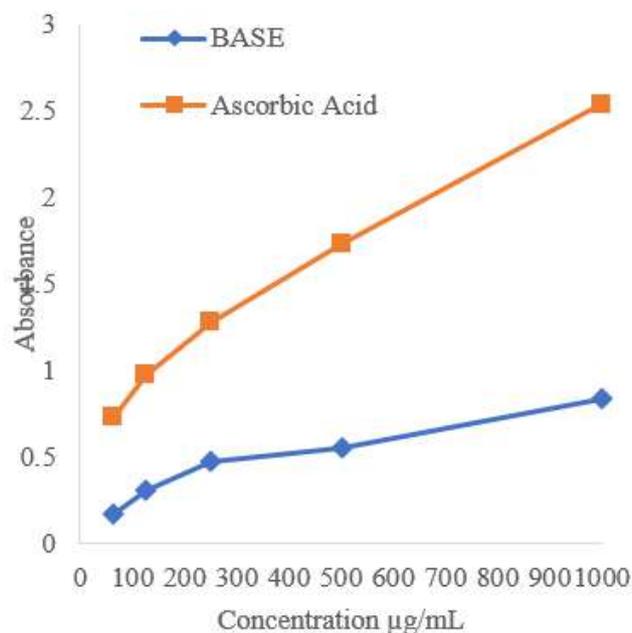
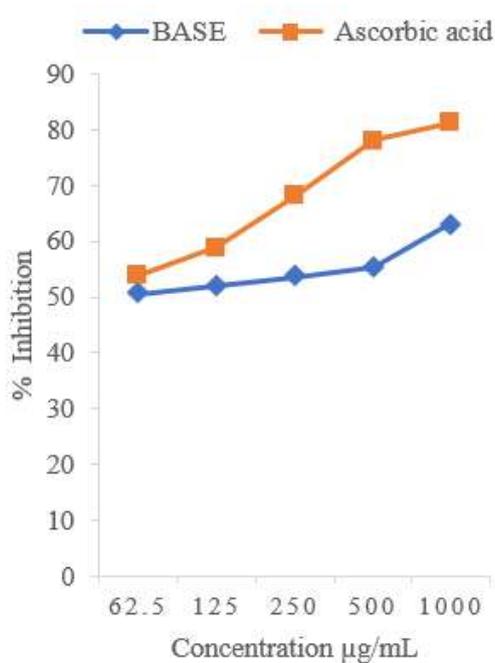


Figure. Antioxidant activity of BASE (a) percentage (%) lipid peroxidation inhibition induced by ferrous sulfate BASE $IC_{50}=0.55\mu\text{g/mL}$, Ascorbic acid $IC_{50}=1.10\mu\text{g/mL}$ and (b) absorption of ferric chloride reducing assay, results were reported as Mean \pm SD of the three experiments.

Biography

Belayhun Alemu Tesema is working at Dilla University as lecture & researcher of Medical Biochemistry, where he has devoted 90 percent of his practice for the last six years. He has extensive experience search. His recent activities include teaching medical science and health science students in medical biochemistry courses, instigating research on phytochemistry and nutrition. He has publications entitled Phytochemical Composition and Invitro Antioxidant and Antimicrobial Activities of the Seed Extract of *Bersama Abyssinica* Fresen,2024:

Belayhun is an avid traveler and has visited over most part of Ethiopia. He's also a horse ride enthusiast and occasionally participates in local horse ride racing competitions. In his free time, you can find him experimenting with phytochemistry in his laboratory at his home. He believes in giving back to the community. He regularly participates in community services.



The intersection of the RBD of SARS-CoV-2 protein production with earth, environmental and climate science

Maryam Saleh, Sohrab Sam, Parisa Roshani-Asl, Zahra Barghi, Vahideh Mazaheri and Behrokh Farahmand

Department of Influenza and other Respiratory viruses, Pasteur Institute of Iran, Iran

Objectives and scope: Changes in climate, temperature and precipitation patterns can impact the transmission dynamics of the highly contagious respiratory infection viruses and influence the timing and severity of their outbreaks. In regions affected by natural disasters or environmental pollution, accurate and efficient testing for the virus is essential to prevent further spread and protect vulnerable populations. The integration of protein purification in serological testing thus serves as a critical tool in addressing public health challenges associated with both natural hazards and pollution control.

In this study, by leveraging the expertise and resources of the Pasteur Institute of Iran, we sought to produce and purify polyclonal antibodies against the recombinant RBD protein of SARS-CoV2 for research applications which plays a crucial role in providing valuable tools for serological tests to detect SARS-CoV-2 infection, particularly in the context of natural hazards and pollution control.

Materials and Methods: According to established protocols, rabbits were immunized with purified recombinant SARS-Cov2 RBD antigen. Serum containing the desired immunoglobulins was isolated using ammonium sulfate precipitation. Immunoglobulin G (IgG) purification was performed using ion exchange chromatography (DEAE-cellulose). The reactivity and specificity of the purified antibodies towards the RBD antigen were assessed using serological assays, including SIRD, Enzyme-linked immunosorbent assay (ELISA), Dot-blotting and Western blot analyses.

Results: The study successfully produced highly purified RBD protein, confirmed by SDS-PAGE and Western blot analyses. ELISA results demonstrated a significant increase in antibody titer against the RBD protein after one month of immunization.

Conclusion: The specific production and purification of polyclonal antibodies against the RBD protein offer valuable tools for serological tests which help in detecting and controlling the spread of SARS-CoV-2 infection, especially in areas prone to natural disasters; not only contribute to public health but also play a significant role in addressing various environmental and climate-related challenges.

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Biography

Maryam Saleh is currently serving at Pasteur Institute of Iran, Influenza and Respiratory Viruses Department as Institute member and research director of microbiology.

Her interest and field of expertise is Microbiology, Immunology, Virology, Cell and Molecular Biology and Biotechnology and most of her research focus is on the antiviral activity. She is generally interested in variety of Molecular cell – biochemistry such as Cell Culture techniques and genetic engineering techniques including protein and DNA extraction and purification, SDS-PAGE, Western Blotting, Protein-Electro-elution, Affinity Chromatography, PCR& RT PCR, and Gene Cloning and she gained satisfying experiences in them.

Maryam has several refereed publications in international journals.



Integration of watershed eco-physical health through algorithmic game theory and supervised machine learning

Hamid Khodamoradi¹, Ali Nasiri Khiavi¹, Mohammad Tavoosi¹ and Alban Kuriqi²

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²CERIS, Instituto Superior Técnico, Universidade de Lisboa, Portugal

In this study, the eco-physical health of the watershed was quantified using the geometric mean method (GMM), game-theoretic algorithm (GTA), and machine learning algorithms such as Random Forest (RF), Support Vector Machine (SVM), Simple Linear Regression (SLR) and K-Nearest Neighbor (KNN) for distributed and semi-distributed monitoring of Talar watershed in Iran. Factors affecting watershed health include LS factor, lithology, soil erodibility factor (K), Topographic Wetness Index (TWI), runoff, slope, Digital Elevation Model (DEM), erosion, runoff density (Dd), rainfall erosivity (Re), curve number (CN), Normalized Difference Vegetation Index (NDVI), moisture, and land use. The Watershed Health Index (WHI) was quantified using GMM, GTA, and various machine learning algorithms in the research methodology. Finally, a watershed health map was created using ArcGIS 10.8 software. According to the results, the RF algorithm was selected as the best optimal model based on MAE, MSE, RMSE, and AUC statistics with values of 0.032, 0.003, 0.058, and 0.940, respectively. The results of WHI prioritization with different approaches showed that the pattern of watershed health changes positively from upstream to downstream. Based on the watershed health prioritization with GMM, it can be said that subwatersheds Int6 and Int5 are the healthiest subwatersheds in the studied watershed, with values of 0.93 and 0.90, respectively. Based on the results of the watershed prioritization using the GTA approach, it can also be said that subwatersheds Int6, Int5, and Int01 were the healthiest. In the RF algorithm, the average values of the pixels in each subwatershed showed that subwatersheds Int6 and Int01 were recognized as the healthiest subwatersheds with values of 0.91 and 0.88, respectively. The most crucial point was selecting Int6 as the healthiest sub-catchment in all three approaches. One of the most important reasons for the healthiness of sub-basin Int6 compared to the other sub-basins was the high values of TWI and NDVI index and the low values of the criteria slope, DEM, erosion, and CN. In general, it can be said that the health index in the studied catchment wholly followed the factors affecting the catchment's health and that the spatial patterns of change of this index were consistent with the physiographic and hydro-climatic conditions in all three semi-distributed and distributed approaches.

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Biography

Hamid Khodamoradi is a PhD student specializing in Watershed Science and Engineering at Tarbiat Modares University in Tehran, Iran. With extensive experience in watershed health projects, river water quality assessment, and sustainable development, he has made significant contributions to his field. Khodamoradi has authored notable articles, including "Integration of Watershed Eco-Physical Health through Algorithmic Game Theory and Supervised Machine Learning" and "Ecological Health and Security of the Jazmurian Wetland Endorheic Watershed, Iran." He has also presented his work at several international conferences in Iran, focusing on environmental issues. His research interests include utilizing green energy and engaging community participation to promote sustainable environmental development.

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Evaluating the skills of the CMIP5 global climate models using multicriteria decision making analysis

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²College of Architecture & Civil Engineering, Addis Ababa Science & Technology University, Ethiopia

³College of Agriculture & Life Sciences, Texas A & M University, College Station, USA

This study evaluates the skills of 30 CMIP5 GCMs and the Multimodel Ensemble (MME) in reproducing the characteristics of precipitation, minimum, and maximum temperature over the Middle Awash sub-basin in Ethiopia. The entire analysis was conducted using historical GCM simulations and observed data for the 1981-2005 period. Both monthly and annual time series (TS) data over the annual and seasonal temporal resolutions were integrated in the analysis. This study adopted two approaches: (a) application of statistical performance metrics (SPMs) - mean, CV, PBIAS, RSR, and r ; and (b) multicriteria decision-making (MCDM) analysis using PBIAS, RSR, and r . The relative weights of the SPMs, in the second methodology, were determined by the entropy method. Besides, the weighted average and compromise programming techniques were employed to rank and select the best-performing GCMs. The findings from the first approach suggested that, for a given variable of interest, a GCM that performs well for one SPM may fail to produce the same for another SPM on the same temporal scale. Likewise, for the same SPM at different resolutions, a GCM may perform well for a one-time scale but poorly for another. Findings revealed that, the skill of GCMs mainly rely on the type of SPM, TS data, and temporal scales chosen for analysis. Furthermore, the CMCC-CMS, BCC-CSM1.1(m), CMCC-CM, BNU-ESM, CanESM2, and MPI-ESM-MR GCMs were skilful, in the MCDM analysis, in simulating the salient features of both variables concurrently. Also, the MME has a better capability in duplicating the climate of the study area over several individual GCMs. Finally, a comprehensive performance evaluation of climate models should involve multiple approaches and SPMs with a range of considerations for dependable results; and instead of aggregating ranks from multiple variables into one, it is recommended to treat each variable independently while developing a subset of best-performing GCMs for ensembling.

