The ICFAI University, Sikkim

INTERNATIONAL CONFERENCE ON INTERDISCIPLINARY STUDIES: Bridging Knowledge for Tomorrow

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BOOK OF ABSTRACTS

Editors

Prof.(Dr.) Jagannath Patnaik

Prof.(Dr.) Shantanu Swain

Dr. Vivek Pathak

INTERNATIONAL CONFERENCE

On

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We would like to express our sincere gratitude to all the authors, researchers and reviewers, who provided their detail research and views for **(ICIS-2026).**

We would like to thank our family, who supported and encouraged me in spite of all the time it took our away from them. This conference could see the light of day due to generous support from the RFI-CARE.

The readers and beneficiaries vary from academicians, professional engineers and scientists, to undergraduate and graduate students from all over the country.

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Message from the Vice Chancellor
ICFAI University, Sikkim

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It gives me immense pleasure to present the Book of Abstracts of the International Conference on "*Interdisciplinary Studies: Bridging Knowledge for Tomorrow (ICIS-2026)*", jointly organized by The ICFAI University, Sikkim, Sikkim University, and the Research Foundation of India.

In an era marked by rapid transformation and complex global challenges, the significance of interdisciplinary research has never been greater. The convergence of diverse academic domains enables us to address critical issues related to sustainability, governance, technological advancement, and societal development in a more holistic and impactful manner. This conference has successfully created a dynamic platform for scholars, academicians, researchers, and practitioners to engage in meaningful dialogue and contribute innovative ideas that transcend traditional disciplinary boundaries.

The Book of Abstracts is a reflection of the intellectual vibrancy and scholarly commitment demonstrated by participants from varied fields including Management, Social Sciences, Law, Science & Technology, Education, Artificial Intelligence, Environmental Studies, and Public Policy. Each contribution embodies the spirit of inquiry and collaboration that is essential for shaping a knowledge-driven future.

I commend the organizers, collaborating institutions, faculty members, and student volunteers for their dedicated efforts in successfully hosting this conference. I also extend my sincere appreciation to all contributors whose research work has enriched this compilation.

I am confident that this volume will serve as a valuable academic resource, fostering further research collaborations and inspiring new perspectives in interdisciplinary studies.

I convey my best wishes to all contributors and readers and hope that the ideas presented herein will contribute meaningfully towards building a sustainable and inclusive future.

Good Wishes…

(Dr. Jagannath Patnaik)
Vice-Chancellor
The ICFAI University, Sikkim

Message from the Convener (ICIS-2026)

***

It is our distinct honor and privilege to welcome you to the *International Conference on Interdisciplinary Studies: Bridging Knowledge for Tomorrow (ICFAI ICIS 2026)*, jointly organized by ICFAI University, Sikkim, Sikkim University, and the Research Foundation of India (RFI). This collaborative academic initiative reflects a shared commitment to advancing knowledge through meaningful interdisciplinary engagement.

In an increasingly complex and interconnected global environment, the pressing challenges of our time require integrative approaches that transcend traditional disciplinary boundaries. This conference has been conceived as a rigorous scholarly platform to promote dialogue, critical inquiry, and collaboration across diverse domains of knowledge.

The theme, *"Bridging Knowledge for Tomorrow,"* emphasizes the importance of re-envisioning established academic frameworks and fostering interdisciplinary perspectives capable of addressing emerging societal, technological, environmental, and economic concerns. The conference invites and showcases contributions from Management, Social Sciences, Science and Technology, Law, Humanities, Education, Artificial Intelligence and Data Science, Environmental Studies, and Public Policy, highlighting the transformative potential of cross-disciplinary research.

The programme features keynote addresses by eminent academicians and thought leaders, and peer-reviewed technical paper presentations. These deliberations are designed to facilitate substantive intellectual exchange, strengthen academic networks, and encourage collaborative research initiatives at national and international levels.

We extend our sincere appreciation to the advisory board members, reviewers, session chairs, authors, and organizing committees whose dedicated efforts have ensured the academic rigor and success of this conference. We also express our gratitude to our distinguished speakers and participants for their invaluable contributions.

We trust that the conference will serve as a productive forum for scholarly engagement, innovative thinking, and sustained academic collaboration.

With regards,

Dr Vivek Kumar Pathak
Convener
ICIS 2026

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ABSTRACTS

Biogas Technology for Sustainable Development in North East India

Sunil L. Narnaware
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Central Agricultural University (Imphal), Sikkim

Abstract

Biogas technology represents a potential renewable energy source for sustainable development in northeastern India. It provides a decentralized, climate-resilient approach to energy security and waste management. The Northeast states generate substantial amounts of organic waste from livestock, poultry, and agriculture which can be used to produce biogas via anaerobic digestion (AD). Biogas is a clean fuel with a calorific value of 16-28 MJ/m^3, suitable for cooking, heating, and electricity generation. The digested slurry produced from the biogas plant has higher nutrient levels and is regarded as an effective bio fertilizer for agriculture. It contains N, P and K about 1.5-2.5%%; 1-1.5% and 0.8-1.2% respectively higher than dung and farm yard manure. It promotes organic agriculture and improves soil fertility and productivity. The state like Sikkim which adapted the organic farming and completely discarded the use of chemical fertilizer, digested slurry can play important role in providing essential nutrient to the soil and crops. Biogas technology offers multiple benefits, including reduced greenhouse gas (GHG) emissions and decreased air pollution, enhances sanitation in rural areas and reduces dependence on fossil fuels. The implementation of biogas can facilitate the development of a sustainable, circular rural economy. Biogas technology is essential for achieving energy security, environmental sustainability, and improved rural livelihoods in the Northeastern region of India, and align well with national renewable energy objectives and sustainable development goals. Notwithstanding the potential advantages, the implementation of biogas technology has faced significant obstacles, including socio-cultural resistance and hindered wider implementation.

Keywords: *Biogas, Renewable Energy, Anaerobic Digestion, Digested Slurry, Organic Waste*

Design and application of fenugreek seed mucilage–sesame protein isolate composite edible films for shelf life improvement of apple slices.

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Abstract

Edible films are increasingly recognized as sustainable alternatives to conventional synthetic packaging owing to their biodegradability, safety, and capacity to deliver functional bioactive compounds. These films function as protective barriers against moisture transfer, oxygen diffusion, and microbial contamination, thereby enhancing food quality and prolonging shelf life. The utilization of natural biopolymers and plant-derived constituents offers an environmentally benign strategy for the development of active packaging systems. In the present study, a composite edible film was fabricated using Fenugreek Seed Mucilage (FSM) and Sesame Protein Isolate (SPI) through the solvent casting technique, with a gelatin-based film employed as the control. The FSM–SPI composite film demonstrated enhanced mechanical performance, exhibiting a tensile strength of 0.56 ± 0.02 MPa and a Young's modulus of 2.45 ± 0.05 MPa. The incorporation of FSM has significant impact on improved film flexibility and its barrier properties. Furthermore, the composite film exhibited pronounced antioxidant activity, with a DPPH radical scavenging capacity of 0.98 mg TE/g and a total phenolic content of 1.82 mg GAE/g, highlighting the functional contribution of bioactive components. Application of the composite film to fresh-cut apple slices effectively suppressed oxidative deterioration, maintaining sensory acceptability and nutritional quality for up to 20 days of storage. Overall, the Fenugreek–Sesame composite edible film exhibits substantial potential as a biodegradable, functional, and active food packaging material.

Keywords*: Edible Film; Fenugreek Seed Mucilage; Sesame Protein Isolate; Antioxidant Activity; Fresh-Cut Apple Slices; Mechanical Properties*

Utilization of AYUSH Systems of Medicine in North-East India: Study from Economic Perspectives

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Abstract

Background: North-East India has unique sociocultural traditions and has many alternative complementary medicines practice, which falls under the AYUSH systems. However, empirical findings on the utilization of AYUSH systems in North-East India remain limited. Objectives: This study aims to find the utilization patterns of AYUSH systems in North-East India and analyses the economic and demographic factors influencing individuals' choice of AYUSH systems. Methods: for this study, the NSS 79th round data set was used and applied multinomial logistic regression. For this regression, four mutually exclusive outcome categories are Ayurveda, Homoeopathy, Naturopathy and Other systems like Yoga, Unani, Siddha and Sowa-Rigpa. Independent variables are age, gender, locality, education, religion, and economic status, which is based on monthly household consumer expenditure and means of livelihood. Results: Ayurveda (58.06%) appeared as the most utilized AYUSH system, followed by Homoeopathy and Naturopathy. Utilization of AYUSH systems of medicine is dominated by females, rural respondents. Those who have attained primary/middle school level education utilize more AYUSH systems. People who are of a poor economic status exhibited more utilization of Ayurveda, Homoeopathy and Naturopathy. Conclusion: The study exhibited that strong heterogeneity is present in AYUSH utilization across socioeconomic and demographic groups in North-East India. This study furnishes some policy measures to enhance the utilization of AYUSH healthcare in this region.

Keywords: *AYUSH Healthcare, Utilization of Ayurveda-Homoeopathy-Naturopathy, North-East India, Multinomial Logistic Regression.*

Comparison between different dosages of a Phytoalexin Resveratrol in Diabetic Wistar rats

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Abstract

Background: Resveratrol is a well-known phytoalexin which is known for its anti-inflammatory, anti-cancer, anti-diabetic and many more effects. Categorized as grade E – dietary and herbal supplement, this compound has no known toxicity profile as available in PubChem toxicity database. In this study, we aimed to determine a dose of this compound which could be administered to the rats for future elaborate studies on the effect of this compound in diabetic condition.

Objective: To observe the effect of resveratrol administered at dosages of 10mg/kg bodyweight, 30 mg/kg and 60 mg/kg bodyweight in T2DM Wistar rats.

Method: The rats procured from registered vendor were made diabetic following standard streptozotocin and nicotinamide method. The phytocompound was then administered to the different groups at dosage of 10 mg/kg body weight, 30 mg/kg body weight, and 60 mg/kg body weight of rats via oral route. The weekly FBG levels and body weight along with food and water consumption were monitored till the end of study.

Result: It was observed in this study that the dose of 10 mg/kg body weight did not cause any significant changes in fasting blood glucose levels. The best suited results were observed in group receiving 30 mg/kg body weight dose with a consistent FBG levels and most stable behavioural and physical conditions. The rats receiving the highest dose also showed symptoms of lethargy, abdominal cramping, and physical suffering which also led to the fluctuations in FBG levels. The group receiving lower doses however were more active, had no symptoms of sufferings or any detrimental effects.

Conclusion: The best dose as per the findings of this study was found to be 30 mg/kg body weight amongst the three dosages, as this dose showed the best results in terms of maintaining the FBG levels without any physical or behavioural changes in the rats.