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Biography

Endalkachew Tesfaye is a Water and Irrigation Advisor at the Lowlands Livelihood Resilience Project in Ethiopia. He has been employed with the federal and state governments for 18 years in various sectors. His Bachelor's degree is in Soil and Water Engineering from Haramaya University. He has a Master's degree in Irrigation Engineering, and he is now a PhD candidate in the Water Resources Engineering program at Addis Ababa University. He is a registered Professional Irrigation Engineer in Ethiopia. He has been working as an expert, lecturer, researcher, engineer, and advisor in the area of watershed management, water resources management, irrigation and drainage water management, water harvesting, climate change, study and design of irrigation projects, construction supervision, contract management, and advice projects in the sustainable operation and management of water and irrigation facilities, particularly in the lowlands of Ethiopia. Over the years, he has been supporting the implementation of several water and irrigation infrastructures to address key socio-economic bottlenecks and reduce vulnerabilities to climate-related risks in the lowlands that are recurrently affected by drought episodes. In his downtime, Endalkachew enjoys attending spiritual events, reading non-fiction, and volunteering with non-profit organisations.



Assessing the effect of industrial products on air pollution in Iran: A novel NDEA approach considering undesirable outputs

Maedeh GholamAzad

Department of Industrial Engineering, University of Kurdistan, Iran

With the intensification of economic development, environmental pollution has increased over time, especially in developing countries such as Iran, China, and India, and its threat has become more serious. The dramatic increase in the use of various machines, both industrial and non-industrial, and the gases released by industrial factories in exchange for using fossil fuels, and the reduction of rainfall is leading to the production of toxic gases. Therefore, in order to improve environmental and economic sustainability, it is necessary to scientifically assess environmental efficiency in each country and provide solutions. Therefore, in this research, the environmental efficiency criterion based on the network data envelopment analysis model was designed using a two-stage chain model in which some outputs are undesirable and others are desirable. In this regard, the black box efficiency model of environmental quality is first extended to basic and general two-stage structures. Depending on the nature of the network structure, the end products were considered undesirable and some of the factors with zero data were entered into the proposed models. Second, the proposed models were used to evaluate the environmental efficiency in Iran, and 20 Iranian metropolitan provinces were selected for assessment. Finally, the efficient and inefficient provinces have been identified in each sub-sector, and their ranking has been done according to the efficiency rate. The results of the proposed models showed that of the 20 provinces, Isfahan, Khuzestan, Tehran, East Azarbaijan, and Alborz have the worst climate and air pollution situations. On the other hand, Kurdistan, Hamedan, Markazi, Lorestan, and Qazvin have the best air quality among other cities. To reduce air pollution, there must be adequate plans to improve public transportation infrastructure and introduce air pollution control systems, which could include stricter control of factories that do not meet or exceed acceptable levels of pollutants in the surrounding atmosphere. the supply of cars based on electricity or with the lowest amount of fossil fuel consumption, implementation of precise monitoring plans for cars on fuel consumption, the use of filters for manufacturing plants in the industrial sector, and careful monitoring of its implementation during all hours that they are active and increase the cost of polluting the air by imposing taxes and heavy penalties on the amount of pollution emission and payment of subsidies to pollution-reducing units in a certain period are some solutions to reduce air pollution.

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Biography

Maedeh GholamAzad, born on March 18, 1985, in Zanjan, Iran, is a dedicated optimization model designer and researcher. Currently residing in Kurdistan, Sanandaj, Iran, she holds a position as a Graphic Designer at Creative Minds Inc. since 2014. She is also a university lecturer at the University of Kurdistan's Department of Industrial Engineering, where she supervises MSc and doctoral theses. Maedeh's expertise spans artificial intelligence, optimization modeling, supply chain management, and healthcare prediction. Fluent in English, Persian, and Turkish, she possesses strong communication and leadership skills, with proficiency in Python, SPSS Modeler, GAMS, Weka, MSP, and Microsoft Office. Her personal interests include volunteering by teaching software classes and engaging in sports like hiking and running. Maedeh is passionate about leveraging design to convey ideas and drive innovation across various domains.

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The role of urban and regional development plans in the face of climate change

Zahra Mahvash Mohammadi and **Naser Barakpour**

Urban Planning Department, Faculty of Architecture and Urban Planning, University of Art, Iran

Today, cities serve as pivotal hubs for endeavors that present abundant opportunities to employ strategies aimed at both mitigation and adaptation to limit the average increase in global temperatures (Un-Habitat, 2020). Urban plans compel city regions to mitigate the adverse effects of climate change through adaptation and mitigation solutions and contribute positively to improving conditions (Buzási, 2021; Sharifi, 2022). As shown in Figure 2, the practical-analytical approach Awareness -Analysis -Action (A-A-A) is a framework for examining the capacity of local plans in confronting climate change (Kumar et al, 2016). This model develops the key concepts of climate change by transforming them into specific indicators to enhance our understanding of how to integrate mitigation and adaptation approaches to climate change into local planning. To enhance community preparedness for coping with potential adverse effects of climate change, planners must identify three vital components: awareness, analysis, and action. Utilizing both quantitative and qualitative content analysis methods, this research assesses six urban and regional development plans in Isfahan, considering 31 indicators across 10 dimensions and three components of the analytical approach in addressing the effects of climate change. Based on the preliminary research findings, it can be stated that these plans inadequately address and respond to the issue of confronting the impacts of climate change, and the role of development plans in integrating climate change issues with other concerns at the local level is still limited and insufficient. The overall assessment indicates that the plans exhibit a low level of awareness, a moderate level of analytical capability, and limited action response for integrating issues and effects related to climate change at the local level. Emphasizing mitigation and adaptation approaches to climate change is inevitable for enhancing awareness, conducting a comprehensive analysis of impacts, and adopting tangible actions in local development plans.

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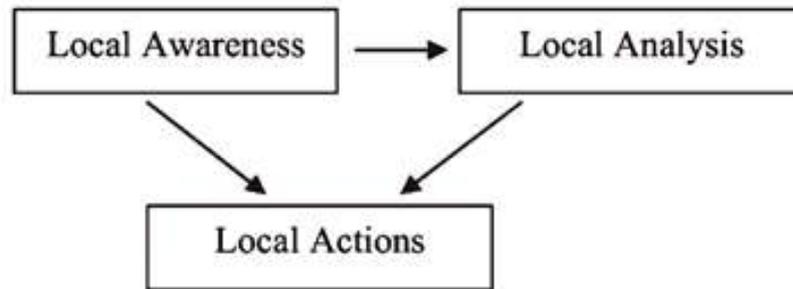


Figure 2: Conceptualization of the Evaluation of the Quality of Local Development Plans with a focus on climate change considerations; (Tang et al, 2010)

Biography

Zahra Mahvash Mohammadi, Master of Urban Planning, Urban Planning Department, Faculty of Architecture and Urban Planning, University of Art, Tehran, Iran.



A methodology for transformation between geodetic datums used in Syria

Al-Kasem. Shaza, Ramadan A. Al-Razzak and Jibrini. Hasan

Department of Topographic Engineering, Faculty of Civil Engineering, Aleppo University, Syria

Global Navigation satellite system (GNSS) provides geodetic coordinates referenced to the world ellipsoid WGS84, whereas positions are computed on the local ellipsoid adopted for geodetic computation in various countries. Thus, to take advantage of GNSS in geodetic applications, the need arises to transform coordinates from the global ellipsoid to the local ellipsoid. This is usually carried out by applying geometric transformations models to convert coordinates from The Global Geodetic System WGS84 into the local systems used in each country of the world and into the grid coordinates of local systems. Over the past years, with the increasing of utilization of GNSS in a number of geodetic projects, a numerous of methodologies are available for the solution of transformations issue. These methods can be classified into three categories, the first is based on direct mathematical formulas, the second on iteration approaches and the last category depends on direct transformation from the global system to the local system based on the calculation of transformation parameters (three, seven, nine...). In this study, a methodology has been proposed for direct transformation from global geodetic coordinates to local geodetic coordinates for a limited area in Syria. It's based on the properties of the ratio and proportion between the geometrical elements of points on global and local ellipsoid without calculation of transformation parameters. The results are compared with some studied method (Bursa-wolf, Molodensky abridge and Cassini). The resulting accuracy is about ± 3.5 cm. The main conclusion drawn is that, the proposed method provides a promising alternative in coordinates transformation. Therefore, the capability of the suggested methodology as a powerful method for converting geodetic coordinates from referenced frame to another has been demonstrated in this present study.

Biography

Shaza Al-Kasem is a recent PhD graduate in Topographic Engineering, originally from Syria. She completed her bachelor's degree in civil engineering with a focus on topographic engineering at the University of Aleppo. Due to the Syrian crisis, her master's studies were interrupted for several years, but she eventually completed her degree and pursued a PhD. Alongside her academic pursuits, Shaza has published multiple articles in her field and participated in The 8th Smart City Applications International Conference held at ESTP, Paris, from October 4-6, 2023. Currently, she resides in Jeddah, Saudi Arabia, and works as a teaching assistant. Shaza's dedication to her field and resilience in overcoming obstacles highlight her commitment to advancing topographic engineering.

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Ideal approaches of mobilising local communities to participate in climate change adaptation in Mpanga catchment, Western Uganda

Racheal Ddungu Mugabi
Makerere University, Uganda

Objective: The study investigated ideal approaches for mobilising local communities to participate in climate change adaptation in the Mpanga catchment.

Methods and Scope: The study worked with Participatory communication for development supported by catchment community development approaches to collect data from 580 respondents of Kamwenge, Kabarole and Kyenjojo districts in Western Uganda.

Results: Results revealed that the best approaches to mobilise local communities to participate in adaptation drives fully are categorised into two including: one; i) use of work with local services development strategy, communities participatory learning and action, community-based management system which involves sensitization, formation and training to conserve the catchment, and public advocacy and two work with media, local leadership, religious leaders, cultural leaders and institutions (schools and markets). The most significant climate change adaptation measures undertaken in the catchment include tree planting, restoration of hilly and mountainous areas, wetland restoration, awareness creation, the establishment of institutions (Catchment Management Committees and Water User Groups) and promotion of income-generating activities such as revolving fund, incentives in the form of physical items like cows and trees.

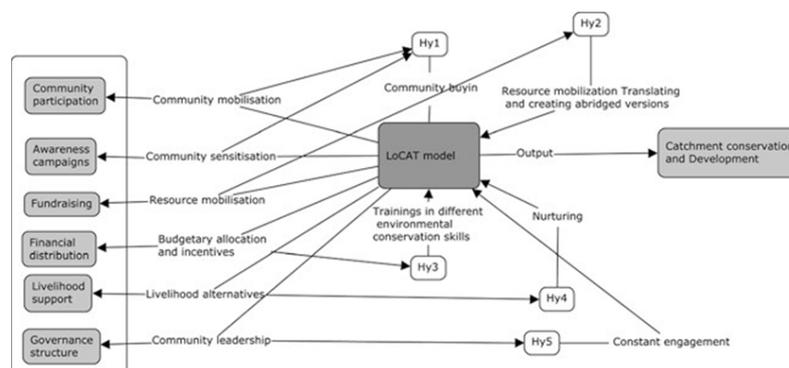


Fig. 1 Proposed model that puts local communities at the centre of catchment resource management.

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In conclusion. The study recommends carrying out massive awareness, capacity building and implementing environmental policies from catchment to micro catchment levels to ensure the continuity of implemented climate change adaptation measures.

Biography

Racheal holds a PhD in Development Studies. Her research interest lies at the intersection of gender, disability, education, employment and climate change. Racheal is currently a Lecturer at Makerere University. Racheal also worked as a consultant at Refugee Law Project, Plan International, and AVSI. Her accomplishments include several published papers and technical reports. She is inspired by societies with climate actions, quality education, decent work, peace, justice and strong institutions. Her goal is to contribute to the development of inclusive policies and programs that promote sustainable employability for individuals with disabilities while addressing the environmental challenges posed by climate change. Racheal is social with a great sense of humour, embraces diversity, likeable character, commendable integrity accompanied with management skills. She loves doing charity work, reading scientific, inspirational and cook books, touring world life and visiting ocean waters.



Prediction of Distribution of Dry Matter and Leaf Area of Faba Bean (*Vicia faba*) Using Nonlinear Regression Models

Najibullah Ebrahimi, Ahmad Reza Salihi and Sabqatullah Alipour

Chazni University, Afghanistan

Growth analysis is a valuable method for quantitatively investigating the growth and development of products. To analyze plant growth during the growing season, access to accurate and regular plant information is needed, which is obtained by measuring leaf surface and dry matter accumulation. The use of non-linear regression models is expanding due to having parameters with physiological meaning in growth analysis. Of these models, there are beta, logistic, Gompertz, Richards, linear, cut and symmetric linear models. Therefore, this study was conducted on bean plant of the variety "Barakt" under factorial experiment in the form of basic Randomized Complete Block Design with four crop densities in four replications under rainfed conditions at the research farm of Gorgan University of Agricultural Sciences and Natural Resources in 2014-2015, located in the west of Gorgan, with a latitude of 37 degrees and 45 minutes north and a longitude of 54 degrees and 30 minutes east and an altitude of 120 meters above sea level. In this study, the non-linear beta and logistic regression models were fitted to leaf surface data, and beta, Gumpertz and logistic models were fitted to bean dry weight. The AICc criterion analysis showed that the beta model had a better fit than the logistic model for leaf area. According to this model under various crop densities, LAI_{max} was between 2.30 and 5.30 grams per square meter, t_m was from 131.90 to 144.20 days after planting and t_e was between 158.7 and 163.50 days. Also, the analysis of the AICc criterion for dry matter accumulation showed that the beta model was better in fitting the dry matter accumulation than Gompertz and Logistic models. According to this model, W_{max} varied between 1.725 to 1484.3 grams per square meter, t_m between 138.30 and 146.40 days after planting and t_e was between 162.60 and 179.0 days in different densities.

Biography

Najibullah Ebrahimi was appointed as an assistant professor at Ghazni University in 2019. He holds a bachelor's degree from Ghazni University and a master's degree from Gorgan University of Agricultural Sciences and Natural Resources, Iran. He has made a significant contribution to the advancement of knowledge and scientific research by publishing More than 10 scientific articles in international journals.

Focusing on topics related to agriculture and life sciences, Najibullah strives to guide students towards innovative and practical research. By leveraging his academic and research experiences, he has greatly contributed to improving the quality of education and enhancing the academic standards of the university.



Carbon stock dynamics in Ethiopian forests: A systematic review

Melkamu Kassaye, Etsegenet Emiru, Yonas Derebe and Alemu Tsega

Department of Forestry and Climate Science, Injibara University, Ethiopia

Determining the quantity and quality of Ethiopian forest carbon pools through a synthesis of recent studies has important implications for sustainable forest management, climate change mitigation policies, strategies, and global initiatives. Some review studies focused on soil organic carbon and biomass allometric equations, but they did not provide comprehensive information on all forest carbon pools. Thus, this review sought to synthesis determinants impacting forest carbon dynamics, emphasizing the role of carbon pools in sustainable forest management and natural balance. A systematic review of 113 research articles in Ethiopia utilizing the PRISMA principles, with an emphasis on forest carbon dynamics and carbon pools. Based on the studies referenced, nineteen biomass allometric models have been developed for native tree species, agroforestry, and bamboo forests in various forest ecosystems. These site and species-specific allometric models emphasize the validity of DBH as a predictor variable. The moist montane forest ecosystem has the most forest carbon pool (693.1 ton/ha), followed by natural forest (426.3 ton/ha), medium elevation (411.91 ton/ha), and PFM forest (585.1 ton/ha). In terms of land use, open natural forest had the biggest carbon pool (394.58 ton/ha), followed by agroforestry (269.1 ton/ha) and cultivated land (242.24 ton/ha). Even though natural forests have a high potential for destruction and fragmentation, they significantly reduce forest carbon sequestration potential by 42.4%. Woody biomass has the highest potential for carbon sequestration (212.9 ton/ha), followed by soil organic carbon (121.7 ton/ha) and litter, grass, and herbaceous biomass (7.4 ton/ha). Determining forest carbon pools has a significant impact on sustainable forest management and meeting carbon offset project requirements in Ethiopia. It is critical for mitigating climate change by increasing carbon pools and limiting land use changes. Using site and species-specific equations, trees absorb carbon from the atmosphere, promoting resilience through climate policy and funding decision-making such as REDD+.

Biography

Melkamu Kassaye Mekonen is a researcher and instructor at Injibara University, Ethiopia, specializing in forestry and climate science. He earned his BSc in Forest and Nature Conservation from Mekelle University and an MSc in Forest Management and Utilization from the University of Gondar. With four years of research experience and five years of involvement in education, research, and community-based projects, Melkamu has developed expertise in forestry, climate change, and agricultural fields. His research interests include natural forest optimization, ecological interactions, and the management of bamboo forest resources for climate change mitigation and adaptation. Melkamu is committed to advancing his knowledge in forestry and aims to pursue a PhD to further explore these critical areas.



Application of resistivity and RS/ GIS methods surveys to delineate Hydrogeological features: A case study in western part of Iran

A.Taheri Tizro and **D. Bagheri**

Department of water and Science Engineering, Agriculture faculty, Bu-Ali Sina University, Iran

Groundwater is a reliable source of water in arid and semi-arid regions and therefore, groundwater potential maps studies can constitute a valuable tool for sustainable management in arid regions. In the present study, the use of RS and GIS is integrated with Vertical electrical soundings data (VES) to assess the groundwater resources of the Asadabad plain in western Iran. Groundwater potential model and map were developed for the plain. The model was based on remote sensing techniques and hierarchical analysis, while geoelectric data were used to verify the results of the study. The model parameters include the lithology, density of lineaments, drainage density, topography, slope, slope aspect, land use, distance from streams, distance from lineaments, rainfall, and air temperature. All different layers of information were classified as standard maps by expert judgment and field visits, and each category is ranked from 1 to 10 according to its degree of importance. Also, each layer is assigned an appropriate weight based on the groundwater potential using the hierarchical analysis process. The resulting map of the study area was quantitatively and qualitatively zoned into five classes of excellent, good, moderate, very low, and poor. The results obtained were compared with field electrical resistivity surveys and a high correlation was found. The results obtained from the groundwater potential map were validated by comparison with lithologic and water-level data, thus delineating Hydrogeological features and demonstrating the accuracy of the applied method.

Biography

Dr. Abdollah Taheri Tizro is an Associate Professor at the Department of Water Engineering; College of Agriculture, Bu-Ali Sina University, Hamedan, Iran. He obtained his PhD degree in Hydrology (Hydrogeology) from the Department of Hydrology, Indian Institute of Technology, Roorkee, India. His research interests are mainly concerned in application of geophysical on Sub surface geological, Lithology variations, groundwater potential, Groundwater modeling, Field Hydrogeology, Aquifer Vulnerability to Pollution, Groundwater management and Quality. He is author of three books on groundwater (in Persian). He has supervised thesis of more than 12 Master students on water engineering. He has published a number of manuscripts in national and international journals. He has participated in many national projects for the past 28 years. Computer skills: Windows applications programs, Surfer, Mudflow, Geophysical interpretation programs and GWW etc,



Nutritional value and agronomic traits of forage sorghum under drought stress

Behzad Sani

Shahre Qods Branch, Islamic Azad University, Iran

Drought negatively affects the crop yield and nutritional value of forage sorghum. The effect of drought on forage sorghum was investigated in a two-year, strip plot field experiment with a randomized complete block design. The vertical factor included four levels of drought stress (mild, moderate, severe, and extreme), and the horizontal factor consisted of four forage sorghum genotypes (Spidfid, Sugargraze, Jumbo, and Pegah). The results showed that drought stress negatively influenced plant height, number of leaves, biomass, leaf-to-stem ratio, and seed yield and yield components, as well as crude protein and prussic acid contents of sorghum. However, the different genotypes did not show the same responses to drought stress. The highest forage yield was observed in Spidfid genotype under mild stress by 121.6 ton/ha, the lowest related value (30.5) was obtained in Sugargraze genotype under extreme drought. The highest seed yields were recorded in the Spidfid genotype in mild and extreme stress treatments (7861 and 4839 kg/ha, respectively). The Sugargraze genotype showed the highest yield reduction under extreme stress. The nutritional value of forage was significantly higher in the Spidfid genotype, and the same genotype contained the lowest prussic acid content under mild and extreme stress conditions by 87 and 86 mg/kg, respectively. However, the crude protein content of the genotypes was not significantly different under severe stress. Therefore, using the Spidfid tolerant genotype and reducing the irrigation period in water shortage conditions, can be a promising solution to achieve the ideal quantitative and qualitative yield of sorghum forage.