Keywords: *Diabetes, T2DM, Phytoalexin, Resveratrol, Wistar Rats*

Beyond Market Co-movement: A Seemingly Unrelated Regression (SUR) Based Analysis of Hidden Sectoral Connectedness in Indian Equity Indices

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Abstract

Indian equity markets are increasingly characterized by sector-level dynamics and cross-industry risk transmission, yet most empirical studies rely on simple correlations or vector auto regressions that confound market-wide movements with genuine inter-sectoral shocks. This study proposes a system-based econometric framework to identify hidden contemporaneous dependencies among major Indian equity sectors after controlling for macro-financial influences. Using daily data for eight NIFTY sectoral indices from 2020 onward, we estimate a Seemingly Unrelated Regression (SUR) system in which each sector's returns are explained by lagged own returns, market returns, volatility, exchange-rate movements, and crude-oil prices. While market betas reveal clear defensive and cyclical segmentation across sectors, the SUR residual covariance matrix uncovers substantial remaining cross-sector dependence. In particular, technology and banking tend to move in opposite directions when sector-specific news hits, while energy and metal move together because of shared commodity and industrial forces. This shows that Indian equity markets are not just driven by the overall market, but also by a network of sector-level shocks, and system-based models like SUR are useful for understanding how risk spreads across the market.

Keywords *- Seemingly Unrelated Regression; Sectoral Equity Indices; Systemic Risk; Market Beta; Volatility Spillovers; Financial Connectedness*

Smart Materials for Fabrication of Food Processing Equipment: A Comprehensive Review

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Abstract

The food processing industry continuously demands advanced materials that improve hygiene, automation, energy efficiency, and product safety. Smart materials, characterized by their ability to sense and respond to environmental stimuli, provide novel solutions for fabrication and performance optimization of food processing equipment. These materials respond dynamically to temperature, stress, moisture, electric or magnetic fields, and chemical agents, enabling intelligent control, self-cleaning, condition monitoring, and energy efficiency. This review paper presents a comprehensive analysis of various smart materials such as shape memory alloys, piezoelectric materials, magnetostrictive materials, self-healing polymers, phase change materials, and antimicrobial coatings, focusing on their relevance in food machinery. The paper also discusses applications, benefits, challenges, and future opportunities, highlighting the potential impact of smart materials on next-generation food processing systems.

Keywords: *Smart Materials, Food Processing Equipment, Shape Memory Alloys, Self-Healing Materials, Antimicrobial Coatings, Intelligent Systems.*

India–United States Agricultural Trade Relations: Pattern, Tariff Structure Comparative advantage, and Potential Impact on India

Manesh Choubey
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Abstract

The objective of the paper is to examine India–United States agricultural trade highlighting trade patterns, tariff structures, and potential impacts. COMTRADE data regarding agricultural trade between India and USA was used in the study to anlyse trade pattern, tariff rate and revealed comparative advantage. Total agricultural trade between the United States and India remains modest, averaging $7 billion annually. India's $5.5 billion agricultural exports to the United States are diverse. India's exports to the United States are dominated by labour-intensive, tropical, and value-added agricultural products, such as Basmati rice, spices, tea, coffee, marine products (shrimp), processed foods, and organic foods. Cotton, almonds, walnuts, soybeans and their products, pulses (peas, lentils), and animal feed are areas where the United States has demonstrated a competitive advantage. The recent tariffs imposed by the US on Indian agricultural exports have had a significant impact on the trade relationship between India and the USA. The tariffs have led to a reduction in agri-exports to the US and an increase in imports from the US, thereby reducing or even wiping out the agri-trade surplus. This situation has created challenges for India in balancing domestic agricultural interests while ensuring stable trade relations with the US. Agricultural commodity commerce between the USA and India. India must switch from raw to processed foods. To maintain RCA in the US market and encourage GI-tagged and organic exports, SPS compliance must be improved. India must mix of tariff adjustments, strategic import liberalization, and long-term competitiveness to safeguard its agriculture. India can prevent large-scale disruption, avoid trade conflict, and emerge as a more competitive and resilient agri-export economy. By turning current challenges into reform opportunities, India can position itself as a global food power in the coming decades.

Keywords*: Revealed Comparative Advantage, Agriculture Trade, Composition, Direction, and Trade Potential.*

Pseudo-Dynamic Bearing Capacity of Strip Footing on Layered Soil

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Abstract:

Conventional bearing capacity theories for estimating the ultimate bearing capacity of shallow foundations are based on the idea that the soil layer is homogeneous and infinite. However, in practice, the layered soils profile is mainly found. In present study, an effort has been made to evaluate the ultimate bearing capacity of shallow strip footing using the limit equilibrium method with the pseudo-dynamic approach. The foundation is resting on two-layered soils with varying cohesion, friction angle and unit weight. A thorough analysis of soil layer thickness, soil cohesion, friction angle, footing depth and width ratio has been studied. A MATLAB program is used for calculation of seismic bearing capacity coefficient. Bearing capacity of shallow strip footing in two-layered soil conveyed as a single coefficient for a simultaneous resistance of unit weight, surcharge, and cohesion. The bearing capacity of footing was compared with previous experimental methods; the results obtained seem reliable.

Keywords: *Pseudo-Dynamic, Particle Swarm Optimization, Layered Soil, Bearing Capacity Ratio.*

Women Police as Agents of Social Change in Sikkim

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Abstract

The birth of police administration within the state led to the creation of women policing as an integral component of modern law enforcement. Women police have emerged as one of the most significant elements of contemporary police administration. Although history of women policing in the state is not widely documented but their contribution towards the society is indispensable. In the context of Sikkim, a small Himalayan state with distinct socio-cultural and geographical characteristics, women police force play a very crucial role not only in combating crime but also as an agents of social change in a state. The present paper aims to study the role and importance of women police personnel in transforming policing practices and also building trust among the public, particularly among women, children and other vulnerable groups of society. The study also highlights the challenges faced by these women police personnel in their work place and family life, along with the operational constraints in a hilly and border-sensitive state. Furthermore, the paper explores how women policing in Sikkim contributes to improved handling of crime against women, domestic violence, crime against children, gender-based offences while simultaneously facilitating better community engagement and public awareness. The method adopted for this study is descriptive and analytical approach, emphasizing the role of women police force as an agent of social change in a state and bridging a gap between police and the society by building trust between them. The integration of women in the police force has been the biggest achievements in strengthening inclusive policing in our society. The paper concludes with the suggestions of various policy measure aimed to strengthen women policing in Sikkim to enhance effective police administration and social development.

Keywords: *Knowledge, Social Transformation, Social Barriers, Women Police, Sikkim*

Ecological Impact of Landfills on Soil Quality and Microbial diversity in Sikkim

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Abstract

Waste management presents a persistent global challenge, particularly in ecologically sensitive regions like the Eastern Himalayas, where rapid urbanization and tourism further intensify environmental pressures. This study investigated the microbial and physico-chemical characteristics of soil from two major landfill sites in Sikkim (Martam and Sipsu), along with a control site, to assess the long-term impact of waste deposition on soil quality, microbial diversity and potential ecological risks. Ten soil samples from each landfill and one control were analyzed for parameters such as pH, moisture, total organic carbon, nitrogen, phosphorus and potassium, alongside microbial isolation and identification. Results revealed 40 bacterial species at Martam and 30 at Sipsu, with predominant genera including Bacillus spp., Staphylococus spp., Pseudomonas and E. coli. The presence of plastic-degrading bacteria (Bacillus and Pseudomonas) suggests natural bioremediation potential of the landfills.

Soil pH ranged from neutral to slightly alkaline across sites, with Martam showing higher moisture, potassium and phosphorus but reduced organic carbon and nitrogen and Sipsu exhibiting elevated levels of moisture, organic carbon, nitrogen, potassium and phosphorus compared to the control. These findings suggest significant ecological impacts of landfill accumulation on soil properties. It is crucial to understand these parameters for developing sustainable waste management and soil remediation strategies. In land-constrained regions such as Sikkim, there is a pressing need to prioritize integrated alternatives to landfilling alongside the adoption of eco-friendly materials and advanced waste processing technologies.

Keywords: *Bioremediation, Sustainable Waste Management, Landfill, Physico-Chemical Characteristics, Waste Deposition.*

Artificial Intelligence Approaches to Mental Health Risk Prediction among Older Adults with Chronic Diseases in India

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Abstract:

Objective: Mental health risk prediction in older adult populations is challenged by high-dimensional, heterogeneous data and complex non-linear interactions among clinical, socioeconomic and behavioral factors. This study applies artificial intelligence-based predictive modelling to identify mental health risks among older adult population in India.

Methods: Data were drawn from nationally representative secondary data i.e., the Longitudinal Ageing Study in India (LASI), Wave 1 (2017-2018), including 73,396 individuals aged 45 years and above. Multiple supervised machine learning algorithms i.e., Decision Tree, Random Forest, Support Vector Machine, Logistic regression, Neural Network and Ridge Classifier, feature selection techniques and ensemble methods were implemented. Model performance and generalizability were assessed using repeated train-test validation and evaluated through diverse evaluation metrics.

Results: Tree-based and ensemble models like random forest achieved superior discriminative performance, demonstrating strong capability in capturing complex interactions among chronic disease status, demographic attributes and behavioral risk factors. Feature importance analysis identified chronic disease burden, functional limitations and socioeconomic characteristics as key contributors to mental health risk prediction.

Conclusion: Artificial intelligence driven models provide a robust and scalable framework for mental health risk stratification in older adult populations. Integrating such approaches into clinical and public health systems may enhance early identification and support precision-oriented mental health interventions.

Keywords: *Artificial Intelligence, Mental Disorder, Machine Learning, LASI, India*

A Comparative Study of Anthropological Metrics in Normal, Diabetic, and Diabetic Nephropathy subjects visiting Central Referral Hospital

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Abstract

Background: Diabetic Mellitus is one of the major health concern in the most part of the world. It is characterized by chronic hyperglycemia. Prolonged progression of type 2 diabetic mellitus (T2DM) leads to microvascular complication and represents the cause of end stage of kidney disease. The study assessed a comparative questionnaire -based association of anthropological metric in diabetic patients with T2DM.

Methods: A total of 90 participants that were divided in three groups of 30 Normal, 30 T2DM and 30 diabetic nephropathy with T2DM (mean age of 53.4). A questionnaire-based study was conducted to collect data on demographic characteristics, diet, substance abuse (smoking, tobacco, alcohol) and the relationship of these data with the diabetic nephropathy in T2DM.

Results: Out of 90 patients 44 were females and 46 were males, and the estimated mean age 53.46 year. In total 19 subjects were smokers who smoked 4.8 cigarettes per day on average. 26 subjects were addicted to tobacco and used to take tobacco 1-5 times per day, Total 33 subjects were addicted to alcohol.

Prolonged exposure to T2DM remains a major factor for diabetic nephropathy. In this study, it was found that patients with diabetic nephropathy had a history of average 15.17 years T2DM.

Conclusion: The study provides a data regarding the relationship between the diet, substance use (smoking, alcohol, and tobacco), duration of T2DM association with diabetic nephropathy. The study highlights the importance of management of diet and substance use in T2DM patients.

Keywords: *Type 2 Diabetes Mellitus, Diabetic Nephropathy, Smoking, Alcohol, Tobacco*

Prevalence of multidrug-resistant *Escherichia coli* in urine samples and its antibiotic spectrum and biofilm formation in a tertiary care hospital Sikkim.