Biography

Dr. Behzad Sani is a faculty member in the Agro-Technology Department at Islamic Azad University,Shahre Qods Branch, Tehran, Iran .He received B.S and M.Sc degree in Agronomy, from Islamic Azad University of Karaj Branch and Ph.D degree in Agroecology from Islamic Azad University ,Tehran Research and Science Branch. Dr. Sani is a member of international conferences committees and serving as editorial board member and reviewer of a number of reputed conferences and journals in the field of sustainable agriculture and food security. he has published numerous articles at international conferences.



GIS and remote sensing-based flood risk assessment and mapping: The case of Dikala Watershed in Kobo Woreda Amhara Region, Ethiopia

Hailu Ayene Kebede² and Wondim Alemu Ayenew¹

¹*Woldia University, Woldia, Ethiopia*

²*Wollo University, Dessie, Ethiopia*

The most destructive natural disasters that harm both natural and man-made features on the surface of the world are floods. The study area, which is located in the low-lying areas of the Amhara Region, is characterized by intensive human activity, a steep slope, heavy summertime rainfall with high drainage density and a predominance of verti soil type, as well as proximity to rivers, all of which have been identified as factors that increase the risk of flooding. For the examination of vulnerability, data on population and land use were employed, and data on flood depth were used for further analysis. The primary goal of the study was to evaluate the flood risk in the Dikala Watershed in the Kobo Woreda Amhara Region using remote sensing and geographic information system (GIS) techniques. This was accomplished by weighing the “vulnerability” and “hazard” elements that contribute to flooding individually at various degree levels using the rank-sum approach. Using a raster calculator, the final vulnerability and hazard index was multiplied to create the risk map. The study’s key findings indicated that the danger and hazard of flooding were between “moderate” and “high.” Future land use and development activity should be done to reduce the risk of flooding in the study area using these flood risk maps for the river and the Dikala watershed.

Biography

Hailu Ayene Kebede, born on March 21, 1989, is a dedicated researcher and instructor in GIS and remote sensing at Wollo University, Ethiopia. He earned his B.A. in Geography and Environmental Studies from Mizan Tepi University in 2010 and pursued his M.Sc. in GIS and Remote Sensing at Bahir Dar University, graduating the same year. With a strong passion for geographic information systems and environmental science, Hailu began his academic career in 2016 at Wollo University, where he continues to contribute to both research and education. His work is centered on GIS, remote sensing, and their applications in environmental studies, helping to advance knowledge and solutions in these critical fields.



Analyzing rainfall trend and drought occurrences in Sudan Savanna of Nigeria

Ernest Benjamin Ikechukwu Ugwu^{1,2}, Desmond Okechukwu Ugbor¹, Jonas Udoka Agbo¹ and Abigail Alfa¹

¹Department of Physics and Astronomy, University of Nigeria, Nigeria

²Natural Science Unit, University of Nigeria, Nigeria

Monthly precipitation data that span from 1986–2019 (34) years were downloaded from the website of Nigeria Meteorological Agency, (NIMET), Abuja, Nigeria and were used to assess rainfall trend and drought occurrences in the Sudan Savanna of Nigeria. The non-parametric Mann–Kendall test was employed to test for trends while Standardized Precipitation Index (SPI) was used to generate SPI values and graphs. Our findings show that rainfall is on the declining trend in Gombe (z-value = -0.5930) and Kaduna (z-value=-2.520) but on increasing trend in Sokoto (z-value = 1.9272). Kaduna alone with P-value of 0.0117 which is less than 0.05 level of significance showed monotonic declining trend. In Sokoto, even though there is an increase, it is not monotonic since the P-value of 0.0540 is greater than the significant value of 0.05. The SPI values show only two extreme droughts in Kaduna in 2004 and 2013 with SPI of -2.04 and -2.08 respectively. Some of the years experienced moderate to severe drought in all the stations while near normal condition is predominant in all the stations. Apart from the only incidence of extreme flooding in Sokoto in 2019 with SPI of 2.755, there were a few incidences of severe wetness or moderate wetness for the other years in all the stations.

Biography

Ernest Benjamin Ikechukwu Ugwu was born and raised in Obollo, a town very close to the ancient University city of Nsukka. Currently, he is a Senior Lecturer and researcher at the Department of Physics and Astronomy, University of Nigeria, Nsukka. He did his primary and secondary education in Central School, Ibenda and Obollo High School, Obollo Eke respectively. He got all his degrees (B.Sc, M.Sc. and PhD) from University of Nigeria, Nsukka, specializing in Atmospheric Physics with bias in Meteorology and Solar-terrestrial Physics.

His research interest is on climate change, environmental Science and solar-terrestrial Physics. He has many book chapters and journal articles to his credit. He has attended many international conferences including COSPAR 2015 Conference in Singapore. Dr. Ugwu was at the University of Delaware, Newark where he worked with Prof. David Legates and others on tropical cyclone.



Network of mobile systems: Mutual influence of oscillators and agents

Venceslas Nguefoue M¹, Thierry Njougouo², Patrick Louodop¹, Hilaire Fotsin¹ and Hilda A. Cerdeira³

¹University of Dschang, Cameroon

²University of Namur, Belgium

³Sao Paulo State University, Brazil

Different behaviors emerging from the unknown have been examined in networks of mobile agents in recent years. This work presents a network of mobile systems whose nodes are constituted by a moving agent in a boundary space with an internal state describe by an oscillator, which influences each other. The coupling topology of the agents and internal oscillators changes over time according to the interaction range also called vision range or vision sizes (Majhi et al. Phys Rev E 99: 012308, 2019) of their corresponding counterparts. The goal is to investigate the dynamics of the oscillators and the agents in the considered systems. Our results show that the synchronization between agents and that between oscillators depends on the coupling parameter of the oscillators, the velocity of the agents and the interaction range of both agents and oscillators. We have found that the vision range of the oscillators has a great influence on the dynamics of the agents (see the graphe (a)). Among this dynamics, we can mention phase synchronization (see (a) and (b)) and clusters formation in the mobile system and complete synchronization (see (c) and (d)) as well as clusters formation on the oscillators. The stability of the synchronization in the oscillators is investigated using the Master Stability Function (MSF) developed by Pecora and Carroll (Phys Rev Lett 80: 2109, 1998).

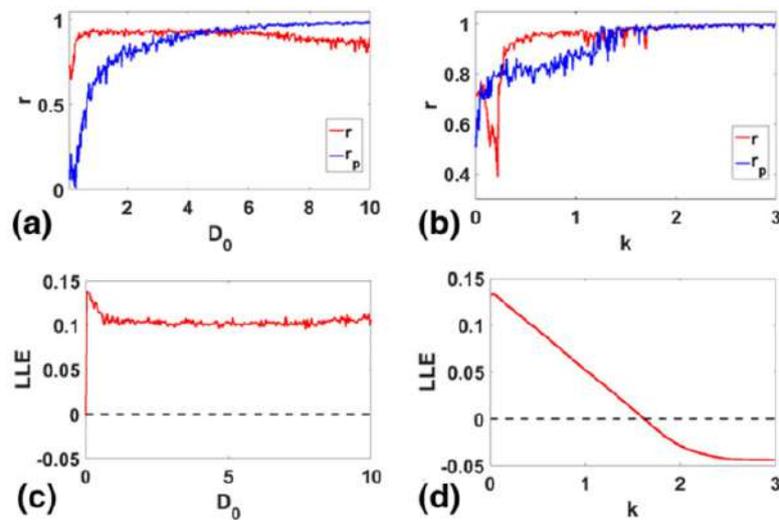


Fig. 1 Synchronization dynamics in the oscillator's network (red) and in the moving network (blue): a as a function of the values of the oscillators' vision range D_0 ($u = 1$, $k = 0.5$, $d_0 = 2$); b as a function of the values of the coupling coefficient k ($u = 1$, $D_0 = 2$, $d_0 = 2$); c and d evolution of the Largest Lyapunov Exponent in the oscillator's network, as a function of D_0 for $k = 0.5$ and of k for $D_0 = 2$ respectively.

Biography

NGUEFOUE MELI Venceslas is a dedicated Cameroonian national and a doctoral student at the University of Dschang. A member of the Cameroon Physical Society (CPS), he is committed to contributing to Cameroon's global standing in education and scientific research. As a lecturer at the University of Dschang, Venceslas has coordinated several projects under the supervision of his thesis director, leading to the successful defence of multiple master's theses. Passionate about scientific research, he has published three articles in reputable journals on current topics. With a keen interest in mobile systems, Venceslas is always eager to share his expertise and foster collaborations that aim to not only develop innovative ideas but also apply research outcomes in real-world scenarios. His work reflects a strong drive to push the boundaries of knowledge and contribute to the scientific community.



Landuse, landcover change dynamics and flooding in the lower Niger Basin Onitsha, South Eastern Nigeria

Ani D. Chinedu and **Ezebube M. Nkiruka**

Centre for Environmental Management and Control, University of Nigeria, Nigeria

This study investigated changes in land use and land cover over a decade (2008-2018) in the lower Niger Basin, specifically focusing on Onitsha and its association with recurrent flooding. Using three sets of ETM+ (Landsat imageries) from 2008, 2013, and 2018, we generated GIS-based land use/land cover maps for the area. Our findings reveal a notable increase in built-up areas between 2008 and 2013 by 9.4%, followed by a further increase between 2013 and 2018 by 5.5%, totaling 470Ha and 275Ha, respectively. Over the entire decade, built-up areas expanded by 745Ha, while vegetation declined by 735Ha, with significant losses observed between 2008 and 2013 and a continued decline between 2013 and 2018. Bare ground saw a slight increase between 2008 and 2013 by 1.3% (65Ha), followed by a marginal decrease between 2013 and 2018 by 0.3% (15Ha). Water bodies increased between 2008 and 2013 by 40Ha but decreased between 2013 and 2018 by 100Ha. These findings highlight substantial reductions in vegetation cover, crucial for ecosystem stability, soil water retention, and absorption rates in the Lower Niger Basin. Consequently, these land cover changes are likely to exacerbate flooding. We also mapped high flood-risk zones to aid in land use policy monitoring and management in the area.

Biography

He has published more than 22 research articles, mainly on environmental pollution, erosion, flooding and near-surface geophysics. His most recent study in Land Use abuses at Onitsha earned him a provisional nomination for the esteemed Best Researcher Award at the 2023 International Young Scientist Awards.

Chinedu currently resides in Enugu, Nigeria, with his family, where he finds inspiration for his upcoming projects in the fields of Environmental science, Computational Physics, and Geophysics.



Root system architecture analysis of sorghum genotypes and its effect on drought adaptation

Hailemariam Solomon, Taye Tadesse, Daniel Nadew and Firezer Girma

Ethiopian Institute of Agricultural Research, Ethiopia

Sorghum is an important crop in semi-arid regions and has shown resilience to drought stress. However, recurrent drought is affecting its productivity. Therefore, it is necessary to explore genes that contribute to drought stress adaptation to increase sorghum productivity. This research aims to assess and ascertain root system architectures' effect on grain production performance and drought stress adaptation, particularly root angle. A total of 428 sorghum genotypes from the Ethiopian breeding program were assessed in three drought-stressed environments. Stay-green and non-stay-green sorghum genotypes were used as the experimental materials. The field tests were carried out using a row column design with three replications. Root system traits were phenotyped using a high-throughput phenotyping platform and analysed using a row-column design with two replications. R software was used to compute regression and variance analyses. The result indicated that stay green genotype exhibited the maximum grain yield of 4.4 tons/ha and the non-stay green genotype yielded 3.0 tons/ha. The analysis of root angle showed that non-stay-green genotypes had an angle ranging from 8.0 to 30.5 degrees, while stay-green genotypes had an angle ranging from 12.0 to 29.0 degrees. Root angle and root length traits had a negative phenotypic correlation ($r = - 0.02$). In summary, narrow root angle genotypes yielded the maximum grain yield under drought stress conditions. Second, the correlation between the narrow root angle trait and grain production showed that the connection between the two traits to maximize sorghum productivity for both stay-green and non-stay-green genotypes. However, the productivity of narrow root angle genotypes was higher for stay-green sorghum genotypes. Finally, the negative correlation obtained between the root angle and grain yield traits for stay-green genotypes has justified the possibility of using the stay-green trait to select sorghum genotypes with narrow root angles.

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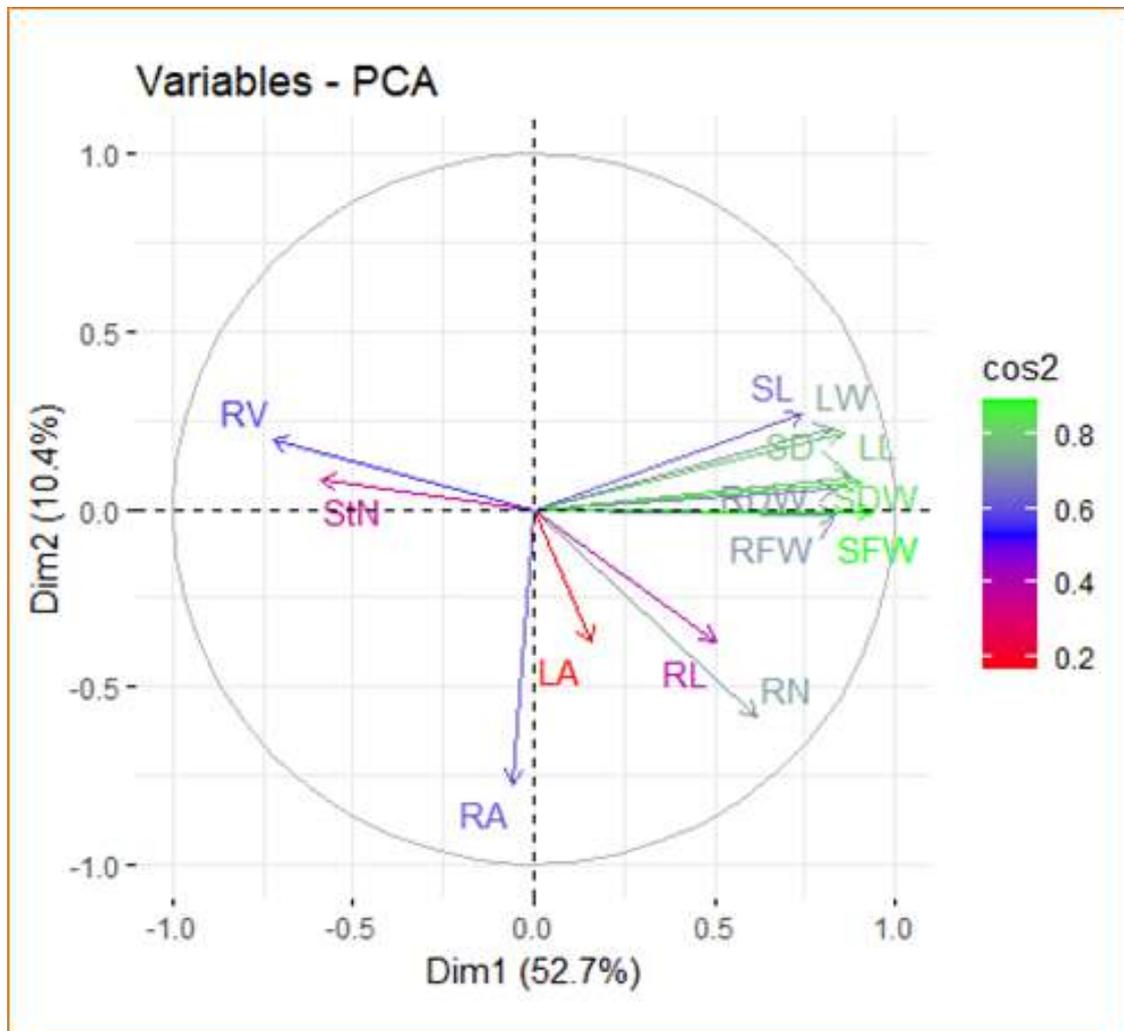


Figure 1: Principal component analysis of stay green gene introgressed sorghum genotypes

Biography

Hailemariam Solomon is a dedicated researcher at the Ethiopian Institute of Agricultural Research with over 14 years of experience working in national and international research institutions across Africa, Asia, and Europe. He earned his MSc in plant breeding from Haramaya University in 2014 and has since made significant contributions to the field, particularly through his leadership of the Sorghum research project focused on climate change adaptation, funded by the International Development Research Centre (IDRC/CRDI) of Canada. In 2016, Hailemariam was awarded for his innovative development of sorghum varieties tailored for the humid lowland agro-ecology of Ethiopia. His expertise extends to proposal writing, data management, and statistical analysis, and he has published numerous research articles in prestigious international journals. Currently, his research focuses on sorghum adaptation to drought stress and the root system traits that enhance productivity. Hailemariam remains committed to advancing agricultural research and contributing to global food security.



Volcano-stratigraphy and Petrography of bimodal volcanic rocks suites of Mekane Selam area, Northwestern Ethiopian volcanic plateau

Habtamu Alemu Alehegn

Mekdela Amba University, Ethiopia

The volcanic stratigraphy and petrography of compositionally bimodal volcanic rocks in the Mekane Selam area were characterized by detailed field investigation, spatial and systematic sampling, and petrographic analysis. Three successions of basaltic rocks with rhyolitic and trachytic rock units at the top with a substantial volume of felsic pyroclastic deposits were categorized as the typical lithological formations in the study area. Volcanic rock types present in the study area include: plagioclase phyric basalt, plagioclase-pyroxene phyric basalt, pyroxene-plagioclase phyric basalt, pyroxene-olivine phyric basalt, pyroxene phyric basalt, olivine phyric basalt, rhyolite, and trachyte from bottom to top. The basaltic rocks are composed of plagioclase, clinopyroxene, and olivine phenocrysts with minor Fe-Ti oxides (Ilmenite and magnetite's). The common phenocrysts of trachyte rocks are sanidine, plagioclase, Fe-Ti oxides, and minor hornblende and green pyroxenes (aegirine). Rhyolites contain quartz and sanidine phenocrysts.

Biography

Habtamu Alemu was born on May 29, 1996 at Dembecha Woreda, West Gojjam, Ethiopia.

His Current Address is Tulu-Awulia, South Wollo, and Ethiopia

He has studied and completed Masters of Science in Geology/Petrology and mineralogy/ with a CGPA of 4.00/4.00, and Thesis result of excellent at Bahir Dar University, 2022/2023.

He has also completed his Bachelors of sciences in Geology with a CGPA of 3.88/4.00, University of Gondar, 2018 G.C. 4.

He have done Project works like: Assessment of the quality of aggregates and quarry materials as a construction material in Gondar town, 2018.

Iron ore occurrence assessment and Quality characterization on sandstone and Granite rocks, from Mekane selam Area, Wollo Ethiopia, 2021 G.C.

Petrographic and Geochemical analysis of Granitoid rocks from Baso-Liben Area, East Gojjam, Ethiopia, and 2022 G.C.

Volcano-Stratigraphy, petrography, and geochemistry of bimodal volcanic rocks suites from Mekane Selam Area, South Wollo, Ethiopia, 2023 G.C. Publication: Volcano-stratigraphy and petrography of bimodal volcanic rocks suites of Mekane Selam area, northwestern Ethiopian volcanic plateau. <https://doi.org/10.1007/s00445-024-01705-z>. 6.