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Abstract

Background & objectives: Multidrug-resistant (MDR) *Escherichia coli* are one of the major cause of persistent and recurrent infections. Biofilm formation is an important virulence factor that enhances bacterial survival and contributes significantly to antimicrobial resistance. This study was undertaken to isolate MDR *Escherichia coli* from urine sample, determine their antimicrobial susceptibility patterns and evaluate the role of biofilm formation in drug resistance.

Methods: A laboratory-based descriptive study was conducted in the department of Microbiology of a tertiary care hospital of Sikkim. *E. coli* isolates recovered from urine specimens were identified by standard microbiological and Vitek2 compact machine. Antimicrobial susceptibility testing was performed using the Vitek2 compact machine and interpreted according to Clinical and Laboratory Standards Institute (CLSI) guidelines. Multidrug resistance was defined as resistance to at least one agent in three or more antimicrobial classes. Biofilm production was assessed using the tissue culture plate (TCP) method, congo red agar method and tube method and categorized as weak, moderate or strong biofilm production.

Results: A total of 188 MDR *E.coli* isolates were collected in the study. High resistance was observed to commonly prescribed antibiotics such as third-generation cephalosporin and fluoroquinolones. Biofilm formation was observed in MDR *E.coli* isolates, with strong biofilm producers 9(4.8) % demonstrating significantly higher resistance rates compared to moderate 30 (15.97%), weak and non-biofilm-producing 149(79.2%) isolates. Strong biofilm-forming isolates demonstrated higher resistance rates to multiple antibiotic classes.

Interpretation & conclusions: The study highlights a high prevalence of multidrug-resistant *E. coli* with strong biofilm-forming ability, contributing to antimicrobial resistance and recurrent urinary tract infections. Routine screening for biofilm production along with antimicrobial susceptibility testing may aid in improved therapeutic decision-making and effective infection control strategies.

Keywords: *Biofilm Formation, Multidrug Resistance, Escherichia Coli, Antimicrobial Susceptibility, Tertiary Care Hospital*

Ethnic differences in Spirometry Parameters and Body Fat% in Young healthy Sikkimese and Non- Sikkimese adults in India- A Cross-Sectional Study

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Abstract

Background: Most pulmonary function laboratories in India use prediction equations for normal values based predominantly on populations of European descent, North Indian adults, North Indian children and South India children. The present study was undertaken to investigate the ethnic differences in Body Fat % and Pulmonary Function Parameters in young healthy adults of Sikkimese and Non-Sikkimese descent in India, using the same equipment for all subjects.

Methods: A cross-sectional study was conducted in the Department of Physiology, Sikkim Manipal Institute of Medical Sciences, Gangtok, Sikkim between June and December 2024. A total of 200 participants were considered as the sample size. The outcome measures of interest were the demographic information (age, gender), anthropometric parameters (height, weight, waist and hip circumference) and pulmonary parameters (FVC, FEV1, FEV1/FVC, PEFR and FEF 25-75%).

Results: A total of 163 participants' information were analysed after removing incomplete data. The age of the participants ranged between 18-29 years. Altogether there were 64 male and 99 female. Among the 163 participants, 92 belonged to the ethnic Sikkimese group and 77 belonged to the non-Sikkimese group. There were no significant differences in anthropometric and pulmonary function parameters between male and female. Comparison of the means reflect that there was no significant difference in the anthropometric as well as pulmonary function parameters ($p>0.05$).

Conclusion: This study result concluded that there were no significant differences in pulmonary function parameters among young healthy adults of Sikkimese and Non-Sikkimese descent in India.

Keywords: *Pulmonary Function, Ethnicity, Students, Sikkim*

Exploring Creativity, Personality, and Mental Health among Writers and Musicians of Sikkim: Focus Group Insights

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Abstract

Creative artists have long been associated with having mental health problems and stereotyped to have introverted or reserved personality. History, media and literature records numerous instances of creative artists succumbing to depression, committing suicide and engaging in alcoholism and substance abuse. While many studies seem to confirm these associations, others seem to contradict them. Therefore, the present study aims to explore the creativity patterns, personality attributes and mental health status among the creative artists, mainly among the writers and musicians of Sikkim.10 creative artists-5 writers and 5 musicians were chosen based on the inclusion exclusion criteria, through purposive sampling for a focused group discussion. The participants extensively discussed and explored a set of predetermined questions and topics based on the research questions. Most participants reported to have had an inclination towards writing or music since their childhood and most seemed to also have a source of inspiration. Early engagement and exposure led them to take up the art form as a part of their career. Most considered their art work to be a form of an expression as well as a form of therapy and all agreed that creating music and writing makes them happy and relaxed. In terms of personality, 50% of the participants described themselves to be introverts and 50% to be extroverts. Some female participants reported facing female-centric issues which impacted their creative profession in one way or another. The findings of the study indicate the importance of early exposure as well as presence of source of inspiration and encouragement in further development of creative skills. It further suggests that art can be a form of expression and therapy boosting the mental health of the creative artists.

Keywords: *Creativity, Personality, Mental Health, Writers, Musicians, Artists.*

Network-Based Analysis of Host Gene Interactions Associated with Dengue Virus NS5 Protein

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Abstract

Dengue Virus (DENV) infection is a major global public health concern particularly in tropical and subtropical regions, causing a wide spectrum of clinical manifestations ranging from mild fever to severe dengue hemorrhagic fever and dengue shock syndrome. Despite extensive research, effective antiviral therapies against dengue remain limited, highlighting the need to better understand virus-host interactions at the molecular level. Among the viral proteins, nonstructural protein 5 (NS5) is the largest and most conserved DENV protein and is essential for viral replication, RNA capping and immune evasion. NS5 is also known to interact with multiple host factors, particularly those involved in innate immune and interferon signaling pathways, thereby facilitating viral survival and pathogenesis.

In this study, a network-based systems biology approach was employed to investigate host genes interacting with DENV NS5. NS5-associated host genes were retrieved from the GeneCards database and subjected to protein-protein interaction analysis using the STRING database. The resulting interaction network was visualized and analyzed in Cytoscape to identify key regulatory hub genes through topological analysis based on network centrality parameters. Hub gene analysis revealed STAT1, IFNG, IRF3, IFNB1, IFNA1, TLR3, IFIH1, STAT2, IL10, and DDX58 as central nodes, indicating their critical roles in antiviral immune responses. Further cluster analysis using the MCODE plugin which is an algorithm that detects functional protein complexes identified STAT1 as a highly connected confident core gene. Although NS5 primarily targets upstream components of the interferon pathway, the network analysis highlights STAT1 as a critical downstream mediator affected by NS5 activity, this suggests that STAT1 represents a putative host-directed therapeutic target. Overall study demonstrates the utility of network-based approaches in identifying key host factors involved in dengue virus pathogenesis and provides a foundation for future experimental validation.

Keywords: *Dengue Virus, NS5, GeneCards, STRING, Cytoscape, MCODE, STAT1*

Demographic challenge in the Eastern Himalayas: An Analysis of Declining Fertility in Sikkim with Special Reference to Unmarried Men and Women

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Abstract

This paper investigates the fundamental cause of declining fertility among unmarried women and men in state of Sikkim, India with special focus on the expected number of children, after married they want to bear. Fertility decline has become one of the important issues, where Sikkim has only 1.1 births per women which is below the replacement rate of 2.1 births per women. With an objective to understand the factors affecting declining fertility in Sikkim through the framework of expected number of children, we conduct the primary survey among 345 unmarried individuals from Gangtok district using purposive random sampling method. Expected number of children, being a count data (0, 1, 2, 3) we use poisson regression method for econometric analysis. The findings of the study highlighted that access to education. Marriage age, financial stability, career aspirations, financial incentives, societal norms, role of healthcare facilities, are significant predictors associated with expected number of children. The findings of this paper contribute for addressing the fertility of Sikkim with special references to the unmarried individuals where it has an important characteristic for the demographic challenge. Sikkim's fertility rate is at alarming stage.

Keywords: *Declining Fertility, Unmarried Individuals, Poisson Regression, Negative Binomial Regression, AIC*

Factors Contributing Household Consumption Expenditure Inequality in India: Decomposition Analysis

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Abstract:

This study aims to examine the determinants of consumption expenditure inequality in India and quantify their proportional contributions to the total explained inequality using the Household Consumption Expenditure Survey (HCES) data for the year 2022-23 collected by the National Sample Survey Office (NSSO) under the Ministry of Statistics and Programme Implementation (MoSPI) government of India. The study applies Field's regression-based decomposition method to the log-linear regression model of per capita monthly expenditure. The model explains about 51% of the variability in the logged monthly consumption expenditure per capita. The findings from the present study revealed that household size, education level, regional variation and rural-urban areas are the most important contributing factors of inequality in the distribution of household consumption expenditure in India. Likewise, social group, household type, religion and gender had lesser contributions to the total explained inequality. However, the age of the household heads has inequality decreasing effects. The findings have significant policy implications, particularly for reducing inequality and improving the standards of living and well-being among population.

Keywords: *Household Consumption Expenditure; Inequality; Regression-Based Decomposition*

Does Organic Dominate Household's Kitchen in Sikkim? A Pilot Study on Organic Food Consumption

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Abstract

Sikkim is globally recognised as India's first fully organic state, symbolising a landmark in sustainable agriculture and environmental policy. However, whether this transformation at the policy and production levels translates into real household behaviour remains uncertain. This pilot study investigates the extent to which local organic products dominate the household kitchens of Sikkim. Data were collected from 23 households across six districts using a mixed-method approach combining structured questionnaires and informal interviews. The analysis revealed high awareness of the Sikkim Organic Mission (SOM) and strong positive perceptions of organic food, primarily due to health consciousness and support for local farmers. Nevertheless, factors such as high price, inconsistent market availability, and moderate trust in certification constrain complete household adoption. The findings suggest that while Sikkim's organic revolution is visible in production, its full reflection in domestic food patterns is still evolving. Policy implications include the need for consumer-side interventions, local market strengthening, and deeper public education on certification and affordability.

Keywords: *Sikkim; Organic Food; Household Behaviour; Local Food System; Food Awareness; Sustainable Consumption*

Rethinking India's Approach to Drug Abuse: Lessons from Portugal's Decriminalization Model

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Abstract

India's current drug policy, overseen by the Narcotic Drugs and Psychotropic Substances Act, 1985, emphasises on supply reduction and punishment. India faces a significant and growing challenge with drug use, with an estimated 70 million individuals affected by substance use disorders. Significantly, in the late 1990s, Portugal faced an explosion of heroin use, an unprecedented opioid epidemic. The drug was causing roughly 350 overdose demises a year and sparked a wave of HIV/AIDS and other diseases linked to shared needles. Portugal's leaders responded by pivoting away from the U.S. drug war model, which ordered narcotics seizures, arrests and lengthy prison sentences for drug offenders. Instead, Portugal focused on health care, drug treatment, job training and housing. Portugal's decriminalization approach, implemented in 2001, offers an alternative model prioritizing treatment and harm reduction. This seminar explores the potential of adapting Portugal's model to India's context.