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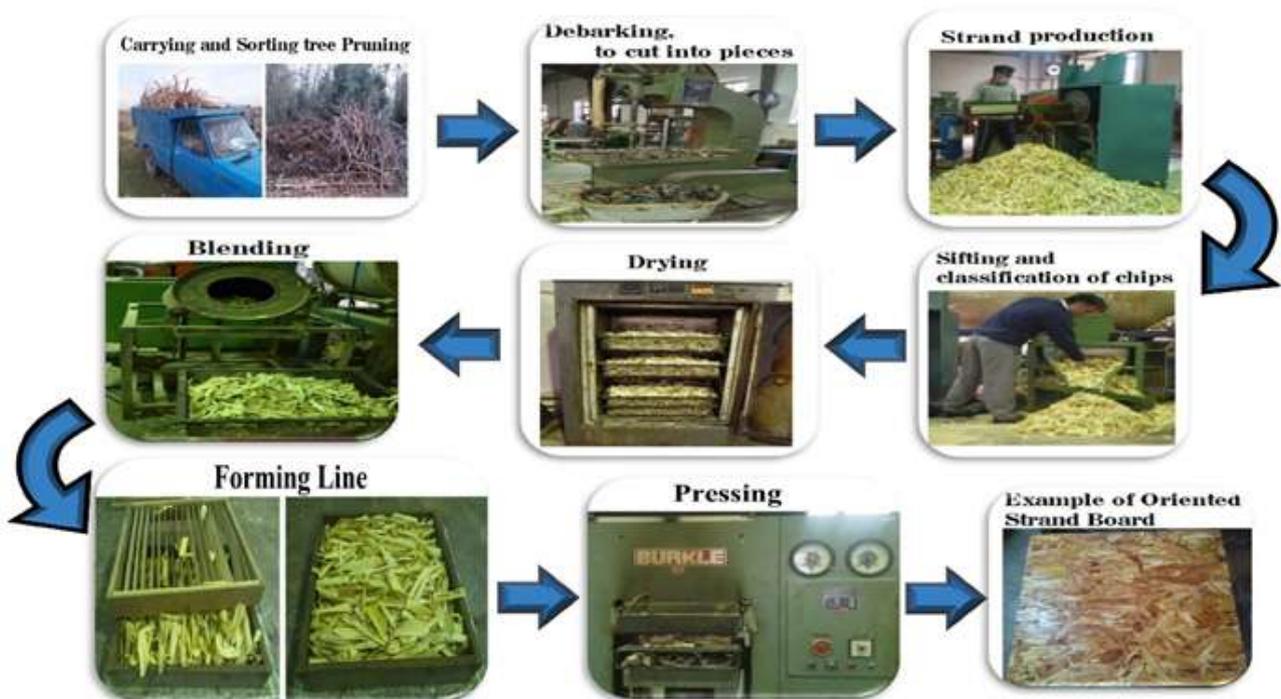
Transforming tree topping waste into flooring: a study on the production and evaluation of oriented strand board finish using urban and garden residues

Mohammad Manafi-Dastjerdi¹, Abbas Rohani¹, Hamid Zarea Hosseinabadi² and Mohammadali Ebrahimi-Nik¹

¹Department of Biosystems Engineering, Faculty of Agriculture, Ferdowsi University of Mashhad, Iran

²Department of Wood and Paper Science and Technology, College of Agriculture and Natural Resources, Faculty of Natural Resources, University of Tehran, Iran

Oriented strand board (OSB) has become a popular building material for residential construction, but little research has been conducted on its use as a finish floor material. The study investigated the quality and performance of OSB as an alternative to traditional engineered wood products for finish floors. Four types of OSB finish floors using a mixture of garden and urban tree toppings were produced and evaluated, along with different types and levels of resin and mat moisture content.



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The finish floor panels were subjected to a battery of tests, including concentrated loading, indentation, falling ball impact resistance, abrasion resistance, and surface wettability. The findings showed that urea formaldehyde resin with garden tree toppings performed best in floor surface indentation, abrasion resistance, and falling ball indentation. The phenol formaldehyde resin with garden tree toppings, on the other hand, showed less moisture absorption and swelling during surface wetting tests and better resistance to force application in the concentrated loading test. Our qualitative comparison revealed that OSB finish floor production using 100% garden tree topping strands and 12% urea formaldehyde resin, along with 14% mat moisture content, produced the best results. The study provides valuable insights into the potential use of OSB as a sustainable and cost-effective finish floor material, using waste materials from urban and garden tree toppings.

Biography

Nir is a Research Associate at Weill Cornell Medicine and the New York Genome Center. His research interests are geared toward developing novel frameworks for cancer vaccines and harnessing innate immunity for cancer immunotherapies through genetic reprogramming of tumor-associated macrophages (TAMs).

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Allelopathic effect of Moringa leaves for suppressing weeds in tiger-nut in a forest - savanna transitory location

Fadeyi, Olasupo James¹, Fabunmi, Thomas Oladeji², Soretire, Adeniyi Adebowale³, Olowe, Victor Idowu Olugbenga¹ and Adeyemi Olusegun Raphael²

¹*Institute of Food Security, Environmental Resources and Agricultural Research (IFSERAR), Federal University of Agriculture, Nigeria*

²*Department of Plant Physiology and Crop Production, Nigeria*

³*Department of Soil Science and Land Management, Nigeria*

Allelochemicals released from plants are useful for weed management options in agriculture to reduce dependency on commercial herbicides which are hazardous. Consequently, the allelopathic effect of Moringa leaves applied as organic manure in tiger nut (*Cyperus esculentus* L.) production on related weeds was investigated in the guinea savanna of South West Nigeria, during the 2014 (September - November) and 2015 (June - August) wet seasons. Five Moringa leaves rates (0, 2.5, 5.0, 7.5 and 10 t/ha) and three tuber sizes (0.28 g, 0.49 g and 0.88 g dry weight) were laid out in the main plot and sub-plot, respectively in a split-plot arrangement fitted into randomized complete block design and replicated three times. Parameters measured, which include, weed cover score (WCS), weed density (WD) and weed dry matter production (WDMP) were significantly ($p < 0.05$) influenced in both years by Moringa leaf. In 2015, WCS, WD and WDMP significantly ($p < 0.05$) reduced by 25-73%, 35-78% and 26-70% on Moringa leaves-treated plots respectively. Significant ($p < 0.05$) interactions were observed between quantity of Moringa leaves incorporated and tuber size. The bigger the tuber and the higher the quantity of Moringa leaves incorporated the lower the WCS, WD and WDMP. Growth and survival of weeds were controlled by the application of Moringa leaves. Bigger tubers complemented the inhibitory effects of higher rates of Moringa leaves incorporated better for weed suppression relative to smaller tubers. Incorporation of 10 t. ha⁻¹ foliage produced lower WCS, WD and WDMP than other rates. Hence, application of 10 t.ha⁻¹ Moringa leaves and planting of large or medium-sized tubers were recommended for optimum weed suppression in tiger nut production in South West Nigeria.

Biography

Fadeyi Olasupo James started his PhD which is yet to be completed in 2021 at Federal University Agriculture, Abeokuta, Nigeria where he obtained his Bachelor and Masters of Agriculture degrees in Plant Science with specialization in Crop Production in 2009 and 2016 respectively. He is an academic Researcher in the Institute of Food Security Environmental Resources and Agricultural Research (IFSERAR) and also anchored as a Lecturer in the Department of Plant Physiology and Crop Production, College of Plant Science and Crop Production, Federal University of Agriculture Abeokuta (FUNAAB). He has several publications that have been cited several times and has been serving as a scientific advisory board member of reputed Journals.



Spatiotemporal modeling of the value of carbon sequestration under changing land use/land cover using InVEST model: A case study of Nour-rud Watershed, Northern Iran

Nematollah Kohestani¹, Shafagh Rastgar¹, Ghodratolla Heydari¹, Shaban Shataee Jouibary², Hamid Amirnejad¹ and Esmail Mokhtarpour¹

¹Sari Agricultural science and natural resources University, Iran

²Gorgan Agricultural and natural resources University, Iran

The current paper aims to assess the effects of landscape change in a mountain river basin in the north of Iran through quantifying, mapping, and assessing carbon storage. The analyses were performed based on previous alterations in land use and land cover (LULC) (1988–2018) and on expected changes determined by three LULC alteration setups for 2048. The Landsat imagery from 2018, 2008, 1998, and 1988 was used for evaluating and predicting the spatiotemporal distributions of LULC changes. The future LULC image prediction has been generated using Land Change Modeler (LCM) module of TerrSet software for the years 2028, 2038, and 2048. Validation was carried out by overlaying the actual and projected to 2018 map. We integrated the Markov Chain and InVEST Carbon Storage and Sequestration models for simulating the ecosystem carbon storage and the long-term monetary valuation. In this process, we considered social costs/economic value because of the area's loss and gain of stored carbon. The results showed that forests and rangelands with good and poor conditions decreased by 631.2, 10,374, and 10,254 ha, respectively, from 1988 to 2018. Overall LULC changes showed a descending trend in forests (0.66%), agriculture (0.1%), and rangelands (4.1%) in 2048. Carbon storage has already been lost by 9.9 million tons (76.98 ha^{-1}) from 1988 to 8.8 million tons (68.86 ha^{-1}) in 2018 and is expected to have an 8.4 million tons (65.25 ha^{-1}) loss by 2048. Monitoring the economic value of carbon storage from 1988 to 2018 shows a loss of \$US 15684338 (121.8 ha^{-1}) and estimates a loss of \$US 6972622 (54.18 ha^{-1}) by 2048. This consideration causes reduction the uncertainty of estimated models and also increases the continuous cost of those changes. This will help government and decision makers for long-term and accurate carbon sequestration strategies for ecosystem. Reduction of carbon sequestration due to climate change and increase in destruction of natural resources, increase in air pollution and as a result more spread of diseases as well as increase in medicine and treatment costs.

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Biography

Nematollah Kohestani, born in 1973 in Mazandaran, Iran, is a seasoned expert in forest, rangeland, and watershed management. He earned his bachelor's degree in Range and Watershed Management from Sari University of Agricultural Sciences and Natural Resources in 1996, followed by a master's degree from Gorgan University of Agricultural Sciences and Natural Resources in 1998. In 2021, he completed his PhD in Rangeland Science from Sari University of Agricultural Sciences and Natural Resources. With over 24 years of executive experience, Nematollah has played a pivotal role in managing forest, rangeland, and watershed affairs for the Iran Forest, Rangeland, and Watershed Management Organization. His extensive expertise and dedication have made significant contributions to environmental conservation and natural resource management in Iran.