Keywords: *Drugs, Legislation, India, Portugal.*

Household-Level Dynamics of Food Service Enterprises in Sikkim: Bridging Knowledge for Tomorrow

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Abstract

The food service sector has emerged as an important component of livelihood generation in tourism-dependent hill states such as Sikkim. This study examines the household-level dynamics of food service enterprises in Sikkim with the objective of understanding income determination, financial inclusion, and key operational characteristics. Using primary data collected from 200 households engaged in food service activities in and around Gangtok, the study employs descriptive statistics and multiple regression analysis to analyse the socio-economic profile of households, income and employment patterns, savings behaviour, access to credit, and major constraints faced by enterprises. The analysis reveals that most food service enterprises are small, family-run units characterized by modest income levels, limited savings, high dependence on family labour, and significant seasonal fluctuations driven by tourism demand. The regression results indicate that capital investment has a positive and marginally significant effect on household food service income, while financial inclusion, labour input, experience, and gender of the household head do not exhibit statistically significant impacts. These findings suggest that access to credit alone is insufficient to enhance enterprise performance without effective utilization and adequate capital support. The study highlights the subsistence-oriented nature of household food service enterprises and the need to bridge knowledge, financial, and capacity gaps through targeted policy interventions. Strengthening capital access, improving skill development, and promoting enterprise-oriented financial support are essential for enhancing the sustainability and growth of household-level food service enterprises in Sikkim.

Keyword: *Household Food Service Enterprises; Financial Inclusion; Livelihood Dynamics*

Beyond Secular Mindfulness: Dispositional Mindfulness and Emotion Regulation within a Culturally Embedded Buddhist Context

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Abstract

Objective: Contemporary mindfulness research has disproportionately prioritized Western, secular frameworks, often side-lining the ethical and soteriological roots embedded in Buddhist traditions. Departing from this dominant trajectory, the present study examines the relationship between dispositional mindfulness and emotion regulation strategies within a culturally rooted Buddhist community in Sikkim, India—a setting where mindfulness manifests as an integral, lived spiritual practice.

Method: This cross-sectional study enrolled 113 self-identified Buddhist practitioners from Sikkim, India (mean age = 28.88 years; 47.8% male, 52.2% female). Participants were divided into two groups based on meditation experience: less experienced (≤ 1 year; $n = 80$) and more experienced (> 1 year; $n = 33$). We administered validated measures, including the Emotion Regulation Questionnaire (ERQ) for emotion regulation and the 15-item Five Facet Mindfulness Questionnaire (FFMQ-15) for dispositional mindfulness. To evaluate the hypotheses, we conducted facet-level regressions, independent-samples *t*-tests, linear regressions, and Pearson correlations.

Results: Dispositional mindfulness was found to have a positive correlation with cognitive reappraisal ($r = .328$, $p < .01$) and a negative correlation with expressive suppression ($r = -.217$, $p < .05$). Dispositional mindfulness also emerged as a significant predictor of emotion regulation strategies. Experienced meditators reported higher levels of dispositional mindfulness ($M = 141.69$ vs. 129.03, $t = -3.985$, $p < .001$). Facet-level analyses reported unique contributions of mindfulness facets to the overall model.

Conclusions: These findings affirm that mindfulness, embedded within its traditional Buddhist context, fosters adaptive emotion regulation and interpersonal harmony, consistent with core teachings on *karuṇā* (compassion), *mettā* (loving-kindness), and discernment of *anattā* (non-self). Integrating Buddhist philosophy with Western psychological paradigms positions mindfulness as a comprehensive pathway to emotional insight, transcending its portrayal as merely a secular cognitive tool. By situating mindfulness within its profound existential and ethical origins, this research aligns empirical psychology with Buddhism's soteriological aim of alleviating *dukkha*—suffering—through the cultivation of wisdom, compassion, and mindful awareness.

Keywords: *Dispositional Mindfulness, Emotion Regulation, Cross-cultural Psychology, Traditional Context*

The 2023 GLOF in the Eastern Himalayan State of Sikkim in India: Disaster Dynamics and Socio-Economic Impacts on Affected Communities

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Abstract

The Himalayan state of Sikkim is highly vulnerable to natural hazards due to its fragile terrain, active tectonics, and rapidly changing climatic conditions. Among these hazards, Glacial Lake Outburst Floods (GLOFs) have emerged as a serious threat in recent years. The Glacial Lake Outburst Flood of October 2023, originating from South Lhonak Lake, stands out as one of the most devastating disasters in the state's history. This paper examines the impacts of the 2023 GLOF on communities and regions across Sikkim, with particular focus on the socio-economic, environmental and infrastructural consequences. Using secondary data from government reports, disaster management authorities, media sources, and field-based observations where available, the study analyzes the spatial extent of damage and the differential impacts on affected regions, especially in North, East, and South Sikkim. The findings reveal extensive loss of human lives, displacement of local populations, destruction of critical infrastructure such as roads, bridges, hydropower projects and severe disruption of livelihoods dependent on agriculture and tourism. Environmentally, the flood altered river courses, triggered landslides and intensified ecological instability along the Teesta River basin. The current study highlights gaps in early warning systems, preparedness, and disaster response mechanisms, while also emphasizing the increasing influence of climate change on glacial dynamics in the Eastern Himalayas. It concludes by stressing the need for improved monitoring of glacial lakes, community-based disaster preparedness, and integrated risk reduction strategies to mitigate future GLOF-related disasters in Sikkim.

Keywords: *Sikkim, Natural Disasters, GLOF, Landslides, Climate Change, Disaster Risk Reduction, Himalayan Vulnerability, Psychological Impact.*

Parenthood beyond Heteronormativity: A Comparative and Constitutional Study Of LGBTQIA+ Parenthood

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Abstract

The recognition of sexual orientation and gender identity as intrinsic aspects of human dignity under Indian Constitutional Law marks a significant advancement in LGBTQIA+ rights jurisprudence. However, this constitutional progress has not translated into equal access to family-making institutions, including adoption. India's adoption framework- governed primarily by Juvenile Justice (Care and Protection of Children) Act, 2015 and Adoption Regulations, 2022 issued by the Central Adoption Resource Authority- continues to operate on heteronormative assumptions of family and parenthood, thereby excluding or marginalising LGBTQIA+ couples. This research undertakes a constitutional and comparative analysis of adoption rights for LGBTQIA+ couples in India. It critically examines whether such exclusion is compatible with Articles 14, 15 and 21 of the Constitution of India, particularly in light of evolving jurisprudence on equality, dignity, privacy, autonomy and family life. The study engages with landmarks Supreme Court judgements such as Navtej Singh Johar v. Union of India, Justice K.S Puttaswamy v. Union of India, Shafin Jahan v. Asokan K.M, Deepika Singh v. Central Administrative Tribunal, and Supriyo v. Union of India, highlighting the tension between constitutional morality and legislative inertia. Through a comparative study of select foreign jurisdictions that recognize LGBTQIA+ adoption, the paper demonstrates that recognition of such adoption is compatible with child welfare principles and international human rights standards. The study argues that the continued exclusion of LGBTQIA+ couples from adoption lack constitutional justification and undermines the best interests of the child by arbitrarily narrowing the pool of prospective adoptive parents. It concludes by arguing for legislative and policy reforms aimed at creating an inclusive adoption regime consistent with constitutional values, international human rights and child-centric principles.

Keywords: *LGBTQ+ Parenthood; Adoption Rights; Constitutional Law; Equality and Dignity; Comparative Legal Analysis.*

Spatio-temporal dimension of soil moisture based agricultural drought in Assam

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Abstract

This study attempted assessment of soil moisture based agricultural drought across the paddy growing seasons in Assam, through the lens of district level data extracted from NASA Prediction of Worldwide Energy Resources for the period 1981-2024. The Standardized Soil Moisture Index was used for spatio-temporal analysis of agricultural drought in the state. The results showed a pronounced regional and seasonal heterogeneity in the spatial distribution of drought frequency across Assam, with frequent drought events consistently occurring in western districts of the state. Season-wise analysis revealed that drought occurrence intensified during the summer paddy season, while autumn and winter paddy seasons showed comparatively localized and moderate drought frequencies, indicating strong seasonal control on agricultural drought risk. The western districts of Assam consistently experienced higher drought frequencies across paddy growing seasons, whereas central and easternmost districts showed relatively lower but seasonally varying drought occurrences. The drought frequencies in southern districts including hill zone become pronounced in summer paddy season.

Keywords: *Agricultural Drought; Soil Moisture; Spatio-Temporal Analysis; Standardized Soil Moisture Index; Assam.*

Factors affecting Upstream and Downstream Environmental Perception towards Large Hydropower Projects in Sikkim: A PCA Approach

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Abstract

Large hydropower projects play a significant role in providing clean energy to the state of Sikkim. However, it has some environmental impacts in both upstream and downstream regions which needs to be studied from the prospectives of the local people. Therefore, this study presents the identification of the factors affecting the environmental perception of the large hydropower projects by the upstream and downstream populations in Sikkim. For this purpose, a sample of 400 respondents was interviewed from the upstream and downstream regions of Teesta Stage-V and Loop Jorethang large hydropower projects situated in Sikkim. It took them 12 and 9 years respectively to complete the project and during that period it brought a lot of change to the environmental setting of the region. Further, the method of principal component analysis (PCA) has been used. We used open-ended and in-depth interview methods to collect primary data from the respondents. A set of 21 variables were used in the primary stage; after a pilot analysis it came down to 12 variables excluding 5 personal variables. These variables were classified as personal and environmental. According to the present study the environmental perception of the riparian community towards the dam was based on change in water quality, increase incidences of water borne diseases, fresh water availability, deforestation, air and noise pollution, erosion and silt risk, effect on wildlife, impact of fish and aquatic life and downstream water flow.

Keywords*: Sikkim, Large Hydropower Projects, Dams, Environmental Perception, Principal Component Analysis*

Non-Therapeutic Brain Computer Interface and the Right to Life: Neuralink's Superhuman Vision under Constitutional Scrutiny

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Abstract

In the present era, technology is advancing at a significant pace. Brain Computer Interface like Neuralink's brain implants, Agentic Artificial Intelligence, Generative Artificial Intelligence etc. which were once considered merely as a subject matter of science fiction is turning into reality and advancing exponentially. Neuralink is a neurotechnology company founded by Elon Musk in 2016, developing implantable brain computer interfaces (BCIs) to connect human brains directly with computers. Neuralink's brain implants once science fiction, now surgical reality raise profound questions about the right to life and bodily autonomy. Elon Musk envisions Neuralink progressing from therapeutic restoration for paralyzed individuals and the blind to Artificial Intelligence (A.I.) enhanced implants offering superhuman cognitive abilities to counter purported existential threat posed by Artificial Intelligence. Elective neurosurgery for such enhancements carries severe risks: hemorrhage, infection, tissue damage, and potentially death. Currently, B.C.I.s like Neuralink's Telepathy demonstrate success in medical contexts, enabling paralyzed patients to control devices through thought. As technology advances, healthy individuals may increasingly seek non-therapeutic implants to transcend human limitations, prompting examination of whether the right to life encompasses such high-risk procedures absent medical necessity. This paper explores the constitutional boundaries of bodily autonomy when personal liberty confronts neurosurgical dangers and broader implications upon Right to Life including but not limited to mental privacy, cognitive alteration, and further access disparities that challenge equality principles. Through doctrinal constitutional analysis, comparative legal perspectives, and regulatory examination, the present paper aims to investigate whether existing Non-Therapeutic Brain Computer Interface is permissible on the touchstone of the fundamental right to Right to Life.