Evolution of the Nigerian sector of the Iullemeden Basin (Sokoto Basin), Northwestern Nigeria, an implication to hydrocarbon exploration

Hamidu Ibrahim and **Halidu Hamza**

Department of Geology Ahmadu Bello University, Nigeria

The Nigerian sector of the Iullemeden Basin, referred to as Sokoto Basin, was studied using high-resolution satellite imagery, aeromagnetic data, and detailed geological mapping to unravel the structures that have affected the basin and ultimately understand its evolution and hydrocarbon prospectivity of the basin.

Three major faults (NE - SW, NW - SE, and NNE - SSW), strike-slip tectonics, and two basin inversions have been identified to have affected the basin. The basin evolved as a rift basin during the Early Maastrichtian in response to NE - SW extensional/transensional regime expressed by listric faults, roll-over anticlines, antithetic faults, synthetic faults, and negative flower structure (tulip Structure) affecting the lower Taloka Formation. During Late Maastrichtian a transpressional inversion occurred in response to NW - SE horizontal shortening, the structural styles related to this event are expressed by transpressional anticlines, thrust folds, and basin inversion affecting the Dukamaje Formation. The Wurno Formation is affected by early Paleocene rifting expressed by normal faults. The Dange Formation, Kalambaina Formation, and primary oolitic ironstone are folded in response to the Late Paleocene compressional event. During the earliest Eocene, the lower Gwandu Formation is affected by NNW - SSE extensional/transensional regime and is represented by normal faults, strike-slip fault (along a releasing bend and formation of pull-apart basin), listric fault, imbricate listric fault, and negative flower structures (Tulip), while the upper Gwandu Formation was affected by NW - SE late Eocene compressional/transpressional inversion, expressed by buckling, strike-slip fault (formed along a restraining bend), sigmoidal drag fold along closed spaced and positive flower structures (palm tree). Identification of the rift, strike-slip setting, and basin inversion in this basin is a clue to migration pathways, fault seals, and traps that serve as guides for hydrocarbon exploration.

Biography

Prof. I. HAMIDU joined the services of Ahmadu Bello University on 26th October, 2001 as Graduate Assistant. His appointment was confirmed on 25th July, 2008. He was promoted to Professor in October 2020. He holds the degree of B.Sc Geology (Unimaid), 1996, M.Sc Geology (ABU), 2005 and Ph.D Geology (ABU), 2012. He is an active corporate member of Nigerian Mining and Geosciences Society (NMGS) and Council of Mining engineers and Geoscientists (COMEG).

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He has several journal papers and conference/seminar papers that are widely and geographically spread. He taught undergraduate and post graduate courses, and so far supervised eight (14) Ph.D students and twenty (25) M.Sc students both completed and ongoing.

Prof. Hamidu's main scientific interest is stratigraphy and structures, his research output, mainly in the area of stratigraphy is documented in international and local journals, his current interest is in Inland Basin Studies especially Sokoto Basin.

Prof. Hamidu has carried out some Administrative duties such as Departmental Postgraduate Coordinator, Departmental Examination Officer, Departmental Welfare Officer and Acting Head of Department (2020-2021).

Among his community services are member advisory committee with Gwoza University students, A.B.U. Chapter, Patron Borno State Students Association, A.B.U Chapter. He has contributed immensely to the development and progress of the Department and the university in general.



Application of AI and IoT in the settlement of pile group in clay materials

Hanan Samadi

School of Geology, College of Science, University of Tehran, Iran

Artificial neural networks (ANN) and the Internet of Things (IoT) are two cutting-edge technologies that are revolutionizing many industries, including geotechnical engineering. When combined, these technologies have the potential to greatly enhance the accuracy and efficiency of settlement prediction in pile group foundations in clay materials. ANNs are computer systems modeled after the human brain's neural networks, capable of learning and performing tasks typically reserved for human intelligence. In the context of settlement prediction in clay materials, machine learning and deep learning can be trained using historical data on soil properties, pile geometry, and loading conditions to create a predictive model that can forecast settlement behavior with high accuracy. On the other hand, the IoT refers to a network of interconnected physical devices that can collect and exchange data in real-time. In the context of settlement prediction of pile groups, IoT devices can be embedded in the soil, piles, and structures to continuously monitor relevant parameters such as soil moisture, temperature, and pile displacement. This data can then be transmitted to a central database for analysis and integration into the ML model for real-time settlement prediction. The integration of ANNs and IoT devices in settlement prediction of pile groups in clay materials offers several key advantages. Firstly, it allows for more accurate and reliable predictions compared to traditional empirical methods, as the model can adapt and learn from new data in real-time. Additionally, the IoT sensors provide continuous monitoring, enabling early detection of potential settlement issues and allowing for proactive remedial action. This presentation will focus on the illustration of application of smart predictor networks in the field of pile group. In conclusion, the application of ANN and IoT technologies in settlement prediction of pile groups in clay materials represents a significant advancement in geotechnical engineering, with the potential to greatly improve the safety and efficiency of pile foundation design and construction.

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Biography

Hanan Samadi holds an M.Sc. in Engineering Geology from the University of Tehran, where she graduated with a thesis on "Investigation of EPB Operating Parameters Through an Artificial Intelligence and Developed New Empirical Models in Soft Ground" and achieved an outstanding GPA of 3.7/4.0. Currently, she serves as a Research Associate at Nazarbayev University's School of Mining and Geoscience (since April 2024) and a researcher at the University of Halabja's Civil Engineering Department (since June 2023). Hanan has been a Research Assistant at the University of Tehran's School of Geology since 2019. She also contributes as a reviewer for Soils and Rocks Journal and holds several editorial positions, including at Mechanization and Automation in Mining and Tunneling Journal. She has chaired the Scientific Committee for international conferences and student congresses, showcasing her leadership in academic and engineering fields. Hanan's work focuses on geology, engineering, and artificial intelligence in mining and tunneling applications.

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Impacts of Climate Change on the proposed Pwalugu Hydropower project based on CMIP6

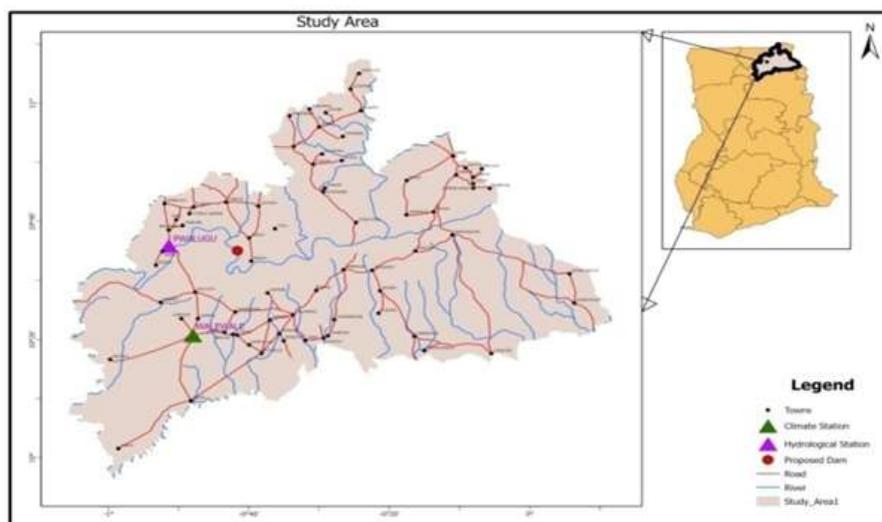
Emmanuel Kekle Ahiale¹, **Amos T. Kabo-bah**² and **Samuel Gyamfi**³

¹Regional Centre for Energy and Environmental Sustainability (RCEES), University of Energy and Natural Resources (UENR), Ghana

²Department of Civil and Environmental Engineering, University of Energy and Natural Resources (UENR), Ghana

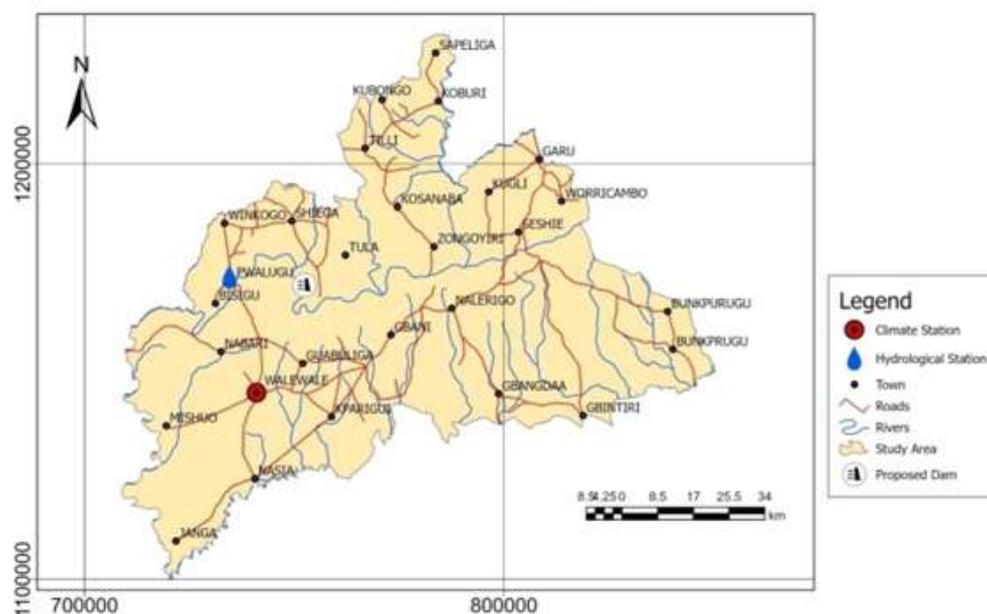
³School of Energy University of Energy and Natural Resources (UENR), Ghana

Background: The threat of climate change is accelerating as a result of the continuous emission of GHGs. This acceleration heightens concerns about future water availability as well as the generation and development of hydropower. Popular among these GHGs are carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O) released from sources such as coal, gas, as well as light crude oil (LCO). The frequency and other characteristics of temperature extremes have also been amplified as a result of changes in the climate leading to a substantial impact on the environment, particularly in hot and arid nations. The proposed Pwalugu hydropower project site is located right in the middle of a semi – arid area. This is one region that is more susceptible to climate change and its associated hazards. Being the first of its kind to be constructed in the semi – arid region of the country, there is the need to undertake this study to find out the impact of the changes in climate on the proposed Pwalugu hydropower.