***Keywords**: Neuralink, Right to Life, Bodily Autonomy, Constitutional Law, Super Human, Artificial Intelligence.*

Bridging Tradition and Democracy: The Constitutional Journey of Peaceful Assembly and Association in India

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Abstract

The right to peaceful assembly and association is a fundamental principle of democratic governance, embodying the collective aspect of constitutional liberty. In the Indian context, these rights are not abrupt constitutional endowments nor merely legal constructs; instead, they signify the culmination of an extensive historical process influenced by indigenous civic traditions, colonial oppression, nationalist mobilization, and post-independence constitutional formulation. This paper examines the historical evolution and constitutional development of the rights enshrined in Articles 19(1) (b) and 19(1) (c) of the Indian Constitution through an interdisciplinary lens. The study delineates the progression of collective action from pre-colonial institutions, including sabhas, samitis, guilds, and village councils, through the repressive legal framework of British colonial governance, culminating in the deliberate constitutional recognition of these liberties as fundamental rights. It critically analyses the discussions of the Constituent Assembly, elucidating how historical experiences of oppression influenced the framers' endeavor to reconcile democratic participation with issues of public order, morality, sovereignty, and national integrity. The paper also looks at how the courts have shaped the scope and content of these rights through important decisions, showing how they have grown, shrunk, and come back, especially during and after the Emergency period. It also looks at legal and administrative limits, such as the continued use of Section 144 of the Criminal Procedure Code and security laws. This shows the ongoing conflict between individual freedom and government control. In its contemporary focus, the paper discusses new problems that digital assemblies, internet shutdowns, and technological governance bring up. It says that the meaning of assembly in the Constitution is changing a lot in the digital age. The paper aligns with the conference theme of "Bridging Knowledge for Tomorrow" by integrating constitutional law, history, political sociology, and public policy. It provides insights into the need to reinterpret traditional constitutional freedoms to maintain democratic participation in a changing public sphere.

Keywords*: Right to Peaceful Assembly; Freedom of Association; Article 19 of the Indian Constitution; Constitutional Governance; Digital Assemblies*

Privacy and India's Data Protection Regime

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Abstract

The rapid growth of digital technology and artificial intelligence has significantly transformed the way of individuals live and way of lifestyle. The idea of privacy has evolved greatly over time, adapting to the changing needs of individuals and society. Every individual has a natural inclination to protect their personal space, dignity and sense of independence. In a democratic country like India, the right to privacy has been recognized as a fundamental right under Article 21 of the Indian Constitution, which ensures the right to live and personal liberty. With the growth of Internet it has become very easy to get information about anyone or anything. All the things we do on social media leaves a footprint forever. This digital footprints produce vast amount of data which is often referred as big data, which may be personal or non-personal as well. However, India's Digital Personal Data Protection Act 2023 seeks to establish a proper regulatory framework for the usage of data, but it raises concern about inadequate user control and board exemption granted to the Government of India. India can build a data ecosystem that upholds individual rights while maintaining a proper balance between the state's interest, judicial oversights and legislative safeguards. The paper studies and analyses the aspects of privacy rights and data governance. The paper concludes that while India has taken significant steps towards data protection but the real challenge lies in the harmonizing individual privacy.

Keywords: *Privacy, Data Governance, Individual Interest, DPDP Act, Judicial Interpretation.*

From Borders to Borderlands: Rethinking International Relations through Interdisciplinary Border Studies

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Abstract

The paper tries to emphasize the interdisciplinary perspectives in studying the borders and understanding borderlands. Borders are a critical object of transnationalism. Viewing transnationalism as a liberal strand within International Relations theory, it is contended that international relations scholars and border studies scholars find common ground to sharpen their understanding of cross-border dynamics like on issues such as sovereignty, citizenship, security, trade etc. Moreover, with growing contemporary challenges such as migration, climate changes, trafficking, insurgency and social disparities, identity conflicts etc.; calls for an integrated interdisciplinary approach. The disciplinary, interdisciplinary, and multidisciplinary study of international borders by scholars, which may be viewed as part of new inter and multidisciplinary scholarship, or as a focus on borders within more traditional academic disciplines, reflects a worldwide public awareness of what borders do and mean in the lives of nations and states, as well as in many other organizations, groups, and individuals who reside and work in or traverse borderlands. This paper is an attempt to examine how the multiplicity of borders demands a corresponding multiplicity in methods and theories to understand them. Focusing on the border between India and Myanmar as a case study, the paper offers insights into how multi-disciplinary and interdisciplinary border studies can be. This approach can serve as a foundation for a larger understanding aimed at stressing interdisciplinary dialogues in international studies.

Keywords: *Borders, Disciplines, Issues, International Relations, Borderlands*

The Essence of Himalayan Hospitality: Indigenous Cultural Practices and Community-Based Tourism in Sikkim

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Abstract

Himalayan hospitality in Sikkim draws on indigenous cultural traditions that interweave spiritual, environmental, and social principles. This study analyses hospitality practices among different ethnic groups—Bhutia, Lepcha, and others within Nepalis like Khas (Bahun, Chhetri), Rai, Limboo, Gurung, Magar, Sherpa, Tamang, Kami, Damai, Sarki, Bhujel, Giri, and Sanyasi. The rituals, foods, symbolic performances, and rituals that make up guest–host relationships and reinforce cultural bonds include presenting khadas, ritual cleansing for feet, fumigation with herbs native to the region, group dances for ceremonies, and group feasts. The study also notes the overlap between these traditions and community-based tourism (CBT), assessing its promise for preserving and revitalizing cultural traditions and its danger of commodification. The results are that tourist development that is sustainable, with a foundation in participatory governance and community ownership, is required for preserving the authenticity and dynamism of Himalayan hospitality. By placing hospitality as a living cultural heritage, this article sheds light on its roles in promoting cultural continuity and socio-economic adaptability in Sikkim.

Keywords: *Himalayan Hospitality, Indigenous Traditions, Sikkim, Cultural Rituals, Intangible Heritage, Community-Based Tourism, Sustainable Development*

Motivating and Constraining Factors of Women Entrepreneurs: A Comparative Study of Gwalior and Jhansi – A Working Paper

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Abstract

Entrepreneurship is widely recognized as a key driver of economic growth, innovation, and employment generation. In a developing country like India, where women constitute nearly half of the population, their participation in entrepreneurial activities remains significantly underutilized despite considerable potential. Women entrepreneurship not only contributes to economic development but also serves as a powerful instrument for women empowerment, social inclusion, and balanced regional growth. However, Indian women entrepreneurs continue to face multiple socio-cultural, financial, institutional, and personal barriers that restrict their entrepreneurial participation and growth. This study is a working paper that aims to examine the socio-economic profile of women entrepreneurs in the Gwalior (Madhya Pradesh) and Jhansi (Uttar Pradesh) regions and to identify the motivating factors that encourage women to opt for entrepreneurship as well as the barriers and constraints they encounter. Using a descriptive research design, the study draws on both primary data collected through a structured questionnaire from women entrepreneurs registered with MSME and secondary data from government reports and existing literature. Statistical tools such as chi-square tests, ANOVA, factor analysis, and t-tests are proposed to analyse the data. The study seeks to compare motivational factors and constraints faced by women entrepreneurs across the two regions and to highlight regional similarities and disparities. The findings are expected to provide valuable insights for policymakers, academicians, and development agencies in designing targeted policies, support mechanisms, and training programs to strengthen the women entrepreneurship ecosystem and promote sustainable socio-economic development in Gwalior, Jhansi, and similar regions.

Keywords: *Women Entrepreneurship; Economic Development; Women Empowerment; Motivational Factors; Entrepreneurial Barriers; Regional Disparities; MSMEs; Gwalior; Jhansi; India*

Precarious Lives and Transnational Surrogacy: Exploring the Notion of Precariousness in Amulya Malladi's A House of Happy Mothers

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Abstract

Transnational surrogacy involves the cross-border arrangement where women in countries like India undertake gestational surrogacy for intended parents from wealthier nations, a practice deeply influenced by global economic inequalities and differing national reproductive laws (Pande, 2011). Transnational surrogacy is a concept that has been problematized in the debates of Neoliberal reproductive discourse. The subject-object relationship that is the nexus of transnational surrogacy becomes a site of vulnerability, bio-precariousness, and ethical dilemmas. The present analysis centers on the fictional work *A House of Happy Mothers* (2016) by Amulya Malladi and the bio-precarious lives of surrogate mothers in transnational surrogacy. Assisted reproductive technology appeals to the neoliberal capitalistic society as it commodifies the medical process of infertility without processing the intrinsic system of marginalization and exploitation. Surrogacy as a process asserts that the surrogate is 'Renting her womb', hence is reduced to a vessel, decentering her from the discourse of the humanistic approach. Transnational surrogacy promotes neoliberal economic globalization, and India prior to the Surrogacy (Regulation) Act 2021, had a thriving commercial surrogacy business. This paper will analyze the notion of precariousness that highlights the dehumanization of the subject within surrogacy practice in transnational surrogacy in India. The theoretical framework used to analyze the precariousness of a surrogate will be based on Judith Butler's concept of precarious lives, given in her work *Precarious Life: The Powers of Mourning and Violence (2004).* The paper will call attention to the acts of representation through normative modes of power and their performance of radical effacement.

Keywords*: Transnational Surrogacy, Bio-Precarity, Neoliberal Capitalism, Infertility.*

From Administrative Head to Government Representative': Principals' Experiences with the Aam Aadmi Party's 'Delhi Education Revolution' Program

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Abstract

This research article is an integral part of the qualitative research work conducted in Delhi Government schools that underwent transformation under the Aam Aadmi Party's (AAP) 'Delhi Education Revolution' (DER) in India's capital city of Delhi. This article would shed light on the implementation and experiences of school Principals working under the program. The program introduced several changes concerning Principals' professional lives, including infrastructural development, student-centric policies, curriculum advancement, training programs, increased workload and liability, and vigorous accountability. The majority of respondents do not find the program revolutionary and helpful. I produced the data for this research using qualitative research method with a thoughtful emphasis on in-depth interviews. The findings conclude that while the AAP government executed the program as a revolutionary intervention within the government schools of Delhi, the principals received the program as un-revolutionary concerning the education system and their professional lives.

Keywords: *Qualitative Research; Educational Policy Implementation; Delhi Education Revolution; Principals' Experiences*

Channel Choice in a Traditional Social Enterprise: A Qualitative Single Case Study of Creative Handicrafts Using Robert Stake's Approach

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Abstract

Digital transformation has fundamentally altered how firms design and manage distribution channels, enabling unprecedented access to global markets while introducing new tensions around control, authenticity, and relational dynamics. While extant research has largely examined channel choice through efficiency- and control-based frameworks, relatively little attention has been paid to how traditional social enterprises interpret and negotiate channel decisions within deeply embedded social, cultural, and economic contexts. This study adopts Robert Stake's qualitative single case study approach to explore channel choice at Creative Handicrafts, a women-led handicraft enterprise based in Rampur, India. Drawing on in-depth interviews (n=12), direct observations across production units, exhibitions, and customer interactions, and comprehensive document analysis including sales summaries, One District One Product (ODOP) scheme reports, and promotional materials, the study uncovers a multifaceted interpretive process. Key findings reveal that channel choice is shaped not only by economic considerations such as cost minimization and market reach but also by profound intermediary dependence, the imperative to preserve the social mission of artisan empowerment and cultural heritage, and pervasive fears of brand meaning dilution in commoditized digital marketplaces. Participants narrated channel decisions as moral imperatives rooted in reciprocity and trust, with digital platforms evoking ambivalence: opportunities for scalability juxtaposed against threats to the tactile authenticity of handicrafts. These insights challenge transaction cost economics by foregrounding relational governance and hybrid logics in emerging markets. The findings contribute to channel management literature by illuminating the interpretive, relational, and mission-driven nature of channel decisions, while advancing social enterprise scholarship through a nuanced examination of digital tensions in informal economies. Theoretically, the study proposes a framework of channel authenticity with strategic choice. Managerial implications include hybrid channel strategies that balance growth with mission alignment, and policy recommendations for India & ODOP initiative that emphasizes digital literacy for artisans. This work underscores the value of Stake's method for capturing contextual meanings in qualitative marketing research, offering transferable insights for similar enterprises navigating digital disruption in the Global South.

Keywords: *Channel Choice, Social Enterprise, Handicrafts, Qualitative Research, Robert Stake, Emerging Markets, Digital Transformation, Authenticity*

Adventure Tourism as a Catalyst for Regional Development in the Mountain State of Sikkim, India.

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Abstract

Adventure tourism has become a major factor in the expansion of tourism in mountain areas. It creates jobs, helps the economy diversify, and supports long-term development in the region. Sikkim, India, is a mountain state with a wide range of landscapes, plants and animals, and cultural sites. Adventure tourism activities including hiking, mountaineering, river rafting, and nature-based recreation have been growing steadily in the state. This study focuses on adventure tourism as a catalyst for regional development in Sikkim using secondary data sources like literature review, government official websites. The study's key aims are to examine the possibilities and potential of adventure tourism in Sikkim, investigate its contribution to regional development, and identify critical challenges while offering strategic policy solutions for sustainable growth. The findings indicate that adventure tourism has facilitated regional development in Sikkim by generating employment for residents, supporting small-scale enterprises, enhancing infrastructure, improving accessibility to remote areas, and enhancing the state's profile as a prominent destination for adventure tourism. Government activities relating to tourism promotion, skill development, safety standards, and infrastructure development have further contributed to adventure growth. The study identifies challenges like insufficient infrastructure in remote areas, environmental sensitivity, safety and risk management concerns, seasonality, and a lack of skilled personnel, which restrict long-term sustainability. The paper conclude that adventure tourism is a catalyst for regional development of adventure tourism in Sikkim, if it is supported by sustainable policies and active involvement of stakeholders.

Keywords: *Adventure Tourism, Regional Development, Mountain Tourism, Sustainable Tourism*

Brewing Identity: Legal Issues and Enforcement Challenges in Protecting the Geographical Indication of Darjeeling Tea

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Abstract

Geographical Indications (GIs) play a crucial role in protecting products whose quality and reputation are intrinsically linked to their place of origin. Darjeeling Tea, often referred to as the "Champagne of Teas," represents India's most prominent success story in GI protection. Despite being the first Indian product to receive GI registration, Darjeeling Tea continues to face significant legal and enforcement challenges, particularly in the global marketplace. This paper examines the legal issues surrounding the protection of the Geographical Indication of Darjeeling Tea and critically analyses the enforcement mechanisms adopted by the Tea Board of India at both national and international levels. It explores the problem of widespread misuse, counterfeiting, and mislabelling of Darjeeling Tea in foreign jurisdictions, highlighting jurisdictional barriers, high litigation costs, and inconsistencies in international GI protection regimes. The study further evaluates the role of international instruments such as the TRIPS Agreement in addressing these challenges and assesses the effectiveness of existing legal frameworks. By analysing key global disputes and enforcement strategies, this paper underscores the gap between legal recognition and practical protection of GIs. The research concludes by offering policy-oriented recommendations to strengthen cross-border enforcement and enhance the credibility of Darjeeling Tea's GI, thereby preserving its economic value, cultural heritage, and global identity.

Keywords: *Geographical Indications (GI); Darjeeling Tea; GI Protection; International Enforcement; Intellectual Property Law*

Politico-Administrative machinery and their presence: The Context of Celebratory Ceremonials

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Abstract

The present work, which is part of the research conducted in a small town of Mirzapur, seeks to explore the nature of political and bureaucratic presence in the everyday life of society. It seeks to do so by focusing on the public celebration of various kind of festivals and lays bare not only the nature of such interplay between politico-administrative machinery and festivals but also the complexities, notions, nature of such celebratory ceremonies. The work is descriptive in nature with symbolic interactionism as the theoretical framework and for the purposes of data collection ethnographic method was used as part of which the researcher stayed in the field for a period of 05 and a half months. The techniques of data collection included extensive observation, and some open-ended interviews. The major findings of the work point to the culturally rich space of the small town of Mirzapur highlighting its dynamism, buoyancy and effervescence. The cultural aspect of the place also highlighted its particularistic, local character along with its connection to larger normative domains. The presence of politico-administrative machinery was shaped by the spatial distribution of religious devotees in different festivals and differed according to the contexts of celebrations. Overall, it remained present as a supervising authority but at the same time with limited overt bearing.

Keywords: *Politico-Administrative Machinery, Celebratory Ceremonials, Symbolic Interactionism, Ethnographic Study, Cultural Dynamics of Small Towns*

Eco-conscious ELT and Critical Language Pedagogy

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Abstract

The escalating ecological crisis has prompted educators in all fields to re-examine the ethical, social, and pedagogical implications of teaching. In this regard, English Language Teaching (ELT) can no longer be pedagogically neutral or environmentally scapegoat-like. This paper discusses the incorporation of environment-friendly ELT and Critical Language Pedagogy (CLP) as a paradigm shift in the instruction of ecological awareness, critical literacy, and social responsibility among the learners of the language. Eco-ELT speculates the ecological aspects of language education, eco-ethos, and eco-discourse in ELT education, whereas CLP focuses on power dynamics, ideological criticism, and learner control in language education. The paper is based on the theoretical perspectives of eco-linguistics, the pedagogy of the oppressed, and applied linguistics and explains how eco-oriented texts, dialogic classroom practice, and problem posing pedagogies allow students to challenge the power of anthropocentric texts and hegemonic discourses of the socio-economy woven in the use of language. The paper hypothesizes that ecological issues and practices of critical pedagogy should be combined in order to positively influence linguistic competence and contribute to an ethical approach to the environmental problems of the world. It also emphasizes teachers as the facilitators of critical inquiry that can mediate the discussion of climate justice, sustainability, and relationships between humans and nature via ELT. This methodology promotes transformative action, reflective thinking and participatory learning by placing language learning in ecological contexts that are real-world. This paper is concluded by stating that eco- focused ELT based on Critical Language Pedagogy provides a socially responsive and pedagogically pertinent paradigm of language education in the Anthropocene, which helps to produce environmentally responsible and critical-minded global citizens.

Keywords: *Eco-Conscious ELT, Critical Language Pedagogy, Eco Linguistics, Sustainability, Critical* Literacy, *Environmental Education, Language Education*

Understanding Institutional Care and Elderly Well-Being: A Qualitative Analysis of Secondary Evidence

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Abstract

The rising use of institutional care, especially the old age homes, has brought about the rising scholarly and policy concerns regarding the quality of life of elderly citizens living in these environments. In the present paper, the author presents an institutional care and quality of life among the elderly people using a qualitative viewpoint of secondary data analysis based on the current empirical data, state reports and policy documents about old age homes and the well-being of the elderly. The research design is a secondary data analysis (qualitative) using thematic analysis to summarize the results on the selected literature with national and international sources. The main themes that arise in the course of the analysis can be arranged as follows: social interactions and interconnectivity, emotional health, autonomy and independence, health care assistance, and engagement and participation opportunities within an institutional context. According to the literature reviewed, though old age homes offer necessary physical support and safety, the elderly tend to find it difficult to deal with loneliness, emotional vulnerability, loss of autonomy, and poor social integration. The paper proposes that the quality of life in institutional care is not only conceivable in the context of material or medical assistance but should also be supplemented with psychosocial and emotional aspects of quality of life. This paper is a summation of various studies providing a holistic qualitative view of the experience of the elderly in institutional care. The results highlight the relevance of the person-centered and dignity-based models of care in enhancing the quality of life of elderly people living in old age homes. The research can contribute to the understanding of the researchers, policy makers, and care providers to consolidate the institutional care systems of the ageing population.

Keywords: *Elderly Well-Being, Institutional Care, Old Age Homes, Quality Of Life, Qualitative Secondary Analysis, Senior Citizens.*

The Role of Environmental Law in Promoting Sustainable Development

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Abstract

Environmental law plays a crucial role in shaping development that is both economically beneficial and environmentally responsible. Sustainable development focuses on fulfilling present needs without compromising the availability of natural resources for future generations. Environmental laws regulate activities that contribute to pollution, deforestation, climate imbalance, and resource depletion. By prescribing legal duties, standards, and penalties, these laws help prevent environmental harm and promote the sustainable use of natural resources. Environmental law also acts as a bridge between economic growth and environmental protection. It guides governments, industries, and communities towards environmentally sound practices and ensures accountability for ecological damage. Legal mechanisms such as environmental impact assessment, pollution control regulations, and conservation measures help reduce long-term environmental risks. Therefore, environmental law functions as an essential legal framework for achieving sustainable development while safeguarding ecological balance.