Study area (left) and Ghana map (right)

Study Area Map



Objective: To project the changes in precipitation and temperature extremes for four CMIP6 data.

Methods: Input data such as precipitation, maximum and minimum temperature data were collected from Ghana Meteorological Service. Daily hydrological data from the Pwalugu (1970–2017) station were used to calibrate and validate the data. CMIP6 data was downloaded from ESGF website and bias corrected using the CMhyd tool. Data were analysed using machine learning.

Results: Temperature variations, rainfall patterns, floods, and droughts are all major signs of changes in the climate that have strong effects on river systems and thereby affecting the generation and development of hydropower.

Conclusion: With the right investment, Government of Ghana needs to adopt a more effective ways for a climate resilient hydropower in the semi – arid region in order to get the maximum benefit from the project.

Biography

Emmanuel Kekle AHIALEY is an ambitious and a self-motivated tutor with seventeen years' experience. He is passionate about the development of the manpower of the next generation and he is committed to sharing his knowledge and experience with colleagues and students across the globe. His expertise makes him a valuable asset to any organization that loves team work. Emmanuel is a PhD candidate in Sustainable Energy Management (2020 – 2024) at Regional Centre for Energy and Environmental Sustainability (RCEES), University of Energy and Natural Resources, Sunyani-Ghana. Aside his academic accomplishments, he is a reviewer of different scientific journals across the globe. At his leisure times, Emmanuel loves nature, jogging to keep fit. He currently seeks a higher position as a lecturer in any University that would make use of his competencies, challenge his problem-solving skills and allow him to continue to develop his knowledge and potentials.

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Mobility pattern, risk assessment and hazards of heavy metal from consuming vegetables at auto-body workshops, Southeastern Nigeria

John Kanayochukwu Nduka¹, Henrietta Ijeoma Kelle², Eliseus Okey Akpunonu³ and Johnpaul Onyenezi Amuka¹

¹Environmental Chemistry and Toxicology Research Unit, Pure and Industrial Chemistry Department, Nnamdi Azikiwe University, Nigeria

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Nigeria's economic problems which inhibited local production has resulted in massive importation of used automobiles. Most of these automobiles need reworking, having outlived their lifespan in the manufacturer's country. The study centers on evaluation of cadmium, chromium, lead, nickel, manganese and copper exposures from paint dust resulting from reworking of imported used vehicles, heavy metal movement pattern, hazards of paint dust, consuming vegetables and risk assessment of metals from paint dust and soil-dust at auto-body workshops. Paint dusts from 56 Japanese made cars and soil-dusts were collected from 8 different panel beating workshops (A-H) in Southeastern Nigeria, soil-dusts were collected at different depths and distances from workshops. They were homogenized, mixed, divided into fine particles, filtered and digested by standard method, vegetables were ashed, before digestion. Filtrates were assayed for cadmium, chromium, lead, nickel, manganese and copper with atomic absorption spectrophotometry (AAS, 200A), workshops F and D have highest concentration (mg/kg): Cd (3.58 ± 0.02) and (3.36 ± 0.04) and higher than in workshops A, B, C, E, G and H. Chromium (mg/kg) in workshops F and G were (2.87 ± 0.04) and (2.95 ± 0.06) and higher than the other workshops. Soil-dust of workshop F has highest Cd (3.93 ± 0.01 mg/kg). Cr and Pb in workshop F and B (3.53 ± 0.02 mg/kg and 5.19 ± 0.05 mg/kg). Highest dust cancer risks were in exponents -4,-7 and -8 (adult) and -3, -6 and -9 (children) for workshops A-H through inhalation, ingestion and dermal contact. Soil-dust hazard quotient and cancer risk via all routes ranged 10^{-18} – 10^{-2} and 10^{-20} – 10^{-7} below EPA's 1 and 1×10^{-6} - 1×10^{-4} . Vegetable metals were minimal than soil-dust. True intake (Cd, Cr, Pb, Mn, Ni, Cu) ranged 14-718 (mg·kg⁻¹). Exposure via soil-dust/vegetables can add to human and environmental metal burden.

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Biography

John Kanayochukwu Nduka, PhD, is a professor in the Department of Pure and Industrial Chemistry, Nnamdi Azikiwe University, Nigeria. He is the head researcher in Environmental Chemistry and Toxicology Unit with a focus on public health and was former head of the department. Dr. Nduka has published several scientific articles and involved in mentoring young academics at his University. He has served as head and member of the National University Commission resources verification exercise to various universities in Nigeria for chemistry programmes. In 2020, he received a RULA award for international best researcher in environmental chemistry and toxicology. He was listed among the top 100 researchers by Nnamdi Azikiwe University. Has attended several local and international conferences and workshops and delivered numerous lectures. John Kanayochukwu Nduka, received certificate of recognition from ELSEVIER for publishing manuscript that was linked to United Nation sustainable development goal (SDGs) for satisfying the SDGs 1 and 11.

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Real-time hospital air quality monitoring based on a low-cost smart electronic device and health risk

Jacob Mbarndouka Taamté

Research Centre for Nuclear Science and Technology, Institute of Geological and Mining Research, Cameroon

This article reports the measurements of pollutants in the air and assessment of health exposure risks in two reference hospitals of the Yaoundé city, using a smart electronic device locally manufactured for the measurement of atmospheric pollutants, very toxic in the air. This low-cost device is built based on an Atmega328 microcontroller, toxic gas sensors (O_3 , $PM_{2.5}$, CO , CO_2 and NO_2), temperature (T) and relative humidity (RH) sensors as well as as XBee modules to establish the Internet of Things (IoT). In each of the two hospitals, two weeks of measurement work was carried out from October 15 to 30, 2023 at the Biyem-assi hospital and from September 1 to 15, 2023 at the Central hospital. The average values obtained are 0.96 ± 0.06 ppm and 0.37 ± 0.09 ppm for O_3 , 39.66 ± 10 $\mu g/m^3$ and 39.72 ± 10 $\mu g/m^3$ for $PM_{2.5}$, 0.41 ± 0.01 ppm and 0.42 ± 0.02 ppm for CO , 316.55 ± 63 ppm and 305.84 ± 89 ppm for CO_2 , and 0.43 ± 0.01 ppm and $0.45 \pm 0, 02$ ppm for NO_2 respectively in Biyem-assi and Central hospitals. These values made it possible to assess the risks of exposure through the Air Quality Index (AQI) and the Air Quality Health Index (AQHI_{2.5}).

Biography

Jacob MBARNDOUKA TAAMTE is a Research Officer at the Research Centre for Nuclear Science and Technology, part of the Institute of Geological and Mining Research in Cameroon. He holds a PhD in Energy, Electrical and Electronic Systems, and Nuclear Instrumentation. His research focuses on the design and development of scientific and nuclear equipment, with a particular interest in air quality and ionizing radiation monitoring. Jacob has gained recognition for his innovative work and has received several prestigious awards, including the IRPA prize for the best young African professional researcher in radioprotection. His expertise extends across nuclear science, and he contributes to advancing the field through his scientific endeavors and commitment to addressing environmental challenges. In addition to his technical achievements, Jacob is an active contributor to national and international nuclear research projects, demonstrating his leadership and dedication to improving both research standards and environmental safety in Cameroon.



Present-day kinematics of the northwest Moroccan Atlantic Margin from GNSS data: West southwest extrusion at the western end of the High Atlas

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The Global Navigation Satellite System (GNSS) has emerged as a practical and effective technique for studying slow and steady geodynamic movements, enabling continuous monitoring and precise quantification of deformation over different timescales. In Morocco, a network of GNSS stations has been established, offering valuable insights into tectonic processes. This paper focuses on investigating the geodynamic motion of the northwest Moroccan Atlantic Margin. By utilizing GNSS data, subsidence rates and horizontal velocity fields were determined for the first time, providing valuable information for oil and gas exploration activities. The study reveals an active uplift rate of 1 mm/year and a westward horizontal motion of 2.04 mm/year in the Essaouira segment. The paper presents a case study of the Essaouira–Agadir basin (EAB) onshore segment and investigates the anomalous displacement observed in this region compared to other coastal GNSS stations. Possible explanations for the observed movements include local processes such as salt tectonics and regional northwest–southeast compression related to Africa–Eurasia convergence. We suggest that the anomalous movement detected in this work is due to the regional northwest–southeast compression related to Africa–Eurasia convergence imparting an extrusion of the EAB to the west. This research contributes to a better understanding of the geodynamics in the northwest Moroccan Atlantic margin, thereby providing valuable insights for ongoing efforts in oil and gas exploration. Furthermore, it indicates the continued activity of the Agadir fault, which would exhibit a sinistral wrench movement, thus posing a threat to the city of Agadir and its inhabitants.

Biography

Khalid Lakhoudsi is a distinguished geophysicist specializing in GPS applications in seismology, volcanology, and tectonics. He is set to present his Ph.D. at Cadi Ayyad University in Marrakech, Morocco, this year, where he also completed his Master's and Bachelor's degrees in Geology Applied to Mineral Resources and Applied Geology, respectively. Khalid's research focuses on the present-day kinematics of the northwest Moroccan Atlantic Margin, geodetic evidence of anomalous displacements, and salt tectonics evolution.

He has contributed to the understanding of seasonal-scale atmospheric precipitable water cycles using ground-based GPS receivers, Aeronet, and NWP models over the central High Atlas Mountains. His work on the April 2016 and December 2019 eruptions of Whakaari/New Zealand provides new insights into the magma plumbing system from geodetic and seismic observations.

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Khalid has presented his research at prestigious conferences, including the EGU General Assembly and the Conjugate Margins Conference. His publications are featured in top journals such as the Canadian Journal of Earth Sciences. In addition to his research, he serves as a Teaching Assistant at Cadi Ayyad University and teaches Mathematics and Life and Earth Science at a middle school in Marrakech.

He is proficient in various software tools, including GAMIT/GLOBK, GIPSY-OASIS, SNAP, and Seisan, for GPS and seismic data processing. His skills extend to geological mapping, radar remote sensing techniques, and monitoring volcanic deformation. Khalid is also an experienced programmer, with expertise in Python, shell scripting, and MATLAB.

Outside of his academic and research endeavors, Khalid leads field trips investigating groundwater tables using resistivity methods and manages an education center, Centre Classe de Réussite, in Marrakech. He is fluent in English, Arabic, French, and Japanese, and enjoys cultural activities such as visiting museums and galleries.

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