Keywords: *Environmental Law, Sustainable Development, Natural Resource Conservation, Environmental Protection, Environmental Governance*

When Religion Is Philosophy, And Philosophy Is History, and History Is Literature: Exploring Buddhist Transmission beyond the Confines of Methodology and Approaches

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Abstract

Buddhism, has most often been misperceived and misinterpreted as a school of philosophy or a religious system only. The academic engagement with Buddhism, has, for almost all of the cases, involved a conventional linear approach related to its doctrinal study, thereby overlooking the intricacies and nuances of its continued and ever-evolving interface with indigenous socio-cultural trends, literary tendencies, traditional customs and intellectual thought processes in regions to which it was transmitted. The study in this paper draws due attention to those very complex processes, factors and agents, machinations and mechanisms that led to the dissemination and subsequent assimilation of Buddhism from the land of its origin (India) to regions, far and distant (South and Southeast Asia, Central and east Asia, Europe and the Americas), thereby underscoring that a serious academic exercise of this stature could eventually open up a wide arena of critical inquiry that would navigate across disciplines, approaches, methods and tools. The statement of the research problem here proposes that the phenomenon of Buddhist transmission across the globe brought about significant changes in the intellectual, spiritual, material, cultural and economic landscape of the spaces into which Buddhism percolated through the natural processes of acculturation and assimilation, as becomes obvious from historical evidences validating the trading of religious items and reliquaries, of political and diplomatic negotiations having been carried out between various geo-political spaces through the efforts of monks and missionaries, royals and envoys, and of intellectual sharing and cultural borrowing of varied elements of everyday human life at the individual and community level through free flow of customs and traditions across the porous bordering regions. The study plans to utilize a qualitative approach and employ research methods in history and historiography, cartography, religious and transcultural studies. The objective of the research initiative centers around the creation of a comprehensive understanding of the historical processes of human interaction and interchange, and identifying the areas of convergence between religion, philosophy, history, literature and culture.

Keywords: *Buddhist Transmission, Acculturation, Assimilation*

A Study on the Environmental Implications of War and Military Technology on Climate Change

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Abstract

The paper intend to examine the most renowned challenge our globe is facing today that is Climate change and War. Climate change refer to long term shifts in temperature and weather patterns. Such shifts can occurred naturally or due to human activities. It threaten our ecosystem, human security and sustainable development. In the era of climate fluctuation, a major contributor of anthropogenic activities in the environment remains undocumented: war and the military industrial complex. The war and military warfare is also a huge emitter of global greenhouse gases. The environmental impact of wars begins long before they do. Building and sustaining military forces consumes vast quantities of resources. War inflicts significant, enduring environmental harm, impacting landscapes, ecosystems, biodiversity, and essential resources. Contemporary warfare not only incurs human fatalities but also inflicts enduring climatic and environmental damage that may last for decades or even millennia. The human cost of war is commonly recognized, although the ecological devastation is frequently neglected, despite its significant, enduring impact on the planet's capacity to support life. Further the author will also explore the carbon footprint of contemporary military high-tech weapons, its manufacturing and production, armed force mobilization and post conflict restoration, marking the contradiction between national security goals and global environmental sustainability. Finally, the study advocates for international collaboration and zero environmental degradation in postwar countries to address the hazards of war and its implications for climate change.

Keywords*: Climate Change, War and Armed Conflict, Greenhouse Gas Emission, Environmental Degradation*

Methods of Productivity Measurement in Aquaculture: A Review of Empirical Approaches

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Abstract

Quantifying productivity is a *conditio sine qua non* for empirical analysis in several research fields. The identification of the measure that best fits the specific goals, while being data-driven, is currently complicated by the array of methodologies available. Empirical studies in aquaculture have employed a variety of methods to measure productivity. This paper reviews and synthesizes the major methodological approaches used in the literature to measure productivity in aquaculture. The review classifies existing methods into partial productivity measures, total factor productivity indices, and frontier-based approaches. Special emphasis is placed on parametric techniques such as Stochastic Frontier Analysis and non-parametric methods, including Data Envelopment Analysis, which are widely applied in aquaculture studies. The review emphasizes that no single method is universally superior and suggests that the choice of productivity measurement technique should be informed by research objectives, data availability, and production conditions.

Keywords: *Aquaculture; Productivity Measurement; Stochastic Frontier Analysis; Data Envelopment Analysis*

Impact of Artificial Intelligence on Management Practices

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Abstract

The rapid advancement of Artificial Intelligence (AI) has significantly transformed contemporary management practices across organizations worldwide. In an era characterized by globalization, digitalization, and intense competition, organizations are increasingly adopting AI- driven technologies to enhance efficiency, effectiveness, and strategic responsiveness. Technologies such as machine learning, big data analytics, robotic process automation (RPA), natural language processing, and intelligent decision-support systems are reshaping core managerial functions, including planning, organizing, decision-making, controlling, and human resource management. By processing vast volumes of structured and unstructured data, AI systems generate real-time insights, predictive capabilities, and enhanced analytical accuracy, thereby improving the quality and speed of managerial decisions. This study examines the growing impact of AI on management practices by analyzing its influence on operational efficiency, strategic planning, resource optimization, performance management, and organizational innovation. AI-driven tools support data-driven decision- making, automate routine managerial tasks, reduce human error, and facilitate predictive planning and forecasting. In operations management, AI improves process optimization, supply chain coordination, quality control, and cost management through advanced analytics and automation. In strategic management, AI assists managers in scenario analysis, market intelligence, competitive analysis, and long-term planning. The research also explores the expanding role of AI in human resource management. AI-based systems are increasingly used in recruitment, resume screening, candidate matching, and predictive hiring analytics, improving efficiency and reducing time-to-hire. AI-powered learning platforms support personalized training, skills assessment, and continuous employee development, while data-driven performance appraisal systems enhance objectivity in evaluations. Despite its benefits, AI adoption raises challenges including ethical and privacy concerns, data security risks, algorithmic bias, and potential workforce displacement. The study concludes that AI complements rather than replaces managerial judgment, enhancing decision-making, innovation, and organizational performance in the evolving digital economy.

Keywords: *Artificial Intelligence (AI), Management Practices, Decision-Making, Human Resource Management, Organizational Performance.*

Exploring Heritage: Indian Traditional Footwear Design and the Bridging of Craft Knowledge

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Abstract

The ingenuity, cultural value and perception of materials passed down through the generations in Indian traditional handcrafted footwear like Kohalapuri chappal, Jutti, Mojari, Paduka and Khadau is on display. The widening industrialisation, the changing tastes in consumers and the broken gearing systems are also reasons that are leading to the losing utilities of these ways. All these are contributing towards the increased rate at which tacit knowledge of skills in people are being lost. This paper is aimed at researching on the evolution of traditional Indian footwear and the features that make them unique compared to other footwear. Besides it, the paper talks of the integrated information systems and key manufacturing processes. It also gives a structure into which the history of shoes can be related to the modern design education, online records, and creative business models which include partnership-cantered practices. The article states that artisans are the holders of information and co-creators who help to promote new forms of doing things according to the tradition. These new methods are valuable not only in enabling craftspeople to earn a living, but also to other aspects of making traditional footwear more acceptable with the current fashion and design. Through craft studies, design thinking, and socio-economic models of diversified disciplines, it can be achieved to enable the process of creating future research directions and practical methods that can integrate old knowledge with new opportunities.

Keywords: *Indian Traditional Footwear; Craft Heritage; Indigenous Knowledge; Design Innovation; Cultural Sustainability.*

Designing Communication Training for Breaking Bad News: A Pilot study on AI Chatbot simulation in Indian Medical Education

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Abstract

Training Indian medical students in communication skills, especially breaking bad news, is a challenge that needs to be addressed that is long overdue in medical education. Skills such as breaking bad news that may create workplace violence require proper advanced training. But traditional training methods such as role-plays and observation with senior physicians are commonly used even in current trainings. This pilot paper presents an interdisciplinary communication training framework using an artificial intelligence chatbot to support deliberate practice in breaking bad news, de-escalation skills, and nonviolent communication skills. The interdisciplinary framework based on learning sciences and medical education conceptualizes breaking bad news, de-escalation, and nonviolent communication as learnable communication skills. The AI chatbot is a pilot study on implementing scalable medical communication training, which allows repeated practice with safe exposure to communication training in various clinical settings and provides immediate, structured feedback for improvement. The training design emphasizes an online learning platform for medical students interacting with an AI chatbot trained in concepts such as breaking bad news, de-escalation skills, and nonviolent communication, along with AI simulation integrating the three concepts in a safe environment with immediate feedback on the medical student interactions. The interdisciplinary framework overcomes the limitation of traditional training methods, such as time limitation and limited multiple practice chances, with multiple practice chances and proper structured feedback for communication skill improvement. This paper put forward the idea that in order to improve the medical student's communication skills for their future clinical practices. Especially in the context of communicating BBN and de-escalating violence using nonviolent communication skills to avoid or reduce workplace violence, an interdisciplinary approach is needed to bridge disciplinary knowledge with professional practice.

Keywords: *AI Chatbot Simulation, Interdisciplinary Learning Design, Medical Education, Learning Sciences, Medical Communication Training*.

Determinants of Job Satisfaction among Healthcare Providers: Insights from Qualitative Research

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Abstract

In a demanding profession like health care services, the stress and pressure of work is an inherent part of the profession. Understanding the key concerns related to job satisfaction is crucial creating a congenial work environment for the health care workers and plays a vital role in standards of patient care and reduce attrition. This study sought to investigate the determinants of job satisfaction among different categories of health care workers i.e., doctors, nurses, technicians, physiotherapists, and administrators based on Maslow's hierarchy of needs as a model to understand their experiences.

Method: A qualitative research was carried out in a tertiary care teaching hospital in a state in India. Seven independent focus group discussions (FGDs) were held, each involving members who were of the same professional category. The FGDs included - two for doctors, two for nurses, and one each for technicians, physiotherapists, and administrators. A total of 50 healthcare professionals took part in the seven FGDs. A thematic approach consistent with Braun and Clarke's approach was adopted in recording, transcribing, and analyzing the discussions. Participants' words naturally led to themes to emerge, but attention was also paid to how their experiences mapped onto Maslow's theory. To ensure an assurance of the accuracy and reliability of the study findings, checking back procedures were carried out by some participants.

Outcomes: The dominant themes that emerged from Focus group discussions are: Resource Limitations and Workload, Economic and Job Security, Support and Workplace Relationships, Recognition and Value, Growth Opportunities, etc. While all the groups reported identical problems, there were particular problems faced by certain cadres which were distinctly different.

Conclusion: Briefly, there are numerous unmet needs that medical professionals must navigate, ranging from basic needs such as equitable compensation and adequate staffing to more complicated issues of perceived value and opportunities for professional growth. It is crucial to address both the material and emotional components of their workplace in order to enhance overall job satisfaction.

Keywords*: Thematic Analysis, Focus Group Discussion, Qualitative Study, Healthcare Professionals, Maslow's Hierarchy, Job satisfaction.*

Drying Kinetics of Musleri (*Elaeagnus latifolia*): A Comparative Study of Empirical Drying Model Using Nonlinear Optimization Techniques

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Abstract

Drying is a critical unit operation in food preservation, aimed at reducing moisture content to enhance shelf life, stability, and reduce microbial activity. In this study, the drying kinetics of *Musleri* (*Elaeagnus latifolia*), an underutilized and nutritionally rich fruit native to the Northeastern Region of India, was investigated under controlled hot air oven drying conditions at various temperatures. Moisture ratio (MR) data were recorded at regular time intervals, and empirical drying models including Lewis**,** Page**,** and Henderson and Pabis were applied to describe the drying behaviour. To validate and optimize model fitting, nonlinear regression techniques using the Generalized Reduced Gradient (GRG) solver in Microsoft Excel were employed. The models were evaluated based on statistical parameters such as the coefficient of determination (R^2)**,** root mean square error (RMSE)**,** and chi-square (χ^2)**.** The comparative analysis revealed significant differences in the predictive accuracy of the models depending on the regression method applied. Among the models tested, the Page model exhibited the best fit to the experimental data, particularly under nonlinear optimization using GRG. This study highlights the importance of model selection and optimization technique in accurately characterizing drying kinetics, which is essential for the design and scaling of efficient drying systems for *Musleri* and similar fruits. The findings offer valuable insights for food process engineers, especially those working on the preservation of indigenous and underutilized crops.

Keywords: *Musleri, Drying Kinetics, Nonlinear Regression Techniques, Generalized Reduced Gradient (GRG).*

Impact of Starch-Based Edible Coatings on Quality Retention and Shelf Life of Refrigerated Fish Fillets

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Abstract

Fish and fishery products are highly perishable and have limited shelf life. This study evaluated the effect of starch-based edible coating enriched with lemongrass essential oil (LEO) on the quality and shelf life of grass carp (*Ctenopharyngodon idella*) fillets stored at 4 ± 1 °C. Fillets were coated using the dipping method and analyzed periodically for physical (PLW, colour), chemical (moisture, protein, pH, TVB-N, TBARS), and microbiological (TVC) parameters. Results showed that coated fillets had significantly ($p < 0.05$) lower moisture loss, protein degradation, pH rise, and oxidative rancidity compared to controls. TVC remained below the acceptability limit until day 12 in coated samples, whereas control samples exceeded the limit by day 12 and were acceptable only up to day 8. Overall, the application of starch-based edible coating with LEO extended the shelf life of fish fillets by approximately 4 days compared to uncoated controls. These findings highlight the potential of LEO-incorporated starch coatings as a natural, cost-effective, and sustainable preservation approach for fish and fishery products.

Keywords: *Grass Carp, Fish Spoilage, Starch, Edible Coating, Essential Oil, Shelf Life*

Tea Gardens: A potential Carbon Sink?

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Abstract

Through carbon sequestration in biomass and soils, perennial tea plantation systems present significant potential for mitigating climate change. Quantification of carbon stocks in a representative tea-growing landscape across various tea production systems, such as agroforestry models based on tea and monoculture tea plantations. Measurements of above-ground biomass, soil organic carbon, and shade tree contributions are used to evaluate carbon sequestration, allowing for an integrated assessment of ecosystem-level carbon storage. The findings show that, in comparison to monoculture plantations, tea-based agroforestry systems have higher total carbon stocks due to increased woody biomass and improved soil carbon stabilization. The results demonstrate how climate-smart agricultural techniques can enhance tea estates' mitigation performance while preserving their productive potential. Increased carbon sequestration in tea systems may have co-benefits beyond biophysical results, such as ecosystem. Improved carbon sequestration in tea systems may lead to co-benefits like ecosystem resilience and sustainable livelihoods, which go beyond biophysical results.

Keywords: *Tea Plantations; Carbon Sequestration; Agroforestry Systems; Soil Organic Carbon; Above-Ground Biomass; Land-Based Climate Mitigation.*

Decoding Ecosystem Restoration Efforts in Lachen and Lachung Village, North Sikkim

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Abstract

The state government of Sikkim has classified the Lachen and Lachung hamlets in North Sikkim as an eco-tourism zone due to their stunning, vulnerable alpine Himalayan ecosystem and cultural significance. Both villages, which are separated by more than 100 kilometers, have demonstrated potential patterns of eco-tourism by maintaining a delicate balance between nature and society, driven by their unique socio-political, self-governed administrative structure called Dzumsha (substituting Panchayat). The implementation of various new restrictive as well as progressive policies appears quite feasible. The institution of *Dzumsha* is more communist in nature, as it not only controls local resources communally but also shares and resolves local conflicts and obligations collaboratively. Meanwhile, the detrimental effects of climate change have become a major worry for many people. As a result, single-use plastic has been banned in both valleys, and is being substituted by locally made bamboo water bottles and organically produced bags. Violations of prohibited activities, as well as any environmental harm, or illegal gatherings/distributions of any natural resources without prior sanction of the local monastery and *Dzumsha,* resulted in severe penalties. As a result, the monastery and *Dzumsha* are complementary institutions that exerted absolute power in both settlements. Lachen and Lachung are largely Lamaist Buddhist societies; therefore religious connection with nature worship is clear. In other words, the protection of nature is encouraged and socio-culturally and religiously internalized. Nevertheless, WWF, JICA and the state government are actively working with residents in these two beautiful valleys to save the ecosystem and retain cultural integrity. Thus, the study's goal is to decode the efforts made by people and institutions in Lachen and Lachung to restore the health of the local ecosystem through descriptive research using both primary and secondary data.

Keywords: *Eco-tourism, Dzumsha, Lamaism, WWF, JICA.*

Valorization of Grape Seed Proteins and Proanthocyanidins for Functional and Bioactive Applications

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Abstract

The agro-food processing sector generates significant quantities of waste, estimated at 25–30% of total fruit and vegetable production, predominantly in the form of seeds, peels, pomace, husks, and other lignocellulosic residues. Among these by-products, grape seeds originating from the wine and juice industries have emerged as a promising source of high-value bioactive compounds, particularly proteins and proanthocyanidins (PACs). In response to the projected 200% increase in global protein demand by 2050, growing research interest has focused on plant-based proteins derived from unconventional and sustainable sources. This review critically examines existing literature on the composition, extraction, and functional characterization of grape seed proteins and PACs. Grape seeds contain approximately 13–15% protein, alongside significant lipid and mineral fractions. The review synthesizes findings from key experimental and animal studies demonstrating the antioxidant, anti-inflammatory, cardio protective, and metabolic regulatory effects of grape seed-derived bioactives. Special emphasis is placed on extraction strategies, including pH-controlled alkaline extraction, acid precipitation, and enzymatic hydrolysis, and their influence on protein solubility, emulsifying capacity, foaming properties, and bioactivity. The collective evidence underscores the potential of grape seed valorization as a sustainable approach to converting agro-industrial waste into functional ingredients for food, nutraceutical, and health-oriented applications.

Keywords: *Grape Seed Waste; Proanthocyanidins (Pacs); Plant-Based Proteins; Agro-Industrial By-Products; Protein Extraction; Functional Properties; Bioactive Compounds.*

Unconventional Flaxseed Protein: Extraction, Functional Properties, and Applications in Food Systems

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Abstract

The growing demand for sustainable and alternative protein sources has intensified interest in plant-based proteins that remain underexploited. Among these, flaxseed (*Linum usitatissimum*) has emerged as a promising non-conventional source of vegetable protein. While flaxseed is traditionally processed for oil and dietary fiber extraction, its protein fraction has received comparatively limited attention despite its balanced nutritional composition and favorable functional attributes. Flaxseed proteins exhibit antioxidant and anti-inflammatory activities, suggesting potential health benefits when incorporated into human diets. Their functional characteristics make them suitable for diverse food applications, including bakery products, meat analogues, beverages, and functional foods. The utilization of flaxseed proteins also supports sustainable food production by valorizing oilseed by-products and reducing dependence on animal-derived proteins. To overcome challenges related to anti-nutritional components and sensory limitations, processing approaches such as protein isolation, enzymatic modification, and fermentation have been explored. Overall, flaxseed proteins present significant opportunities for developing value-added food products that enhance nutritional quality, promote food security, and contribute to environmentally sustainable food systems.

Keywords: *Flaxseed Protein; Unconventional Plant Protein; Sustainable Protein Source; Functional Properties; Plant-Based Foods; Food System.*

Scaling Sustainability: A Comprehensive Review of Low-Cost Solar Thermal Integration in Domestic Food Preservation

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Abstract

Food industry has emerged as one of the leading and largest energy demanding industries in the world. However, lack of proper and efficient storage system and preservation techniques have led to enormous amount of food spoilage and wastage leading to massive wastage of fruits and vegetables and rapid deterioration including microbial spoilage by bacteria yeast and molds which grow in moistures and multiply thriving during storage and transportation causing rottening and spoilage. Food and vegetables account and contribute to largest portion of global food wastage of 25%-50% in the supply chain. 30%-40% produce are lost due to proper drying techniques globally. Therefore, drying of food products emerge to be the effective way of preservation reducing postharvest loss making them easier for transportation store and prevent spoilage. Abundant solar energy is available and free of cost. Solar drying is most cost effective, environmental friendly and economically beneficial for preventing food spoilage. A solar dryer is a device which is used to eliminate moisture from crops, vegetables and fruits by absorbs heat energy and ventilation for moisture removal. However only solar dryer is widely available in modern days. Therefore, a multifunctional solar kitchen has been proposed which shall integrate the solar drying with low-temperature boiling, warming and low heating operations. This system combines controlled air circulation and moisture removal and thermal distribution. Its versatile and dual-purpose design not enables drying and also serves cooking functions such as boiling water, warming food and per heating making ideal for kitchen use. This system is developed using heat collector, absorber plates, air circulator DC fan, solar panel, thermal cooking plate integrated with heat transfer plate etc. This solar kitchen assistant is safe, smoke free, and eco-friendly. This approach enhances energy efficiency, reduces conventional fuels and offers a sustainable approach for preservation and cooking techniques.

Keywords: *Spoilage, Food preservation, Solar Energy, Drying , Kitchen- assistant, Low cost, cooking, sustainability, Renewable energy*

Sunflower Seed Proteins as Sustainable Plant-Based Ingredients: Nutritional Value, Functional Properties, and Bioactive Potential

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Abstract

The global transition toward sustainable and nutritionally adequate protein sources has intensified interest in plant-based alternatives, particularly those derived from agro-industrial by-products. Sunflower seeds (Helianthus annuus), predominantly cultivated for oil extraction, generate substantial quantities of protein-rich residues that remain underutilized. This review critically examines sunflower seed protein as a promising plant-based protein source with significant nutritional, functional, and bioactive potential. Sunflower seed proteins exhibit a favorable amino acid profile, good digestibility, and functional attributes, including high solubility, emulsifying stability, oil-holding capacity, gelling ability, and water retention, making them suitable for incorporation into bakery products, protein-enriched foods, and meat analogues. In addition to proteins, sunflower seeds are rich in minerals, phenolic compounds, flavonoids, carotenoids, and residual oils, which confer antioxidant, antimicrobial, and anti-inflammatory activities and support cardiovascular health, immune function, and metabolic regulation. Importantly, sunflower seed proteins provide a hypoallergenic alternative for individual's sensitive to soy or gluten, thereby expanding dietary inclusivity. From a sustainability perspective, the valorization of sunflower seed by-products aligns with circular economy principles by reducing food waste and lowering reliance on animal-derived proteins. Overall, sunflower seed proteins represent a multifunctional, eco-friendly, and nutritionally valuable ingredient with a wide range of applications in the food and health sectors.

Keywords: *Sunflower Seed Protein; Plant-Based Proteins; Agro-Industrial By-Products; Functional Properties; Bioactive Compounds; Sustainable Food Systems*

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